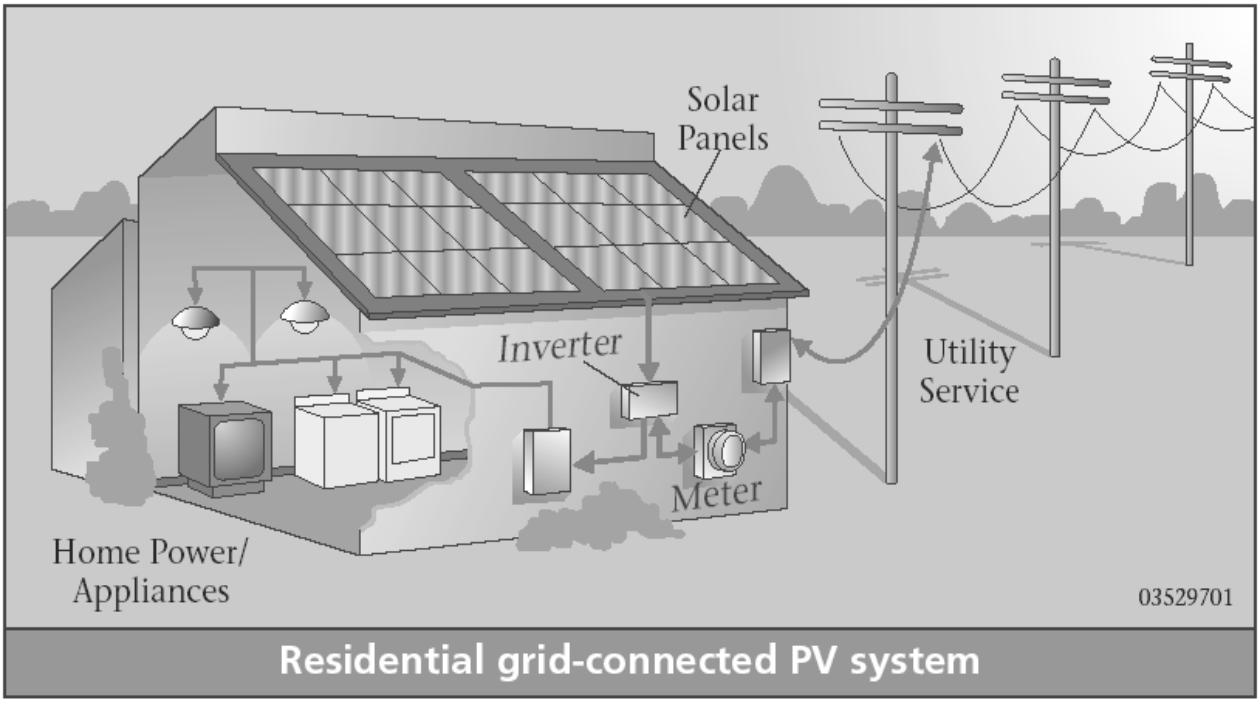
BASICS OF A SOLAR ELECTRIC SYSTEM



What is a solar electric or photovoltaic system? Photovoltaic (PV) systems convert sunlight directly to electricity. They work any time the sun is shining, but more electricity is produced when the sunlight is more intense and strikes the PV modules directly (as when rays of sunlight are perpendicular to the PV modules). Unlike solar thermal systems for heating water, PV does not use the sun's heat to make electricity. Instead, electrons freed by the interaction of sunlight with semiconductor materials in PV cells are captured in an electric current.

PV allows you to produce electricity — without noise or air pollution — from a clean, renewable resource. A PV system never runs out of fuel, and it won't increase U.S. oil imports. Many PV system components are manufactured right here in the United States. These characteristics could make PV technology the U.S. energy source of choice for the 21st century.

The basic building block of PV technology is the solar “cell.” Multiple PV cells are connected to form a PV “module,” the smallest PV component sold commercially. Modules range in power output from about 10 watts to 300 watts. A PV system connected or “tied” to the utility grid has these components:

- One or more PV modules, which are connected to an inverter
- The inverter, which converts the system's direct-current (DC) electricity to alternating current (AC)
- Batteries (optional) to provide energy storage or backup power in case of a power interruption or outage on the grid.

AC electricity is compatible with the utility grid. It powers our lights, appliances, computers, and televisions. Special appliances that run directly on DC power are available, but they can be expensive. Before you decide to buy a PV system, there are some things to consider:

First, PV produces power intermittently because it works only when the sun is shining. This is not a problem for PV systems connected to the utility grid, because any additional electricity required is automatically delivered to you by your utility. In the case of non-grid, or stand-alone, PV systems, batteries can be purchased to store energy for later use. Second, if you live near existing power lines, PV-generated electricity is usually more expensive than conventional utility-supplied electricity. Although PV now costs less than 1% of what it did in the 1970s, the amortized price over the life of the system is still about 25 cents per kilowatt-hour. This is double to triple what most people pay for electricity from their utilities. A solar rebate program and net metering can help make PV more affordable, but they can't match today's price for utility electricity in most cases.

Finally, unlike the electricity you purchase monthly from a utility, PV power requires a high initial investment. This means that buying a PV system is like paying years of electric bills up front. Your monthly electric bills will go down, but the initial expense of PV may be significant. By financing your PV system, you can spread the cost over many years, and rebates can also lighten your financial load.

Are incentives available to help reduce the cost? Yes, many states have incentive and rebate programs. An excellent source for information on such programs is the National Database of State Incentives for Renewable Energy (DSIRE). Prepared by the North Carolina Solar Center, this database contains information on financial and regulatory incentives that promote renewable energy technologies. The State of Florida has just recently passed an incentive program in 2006 that will pay a rebate on a residential PV installation of $4 per watt of installed capacity up to $20,000. For more information, visit the Florida Solar Energy Center's website at www.fsec.ucf.edu.

Net Metering — In more than 35 states, customers who own PV systems can benefit from laws and regulations that require "net" electric meter reading. The customer is billed for the net electricity purchased from the utility over the entire billing period—that is, the difference between the electricity coming from the power grid and the electricity generated by the PV system. Through net metering, the customer obtains the full retail electricity rate — rather than the much lower wholesale rate—for kilowatt-hours of PV-produced electricity sent to the utility power grid. The benefits of net metering to consumers are especially significant in areas such as Hawaii and New York, which have high retail electric rates. Utilities also benefit because the solar-generated energy often coincides with their periods of "peak" demand for electricity.

Source: U.S. Department of Energy's National Renewable Energy Laboratory