



WE BRING GREEN SOLUTIONS TO YOU



A SOLAR GUIDE - EVERYTHING YOU NEED TO KNOW

Provided by

A COOLER PLANET

WHY GO SOLAR? TOP FIVE FACTORS TO CONSIDER FOR ADDING A SOLAR ENERGY SYSTEM TO YOUR HOME

Your home's resale value goes up. Realtors and buyers view solar home energy systems as significant value-added improvement, similar to adding a deck. Plus unlike a deck or kitchen remodel, you also gain one-up on your power bills.

Solar systems pay you back. Generating your own power on-site reduces, or may even eliminate, most of your home's energy-operating costs. Solar energy can also offset any impacts from potential Utility rate increases.

You get a tax break. Washington State law exempts state sales and use tax related to the purchase of solar energy systems. The federal government provides a tax credit as well! The federal tax credit covers 30% of the system cost up to \$2,000.

Your Utility credits you for the excess electricity you generate. Washington State law permits net metering so that you can receive credit for any excess electricity you generate - as much as 15 cents per kilowatt hour (and up to \$2,000 per year). You benefit from reduced, if not eliminated, energy operating costs and utilities benefit from reduced demand on the system.

Solar technology has grown up. Although solar panels have been around since 1954, solar cells have matured and the marketplace expanded. Today, solar photovoltaic and solar hot water systems are far more efficient than their predecessors. Most come with a 25-year warranty.

It's Our Planet

From a broader perspective, solar power reduces our reliance on our electrical-grid. Using solar energy helps decrease overall demand for the hydropower and coal it takes to generate the electricity we use. Instead of water diverted to power plants, our rivers can be used for water supply to nourish fish (like salmon), irrigate crops, and preserve the places we go to like to go to recreate and play.

Reducing our use of coal to fuel power plants also protects air quality, lessens the formation of acid rain, and reduces the need for strip mines. If each one of us added even a modest amount of solar photovoltaic infrastructure to our homes, our efforts could expand Washington State's mix of energy solutions and decelerate our impacts on climate change - creating a cooler planet indeed.

THINGS YOU SHOULD KNOW ABOUT SOLAR

Review Your Utility Bills. You'll have a better point for comparison if you find out how many kilowatt hours (kWh) you use per day, per month, per year. Your utility bill should include that information.

Estimate Your Solar Power Needs. If you are constructing a new home, then you'd need to estimate

your demand based on the type of equipment you plan to install and your home's square footage. The pro's call this "your load."

To figure out your anticipated load, create a table that record each the watt use for each appliance. Each appliance – be it a water heater, electric light, computer, or refrigerator – should have a nameplate that lists its power rating in watts. Some labels list amperage and voltage only; to obtain watts multiply the two together (amperage x voltage = watts). In another column, record the number of hours each appliance is expected to operate. Then multiple the watts and hours together to estimate watt-hours used per day. Since it's hard to anticipate all electric loads (it may get tedious scouting out every toothbrush and mobile phone cell charger), you might want to add a multiplier of 1.5.

One Square Foot Yields 10 Watts. In bright sunlight, a square foot of a conventional photovoltaic panel will produce 10 watts of power. That's a helpful rule of thumb for calculating a rough estimate of how much area you might need. For example, a 1000 watt system may need 100 – 200 square feet of area, depending on the type of PV module used.

Don't Shade Your Array. Yes, solar works in our climate, but it doesn't work well anywhere if it's in the shade. Shading a photovoltaic system dramatically decreases its output. Just shading the bottom row of wafers alone amounts to an 80% reduction in efficiency.

Shop for Solar. As is true with any major purchase, don't hesitate to ask for several bids from different contractors.

FREQUENT QUESTIONS ABOUT SOLAR

How do solar electric systems work?

Photovoltaic panels are often mounted on a roof and wired into a building via an inverter. The inverter converts the direct current (DC) energy generated through the solar panels into alternating current (AC), the standard type of current used to power buildings in the USA. Orienting solar panels to the south maximizes the effectiveness of energy collection, and most roofs – from flat to 60-degrees – can accommodate photovoltaic cells.

