ENERGY CARD:

Wind Energy

Humans have been using wind to create electrical energy for a long time. In the late 1880s through the 1940s, farmers used windmills to pump water from the ground and to power their homes. More recently, wind farms have been built across the United States in areas with open spaces and winds that blow at least 14 miles an hour. Though they look like fans, a wind turbine actually works the opposite of a fan. Instead of electricity powering the blades, the wind turns the blades attached to a long tube-shaped shaft. The shaft is attached to a generator in the turbine that creates energy. The energy moves through power lines to a substation that sends the energy out for use in homes and businesses. As long as land is available, this is a low cost source of energy.

Though it is a great source of energy, there are two problems with wind farms on earth. First, turbines take up a lot of space. Most turbines are about 13 feet wide at the base, over 230 feet tall, and have blades over 100 meters long. To work effectively, wind turbines have to be about 600 meters apart. Wind turbines could supply enough energy to power the whole world, but that would require a wind farm that would cover over 60% of the United States. Secondly, environmentalists complain that wind turbines are very dangerous to birds and other animals. Could starting a wind farm on Mars could solve both these problems?

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Wind Energy

In the 1970s, NASA began exploring harvesting wind energy in space. NASA scientists have determined that wind power could be collected on Mars. Data from the Viking and Pathfinder missions to Mars did not find strong Martian winds. However, evidence supports that Mars has month-long global storms that generate very high, sustained winds. These windstorms would be perfect for generating energy. In 2001, NASA did a study at the Martian South Pole. This study proved that wind turbines could work in an environment where extremely cold winds blow abrasive materials such as sand and ice into the machinery.

1" There are problems associated with developing wind farms on Mars. The first problem is that Martian storms are not constant and there can be long periods of time with no wind. A second problem is the air is so much thinner on Mars that the wind would have to blow three times as hard as wind on Earth just to get the turbines moving. A final problem is that transporting the wind turbines to Mars would be very expensive. Finally, there is currently no known way to get the generated energy back to Earth. Scientists believe the energy created on Mars could 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.



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