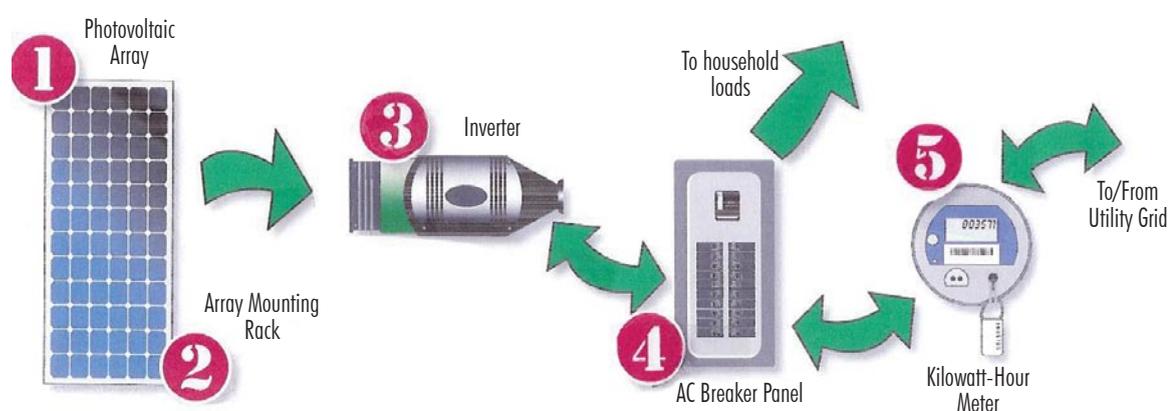


LIVING GREEN™

GREEN OPTIONS HIT THE ROOF

Solar Energy is among the most innovative and progressive green features being integrated into new home construction today. On the leading edge of solar energy technology are Photovoltaic (PV) on-grid, grid-tied, or utility-interactive (UI), solar-electric systems. This system generates solar energy and routes it to the electric grid, offsetting the home's electrical consumption. Living with a grid-connected solar-electric system is no different than living with grid power except that some or all of the electricity you use comes from the sun.

Unlike solar systems for heating water, which you might be more familiar with, solar electric technology does not use the sun's heat to make electricity. Instead, solar electric produces electricity directly from the electrons freed by the interaction of sunlight with semiconductor materials in the solar electric cells.



The basic anatomy of a photovoltaic (PV) isn't that complicated. All the parts have a purpose and once you understand the individual tasks that each part performs, the whole thing makes a bit more sense.

1) Solar Electric Panels

PV panels are a solar-electric system's defining component; this is where sunlight is used to make direct current (DC) electricity. Behind a PV panel's shimmering façade, wafers of semiconductor material work their magic, using light (photons) to generate electricity—what's known as the photovoltaic effect.

Other components in the systems enable the electricity from the panels to safely power your electric loads, like lights, computer and refrigerator.

2) Array Mounting Rack

Mounting racks provide a secure platform on which to anchor your PV panels, keeping them fixed in place and oriented correctly.

3) Inverter

Inverters transform the DC electricity produced by the PV modules into the alternating current (AC) electricity commonly used in homes.

4) AC Breaker Panel

The AC breaker panel is the point at which all of a home's electrical wiring meets with the "provider" of the electricity, whether that's the grid or a PV system.

5) Kilowatt Hour Meter

Most homes with a grid-tied PV system will have AC electricity both coming and going to the electricity grid.

Our climate and other site-specific variables will determine PV panel efficiency but each day in Seattle, on average enough raw solar energy falls on a typical residential 40 x 100' lot to power 50 homes.

Investing in Solar Electric

You don't need to understand the detailed physics of how solar electric works to understand its appeal:

- Produce Your Own Electricity
- No Noise
- No Air Pollution
- No Moving Parts and is practically maintenance-free operation
- A Solar Electric System will never run out of fuel (photons directly from the sun)
- Solar Panels outlive nuclear plants and leave NO waste
- PV modules are very durable and long lasting, most carry 25-year warranties. They can withstand severe weather including extreme heat, cold and hail storms

The only drawback could be the solar electric power systems come with a high initial investment, however significant federal tax incentives and local utility and state rebates along with subsidized loans and financing may dramatically diminish the hard costs. Additionally, PSE like all Washington utilities offers net metering to make these systems even more economical. Net metering means that if your system generates more power than you need, the meter runs backwards resulting in an even swap for the grid power you use at other times. In essence you receive full retail value for all power your system generates.

Consider This

- PVs recoup their production energy in two to four years—this means the modules will go on to generate twenty or thirty more years of clean renewable energy than the amount of power used to produce it
- Every dollar you spend on making your home more efficient decreases the cost of your system by approximately \$3 to \$5
- In the solar world, sunlight is measured in units called "peak sun hours"
 - Peak Sun Hours per day received on an annual average:

Phoenix, AZ of 6.5	Seattle, WA 3.7
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- Even the sunniest regions won't guarantee you good system performance unless you have unobstructed solar access at your site. This daily access to the sun is called your "solar window". You will need a location on your rooftop that:
 - Ideally faces south, but east- or west facing arrays make sense in some cases
 - Provides enough space for the number of PV panels needed, possibly including room for expansion
 - Enables the entire array of modules unshaded exposure between the hours of 9am and 3pm, year round

Estimating Installed Costs

The US Department of Energy (DOE) estimates that a 2 KW (2,000 watt) systems costs \$8 to \$10 per watt to install while at 5 KW (5,000 watt) can cost \$6 to \$8 per watt installed.

Article written by **Specialized Homes** of Seattle, Washington. Beginning in March you can solidify your understanding by examining a solar-electric system in person at 1587 26th Court NE, an Issaquah Highlands home built by Specialized Homes. Data on Calculating Electricity Bill Savings for Net-Metered solar electric systems can found at www.specializedhomes.com.