

# SOLAR WIND POWER: GENERATING POWER IN THE FUTURE

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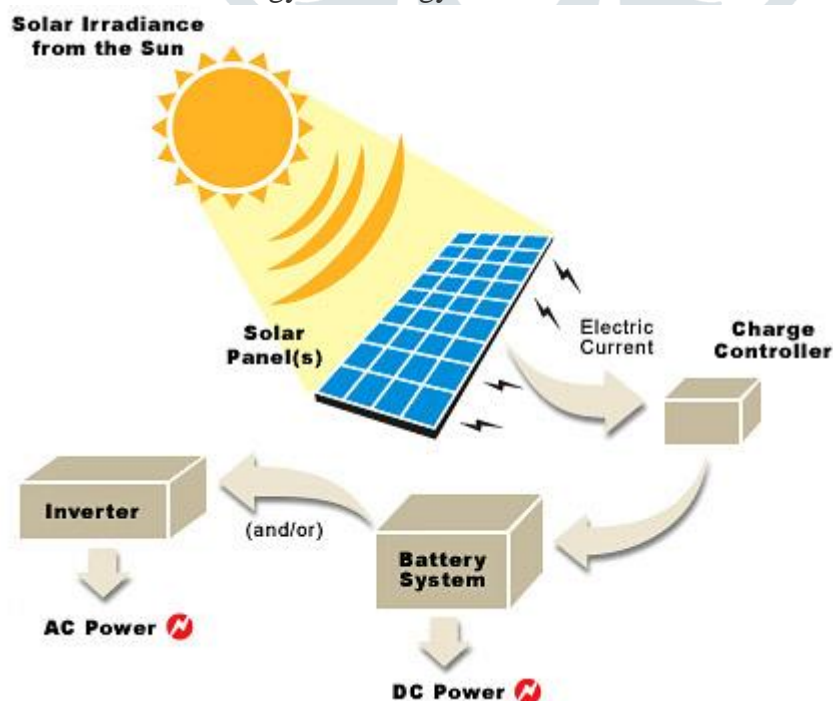
## Abstract:

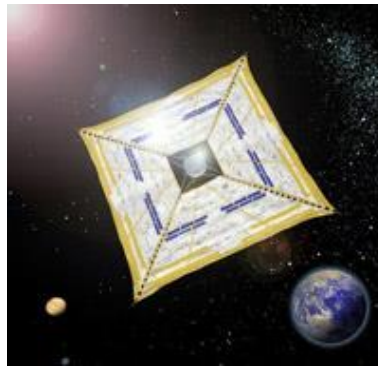
As the world discovers new ways to meet its growing energy needs, energy generated from Sun, which is better known as solar power and energy generated from wind called the wind power are being considered as a means of generating power. Though these two sources of energy have attracted the scientists for a very long time, they are not able to decide, which of the two is a better source to generate power. Now scientists are looking at a third option as well. Scientists at Washington State University have now combined solar power and wind power to produce enormous energy called the solar wind power, which will satisfy all energy requirements of human kind.

Key words: solar, solar energy, solar power, wind power.

## SOLAR POWER

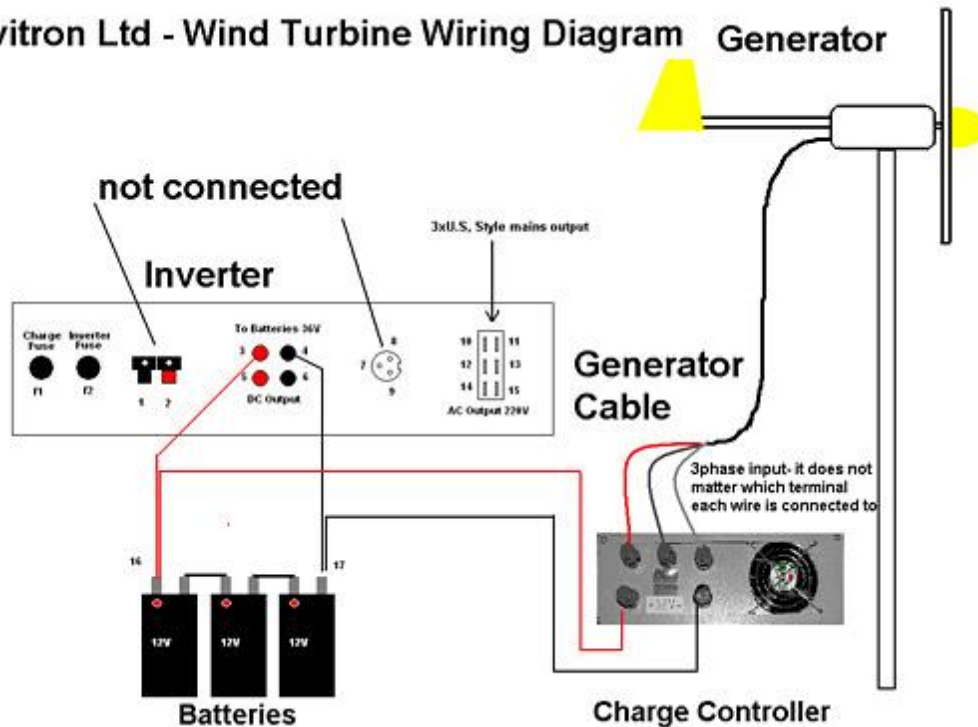
Solar power is produced by collecting sunlight and converting it into electricity. This is done by using solar panels, which are large flat panels made up of many individual solar cells. It is most often used in remote locations, although it is becoming more popular in urban areas as well. This page contains articles that explore advances in solar energy technology.





