Types of Renewable Energy

There are five types of renewable energy:

- Solar
- Wind
- Geothermal
- Municipal Solid Waste
- Biomass

However, since solar and wind are the two prevalent renewable energy sources, this document provides a brief explanation of the various systems that convert these naturals resources into energy.

Solar Energy

The earth's sun makes more energy in one second than the amount six billion nuclear power plants would produce in a year. The sun is also ultimately the source of all energy supplies, except for nuclear and geothermal energy.

Solar Energy Conversion Systems

Solar Electric Systems

Photovoltaic (PV) systems use sunlight to generate electricity. A PV panel is made up of many individual solar cells, all of which are covered with a protective sheet of glass in a PV module or panel. The cells are made from silicon, a very common chemical element found in sand.

In addition to the panels, a PV system usually contains an inverter to covert solar power from direct current (DC) to the alternating current (AC) of the utility grid power transmission and delivery system. Before installing a PV system on a home or business, it makes sense to make a home or business as energy efficient as possible so accurate PV sizing can take place. PV systems can be sized and configured to generate electricity in grid-connected or stand-alone applications.

Solar Thermal Systems

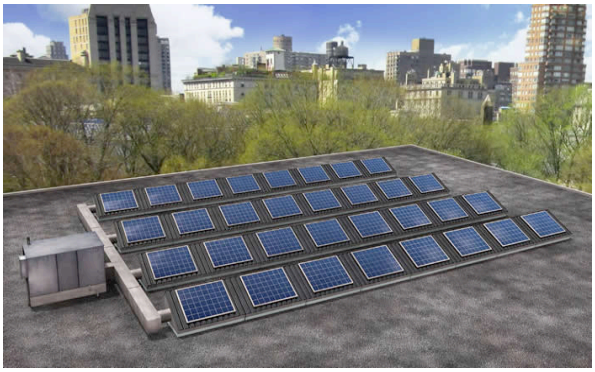
Passive solar thermal design can be used to heat homes and buildings that are designed with large areas of glass facing south to maximize “passive solar gain.” Solar thermal mass such as tile floors, Trombe walls, and stone can collect, store, and dissipate the sun’s heat.

Active solar thermal systems typically use flat plate or evacuated tube collectors that collect and concentrate the sun's heat and transfer the heat to circulating water or some other heat transfer fluid. Active solar thermal systems can provide space heating, water heating, cooling, or dehumidification.

Solar Thermal Generation Systems

Solar thermal systems can also generate electricity through technologies, which take advantage of heat produced by concentrating the sun's rays onto a small location with mirrored reflectors.

Hybrid Solar Electric/Thermal Systems



Solar systems that produce both electricity and heated air (PV/T) can generate 2-3 times more energy than a standalone PV system for approximately 25% more cost, according to some manufacturers. The two solar technologies in one footprint offset both heating and electricity costs, while also increasing the PV performance by up to 10% by cooling the panels.

Wind Energy

Wind power is one of the most efficient, deployable, scalable and affordable renewable energy technologies. Many areas in Maryland have wind speeds high enough to generate significant energy for homes, businesses and agriculture. Under Maryland's net metering statute, customers can receive credit for generated energy from utilities even when it exceeds their demand. Below are several resources and programs that can help determine the optimal location and scope of any wind energy project.