Green Energy: Solar, Wind and Geothermal System Installations

Owners may wish to consider sources of Green energy to lower the carbon footprint of the apartment complex. Green energy is the term used to describe sources of energy that are considered to be environmentally friendly and non-polluting, such as geothermal, wind and solar. Green energy sources are often considered "green" because they are perceived to lower carbon emissions and create less pollution.

Solar Power:

Sunlight can be converted into electricity using photovoltaics (PV), concentrating solar power (CSP), and various experimental technologies. PV has mainly been used to power small and medium-sized applications. Solar power is by far the Earth's most available energy source, easily capable of providing many times the total current energy demand. However, it is an intermittent energy source, meaning that it needs to be backed up. There tends to be more wind power available in winter and more solar power in summer, making wind power and solar power somewhat complementary. Areas in the South and Southwest are generally thought to be economically favorable to solar power, but federal and local tax incentives and local electric costs can make solar an economic owner investment in other areas.

PV cells are made of semiconducting materials similar to those used in computer chips. When sunlight is absorbed by these materials, the solar energy knocks electrons loose from their atoms, allowing the electrons to flow through the material to produce electricity. This process of converting light (photons) to electricity (voltage) is called the photovoltaic effect.

PV cells are typically combined into modules that hold about 40 cells; about 10 of these modules are mounted in PV arrays that can measure up to several meters on a side. These flat-plate PV arrays can be mounted at a fixed angle facing south, or they can be mounted on a tracking device that follows the sun, allowing them to capture the most sunlight over the course of a day. About 10 to 20 PV arrays can provide enough power for a household; for large electric utility or industrial applications, hundreds of arrays can be interconnected to form a single, large PV system.

The performance of a PV cell is measured in terms of its efficiency at turning sunlight into electricity. Only sunlight of certain energies will work efficiently to create electricity, and much of it is reflected or absorbed by the material that make up the cell. Because of this, a typical commercial PV cell has an efficiency of 15% – about one-sixth of the sunlight striking the cell generates electricity. Low efficiencies mean that larger arrays are needed, and that means higher cost. Improving PV cell efficiencies while holding down the cost per cell is an important goal of the PV industry, NREL researchers, and other U.S. Department of Energy (DOE) laboratories, and they have made significant progress. The first PV cells, built in the 1950s, had efficiencies of less than 4%.

Additional information at: http://en.wikipedia.org/wiki/Green_energy