Energy Considerations

Key Questions:

- What will the energy be used for?
- How might energy be transformed on the Moon?
- Where will the fuel come from?
- What are the safety concerns?

Energy Overview:

There are many different types of energy sources we use on a daily basis. Many people in the United States obtain their electricity from wind energy, hydroelectric dams, coal power plants, nuclear power plants, solar panels, natural gas, geothermal, and many more. When establishing a colony on the Moon, many of these alternatives are no longer possible. For instance, a hydroelectric dam would not be a good idea, because there is no water on the Moon. Solar power may be an alternative, but that would require constant solar activity. Consideration also needs to be given to the fact that all the equipment that goes to the Moon must be transported from Earth. On the next page are some web sites for you to review. They provide some good information about things that need to be considered when choosing an energy source for lunar colonization.

The following description of nuclear power and solar energy has been excerpted from Wikipedia at the following web site:

Wikimedia Foundation, Inc. (May, 2007). *Wikipedia: The Free Encyclopedia*. "Colonization of the Moon." Retrieved May 10, 2007, from <http://en.wikipedia.org/wiki/Colonization_of_the_Moon#Energy>.

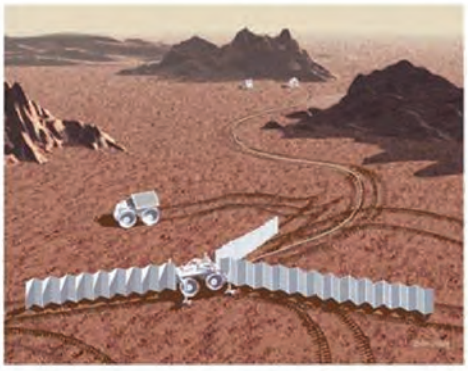
Nuclear Power

A nuclear fission reactor could fill most of the need for power. The advantage it has over a fusion reactor is that it is an already existing technology. One advantage of using a fusion reactor is that Helium-3, which is required for a type of fusion reaction, is abundant on the Moon. However, it is possible that reliable, efficient fusion reactors will not be available at the time of lunar colonization. Radioisotope thermoelectric generators could be used as backup and emergency power sources for solar-powered colonies.

Solar Energy

Solar energy could prove to be a relatively cheap source of power for a lunar base, as many of the raw materials needed for solar panel production can be extracted onsite. However, the long lunar night (14 Earth days) is problematic for solar power on the Moon. This might be solved by building several power plants, so that at least one of them is always in daylight. Another possibility is to build such a power plant where there is constant or near-constant sunlight, such as at the Malapert Mountain near the lunar south pole, or on the rim of Peary crater near the north pole. See Peak of Eternal Light.

The solar energy converters need not be silicon solar panels. It may be more feasible to use the larger temperature difference between Sun and shade to run heat engine generators. Concentrated sunlight could also be relayed via mirrors and used directly for lighting, agriculture, and process heat. The focused heat can also be employed in materials processing in order to extract various elements from lunar surface materials.



Internet Web Sites:

Rudo, Brian (Author). (March 5, 2003). *Nuclear propulsion and what it means to space exploration*. Red Colony. Retrieved May 10, 2007, from <http://www.redcolony.com/art.php?id=0303050>.

- This web site provides some easy-to-understand descriptions of how various types of nuclear energy can be used, including radioisotope decay, nuclear fission, and nuclear fusion.

Knuth, William H. (Author). (March 2, 2004). *Lunar convoys as an option for a return to the Moon*. Space Daily: Your Portal to Space. Retrieved May 10, 2007 from <http://www.spacedaily.com/news/lunar-04j.html>.

- This web site is a short article about how solar energy might be used on a lunar colony.