How many solar panels do I need?

The size of the photovoltaic system is correlated to energy-use needs, available space for a system, and overall costs for the system components and installation. Solar contractors in our area can help determine the best size for your solar photovoltaic system. In Seattle, a one kilowatt system should produce about 1150 kilowatt hours per year.

How much does it cost?

A 2kW solar electric system may cost approximately \$20,000. That total includes the cost for all components – solar panels, panel mounts, and inverter – and labor associated with installation. It does not however, reflect all the avoided costs, such as the tax breaks and the credits received through net metering. Work with a solar power contractor to size and price the right system for you.

How much will I really save on my utility bills?

Of course this is a relative question. It depends, in part, on how much electricity you use and how

efficient the appliances are that you operate. That said expect to generate excess electricity in the summer (when days are long) which can potentially offset the energy you use from the grid in the winter. A combination of energy efficient appliances and light bulbs can help reduce your homes energy bill by over two-thirds.

How do net metering systems work?

Net meters look very much like other outdoor meters with one notable exception – they spin both forwards and backwards recording both the power produced and power used.

Do I need battery backup?

Because adding backup battery banks can add as much as 25% in cost to a residential solar power system, most solar photovoltaic experts do not recommend adding a backup battery system unless there is concern about a long utility outage or the residence is in a remote location.

What's the difference between solar electric and solar thermal?

While both types of solar systems capture energy from the sun, solar electric systems use photovoltaic panels to produce power; solar thermal systems capture sunlight to heat water for domestic use or for a heating system.

How do solar hot water systems work?

Often solar hot water collectors are closed-loop systems which absorb the sun's rays into heat pipes evacuated of air, heating up the pipe's thin copper laminate located on the back of each pipe. Glycol (an ingredient in antifreeze) runs through adjacent pipes within the closed-loop system and heats up via contact with the copper laminate. As the temperature in the pipes rise, the heat activates a pump that circulates the glycol fluid through a heat exchange coil in the water tank. That coil, in turn, heats the tank's water and voila, hot water is produced.

How much maintenance do solar systems require?

Solar photovoltaic panels require little maintenance – no need to wash or dust. It is, however, important to place panels where they will remain clear of shade and debris.

Solar hot water systems don't need much attention either. The solar heat pipes are less susceptible to shade because it's a tube evacuated of air, but it does help to periodically use a window wash brush, biodegradable soap, and water to clean the tubes.

Can I use a financing system?

Yes. Consider using a mortgage loan for the purchase and installation costs of a solar photovoltaic or solar hot water system to take full advantage of federal tax deductions. Remember, installing a solar energy system is comparable to any other upgrade you might do to your home, such as installing a new deck or remodeling a kitchen.

Do I need special insurance requirements?

Standard homeowner's insurance policies usually suffice to meet electric utility requirements. Electric utilities require that homeowners who take advantage of net metering sign an interconnection agreement.

TERMS TO KNOW

Net, or reverse, metering: the ability to record both power produced and power used. Utility companies record the information, as they do for all home meters, and charge customers for the power they use as well as credit them for any excess power they generate.

Kilowatt-hour (kWh): a common unit of electric power consumption. One kilowatt-hour equals 1000 watt-hours and can be used to define the amount of energy used over a one-hour period. For example, a 60-watt incandescent light bulb turned on for one hour would use 60 watts of energy.

A side note: Interestingly, a 19-watt compact fluorescent bulb (CFL) packs the equivalent amount of output as a 60-watt incandescent, but saves 68% of the comparable energy. There are two reasons for this: (1) 75% of the energy incandescent light bulbs use ends up as heat, only 25% gives off light; (2) CFLs last 10 times longer than incandescents and save \$30 or more in energy bills over their lifetime. So use CFL bulbs wherever possible to cool down the planet too.

Photovoltaics (PV): cells generally made from silicon, or other conductive materials, that absorb and convert sunlight into electricity.