## WIND POWER

Navitron Ltd - Wind Turbine Wiring Diagram Generator



Wind power is produced by using wind generators to harness the kinetic energy of wind. It is gaining worldwide popularity as a large scale energy source, although it still only provides less than one percent of global energy consumption. The articles listed below explore wind power and its usage around the world.

**Wind energy** is a form of solar energy. **Wind energy** (or **wind power**) describes the process by which **wind** is used to generate electricity. **Wind turbines** convert the kinetic **energy** in the **wind** into mechanical power.

### Could solar wind power Earth?

Where does solar wind come from?

The fast **solar wind** originates from coronal holes, which are funnel-like regions of open field lines in the Sun's magnetic field. Such open lines are particularly prevalent around the Sun's magnetic poles. The plasma source is small magnetic fields created by convection cells in the **solar** atmosphere.



The **solar wind** is a continuous outward stream of particles (mostly protons and electrons) from the sun's hot corona. Energized by high temperatures in the corona, these particles leave the sun at speeds ranging from 200 to 500 miles per second (300 to 800 kilometers per second).

These solar wind particles will take around **two to four days** to reach earth but fortunately our magnetic shield is up to the task and deflects the potentially deadly particles away from the planet.

The **solar wind** is a stream of charged particles (a plasma) released from the Sun. This stream constantly varies in speed, density and temperature. The most dramatic difference in these three parameters **occur** when the **solar wind** escapes from a coronal hole or as a coronal mass ejection.

As we strive to find sources of alternative energy, a number of researchers continue to look to what we consider the ultimate in renewable energy -- the sun. However, on earth creating efficient solar panels remains a challenge. While solar cells have been increasing in efficiency, and while new advances are made in solar technology on earth, there are some looking to harvest solar energy a little bit closer to the source by harvesting energy solar wind.

They move outward toward Earth and the rest of the planets, and provide the potential to power to the entire Earth, according to some researchers. And, even though we refer to the solar wind as "wind", it wouldn't provide energy in the way we see wind turbines act here on earth. Instead, energy from the solar wind would be collected by a gigantic sail deployed in space, between the sun and Earth.

The Sun's outer atmosphere, the super-hot **corona**, is the source of the solar wind, a steady outflow of charged particles from the Sun. These particles have gained enough energy to fill the heliosphere, a region of space that extends well past the orbit of Pluto

Solar wind **affects** the earth by the intense clouds of high energy particles that it often contains which are produced by **solar** storms. When these clouds, called coronal mass ejections, make their way to the **Earth** in 3-4 days, they collide with the magnetic field of the **Earth** and cause it to change its shape.

One proposal has been offered by scientists at Washington State University. Discovery News reports on the specs of a massive solar sail -- and its potential:

*According to the team's calculations, 300 meters (984 feet) of copper wire, attached to a two-meter-wide (6.6-foot-wide) receiver and a 10-meter (32.8-foot) sail, would generate enough power for 1,000 homes.*

*A satellite with a 1,000-meter (3,280-foot) cable and a sail 8,400 kilometers (5,220 miles) across, placed at roughly the same orbit, would generate one billion billion gigawatts of power.*

The real challenge is how to get all that energy back to Earth in order to power the planet. One idea is to use a concentrated laser beam to send the energy back to Earth. Unfortunately, there would be millions of miles between satellite and its earthly target, making it difficult for the laser beam to reach the planet without widening and losing energy.

While it is likely that the solar sail could be built and deployed with current technology, beaming the energy it harvests from the solar wind will take a little more time to figure out. Until then, we will have to be content with solar cells on Earth.

### **Advantages of Solar wind power.**

- The scientists say that whereas the entire energy generated from solar wind will not be able to reach the planet for consumption as a lot of energy generated by the satellite has to be pumped back to copper wire to create the electron-harvesting magnetic field, yet the amount that reaches earth is more than sufficient to fulfill the needs of entire human, irrespective of the environment condition.
- Moreover, the team of scientists at Washington State University hopes that it can generate 1 billion billion gigawatts of power by using a massive 8,400-kilometer-wide solar sail to harvest the power in solar wind.
- According to the team at Washington State University, 1000 homes can be lit by generating enough power for them with the help of 300 meters (984 feet) of copper wire, which is attached to a two-meter-wide (6.6-foot-wide) receiver and a 10-meter (32.8-foot) sail.
- One billion gigawatts of power could also be generated by a satellite having 1,000-meter (3,280-foot) cable with a sail 8,400 kilometers (5,220 miles) across, which are placed at roughly the same orbit.
- The scientists feel that if some of the practical issues are solved, Solar wind power will generate the amount of power that no one including the scientists working to find new means of generating power ever expected.

### **How does the Solar wind power technology work?**

The satellite launched to tap solar wind power, instead of working like a wind mill, where a blade attached to the turbine is physically rotated to generate electricity, would use charged copper wire for capturing electrons zooming away from the sun at several hundred kilometers per second.

### **Disadvantages of Solar wind power**

But despite the fact that Solar wind power will solve almost all the problems that we were to face in future due to power generating resources getting exhausted, it has some disadvantages as well. These may include:

- Brooks Harrop, the co-author of the journal paper says that while scientists are keen to tap solar wind to generate power, they also need to keep provisions for engineering difficulties and these engineering difficulties will have to be solved before satellites to tap solar wind power are deployed.
- The distance between the satellite and earth will be so huge that as the laser beam travels millions of miles, it makes even the tightest laser beam spread out and lose most of the energy. To solve this problem, a more focused laser is needed.
- But even if these laser beams reach our satellites, it is very doubtful that our satellites in their present form will be able to tap them. As Greg Howes, a scientist at the **University of Iowa** puts it, “The energy is there but to tap that energy from solar wind, we require big satellites. There may be practical constraints in this.”

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