Renewable Energy Primer (PART 3 - SOLAR) - courtesy of Power Scorecard

Next to using less electricity, purchasing renewable energy or energy that comes from non-fossil based sources is a great choice if you want to reduce your contribution to Climate Change. This week we will explore solar sourced electricity.

The sun provides the ultimate source of most of the world's energy including light, heat and radiation. There are two different approaches to generate electricity from the sun: **Photovoltaic (PV)** and **Solar-thermal technologies.** PV relies upon chemical reactions to generate electricity. PV cells are small, square-shaped semiconductors manufactured in thin film layers from silicon and other conductive materials. When sunlight strikes the PV cell, chemical reactions release electrons, generating electric current. The small current from individual PV cells, which are installed in modules, can power individual homes and businesses or can be plugged into the bulk electricity grid.

Solar-thermal technologies use the sun's heat to create steam to drive an electric generator. Parabolic trough systems, like those operating in southern California, use reflectors to concentrate sunlight to heat oil that in turn heats water to create steam to drive a standard turbine. Two other solar-thermal technologies are nearing commercial status: ***Parabolic dish systems*** concentrate sunlight to heat gaseous hydrogen or helium or liquid sodium to create pressurized gas or steam to drive a turbine to generate electricity. ***Central receiver systems*** feature mirrors that reflect sunlight onto a large tower filled with fluid that when heated creates steam to drive a turbine.

What are the environmental impacts? Manufacturing PV cells involves the generation of some hazardous materials. Nonetheless, appropriate handling of these small quantities of hazardous material reduces risks of exposure to humans and to the environment. Like PV, solar-thermal technologies generate zero air emissions, though some emissions are created during the manufacture of both technologies. The biggest concern with solar technologies may be land use since five acres of land are often needed for each megawatt of capacity. PV can eliminate the land use impacts by integrating the generators into building construction eliminating the need for dedicated land use for PV generation and most solar thermal plants are sited in desert areas away from sensitive land. Bottom line: the environmental footprint of sun-generated electricity is very small when compared to the wildlife and ecosystem impacts of fossil fuel mining and fuel combustion.

Find out more about renewable energy and where to buy it at http://powerscorecard.org

Next Week's Column: *landfill gas and biomass*