

ENERGY CARD:

Solar Power

Solar power is already being used successfully as an energy source on Earth. Solar energy is the sun's rays (solar radiation) that reach the earth. This energy is collected by large cells, called photovoltaic panels that are designed to absorb solar radiation. Photo means light and voltaic means electricity, so these panels create electricity from light. The photovoltaic panels are made of melted silicon, which is found in sand. When the sunlight hits a solar panel, electrons in the silicon move around, flow through the wires in the panels, and energy is created. This energy is transferred to a power station and sent out for use in homes and businesses.

There are two problems with collecting solar energy on Earth. First, the amount of solar radiation that reaches the Earth is not constant. Weather, time of day, time of year, and the location of solar cells can affect the amount of solar energy that hits the Earth's surface. The second problem is that our atmosphere reduces the amount of solar energy that reaches the Earth's surface so large panels are needed to collect enough energy to be effective. These problems would be solved if a solar energy system were developed in space.

There are several reasons to gather solar energy from outside our atmosphere. The amount of solar radiation in space is five to eight times greater than on the Earth's surface. Furthermore, without clouds, season or nighttime, space-based solar panels would receive more consistent solar radiation. Also, huge solar photovoltaic panels could be used in space. These panels could be attached to a satellite floating above a

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planet or the Moon, or stationed on the surface. A satellite less than 1,000 feet (300 meters) across orbiting 300 miles (540 kilometers) above Earth could potentially power 1,000 homes.

Scientists have already developed the technology to transfer the collected energy to the Earth. The energy created in space would be converted into microwaves and beamed down to Earth. Huge antennas would collect the microwaves on earth and convert the microwaves back into electricity. This is a system similar to the way communication satellites transfer information to, and from, a cell phone.

The only really big problems with starting a space-based solar energy system are the start up, labor and transportation costs. Launching, setting up and maintaining a solar energy farm in space would be tremendously expensive. With current costs, it is 1,000 times more expensive to send an object into space. This does not include the expense of labor to build and maintain a space-based solar energy system. Another consideration is location. It would be much cheaper to build a space-based solar energy system on the moon than Mars because of distance. Either way, a solar energy system in space would be very expensive.