

About Solar Panels

Introduction

As far back as the 15th century, Leonardo da Vinci foresaw the need for solar power. (See References 1) Six hundred years later, solar power continues to captivate scientists and consumers, and environmentalists are working hard to find ways to harvest the sun's energy. One way they're doing this is through the use of solar panels, tools that collect solar energy to provide clean electricity.

How It Works

Residential solar panels are the most common use of solar power. Solar photovoltaic (PV) cells consist of positively and negatively charged semiconductor materials, such as silicon, that trap electrons from the sun within an electric field. This energy is transformed into a current when it goes through a device called an inverter. The inverter allows the energy to become an alternating current that can run electrical items in the home. (See References 2 and 3)

The Facts

Most homeowners get their electricity from a local power company that keeps track of how much electricity is used with a meter, located on the outside of the house. As the homeowner uses more solar energy to power his home, the meter will spin more slowly, and the cost of electricity from the power company will be significantly lower. In some cases, the consumer will produce enough solar energy that he will be able to sell the excess back to the power company.

Considerations

While solar panels have generally been lauded as a valuable source of renewable energy, the production of these panels produces certain toxic byproducts that could cause illness, according to the Silicon Valley Toxics Coalition, a solar industry watchdog group. Some of the hazardous byproducts include silicon tetrachloride, dusts and a greenhouse gas called sulfur hexafluoride. (See References 4) However, once solar panels are in place, they do not produce the huge emissions of carbon dioxide that coincide with the production of fossil fuel, which is arguably, the main source of global warming.

Cost

The cost of installing a solar-power system depends on a variety of factors, including the size of the system, location and how much power you intend to generate. According to a consumer guide produced by the National Renewable Energy Laboratory at the time of publication, a five-kilowatt system can be installed for about \$35,000. However, many state and federal tax incentives can decrease the out-of-pocket expense significantly. Depending on where you live, the five-kilowatt system could be reduced to \$12,500 after rebates and tax credits. (See References 5, Page 11)

Future

The relatively high price of installing solar panels may initially keep the industry from gaining a strong foothold in the early part of the 21st century. However, as costs decrease and electricity prices increase, many believe solar power will become more viable. The U.S. International Energy Information Administration expects 30 percent of all U.S. households to have solar panels installed by 2030. (See Resources 1)

Key Concepts

Solar panels
Solar energy

Solar power
Electricity
Green energy
Renewable energy

References

1. Salon: The Technology That Will Save Humanity; Joseph Romm; April 2008
http://www.salon.com/news/feature/2008/04/14/solar_electric_thermal/index.html
2. Science @ NASA Headline News: How Do Photovoltaics Work?; Gil Knier; 2002
<http://science.nasa.gov/headlines/y2002/solarcells.htm>
3. Southface Non-Profit: How Solar Thermal and Photovoltaics Work
http://www.southface.org/solar/solar-roadmap/solar_how-to/solar-how_solar_works.htm
4. Silicon Valley Toxics Coalition: Toward a Just and Sustainable Solar Energy Industry
http://www.svtc.org/site/DocServer/Silicon_Valley_Toxics_Coalition_-_Toward_a_Just_and_Sust.pdf?docID=821
5. National Renewable Energy Laboratory: Own Your Own Power! A Consumer Guide to Solar Electricity for the Home
<http://www1.eere.energy.gov/solar/pdfs/43844.pdf>

Resources

1. U.S. Energy Information Administration: Solar Photovoltaic and Solar Thermal Electric Technologies
<http://www.eia.doe.gov/oiaf/ieo/solar.html>
2. Database of State Incentives for Renewables & Efficiency: State-by-State Calculator
<http://www.dsireusa.org/>