

## Resources

**Websites:** *There are hundreds, but these will get you started in the right direction...*

### **Clallam County PUD Utility Services Department: Your Partner in Energy Conservation.**

Responsible for delivering energy efficiency and conservation programs, incentives and outreach education. Visit them at 83 Idea Place in Carlsborg, [www.clallampud.net/conservation](http://www.clallampud.net/conservation) or call: 565-3249.

### **U.S. DOE: Energy Efficiency & Renewable Energy**

These consumer education resources provide a wealth of information on energy efficiency and renewable energy. [www.energysavers.gov](http://www.energysavers.gov) [www.energystar.gov](http://www.energystar.gov)

### **Solar Washington**

This local chapter of the American Solar Energy Society is a non-profit association of PV equipment manufacturers, vendors, professionals, students, and enthusiasts offering solar education outreach. [www.solarwa.org](http://www.solarwa.org)

### **American Solar Energy Society**

ASES leads national efforts to increase the use of solar energy, energy efficiency and other sustainable technologies in the U.S. through outreach activities such as their SOLAR TODAY magazine, National Solar Conference and National Solar Tour. [www.ases.org](http://www.ases.org)

### **Tax Incentives Assistance Project**

Sponsored by a coalition of public interest non-profit groups, government and other energy efficiency organizations, TIAP offers information on federal income tax incentives for energy efficient products and technologies. [www.energytaxincentives.org](http://www.energytaxincentives.org)

### **North American Board of Certified Energy Practitioners**

NABCEP supports the renewable energy and energy efficiency industries through credentialing and certification programs for practitioners. [www.nabcep.org](http://www.nabcep.org)

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# Going Solar in Clallam County

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*Solar electric systems are safe, pollution free sources of renewable energy. When added to a fully-weatherized, energy efficient home with high-efficiency appliances and energy-conserving occupants, solar electric or "PV" systems can help lower your utility bills, reduce your impact on the environment -- and even send production incentive checks to your mailbox.*

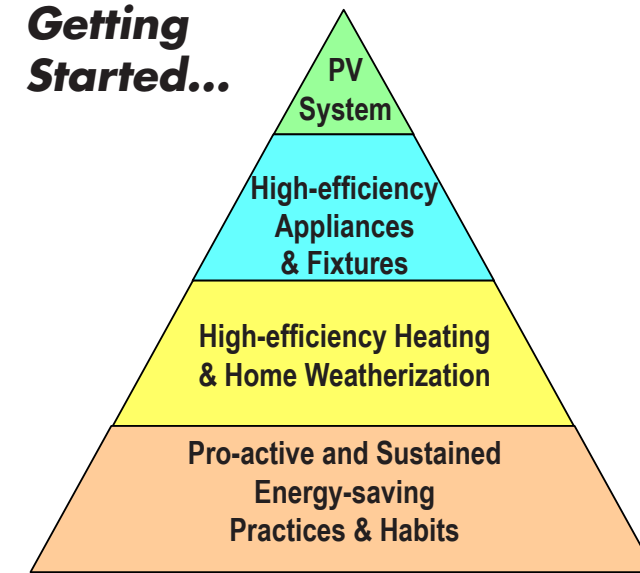
Energy efficiency and conservation measures are the keys that open the door to cost-effective solar energy production. That's because, on average, it's 300% - 500% cheaper to save a watt through energy conservation than it is to replace that watt with solar power. As such, PV systems only make financial sense/cents *after* air sealing, maximizing insulation, duct-sealing, installing high efficiency appliances, lighting, heating systems, windows, etc.. As *your partner in conservation*, your PUD offers many energy efficiency incentives, programs and informational materials to lower your utility bill while making your home more comfortable year round.

*"You've got to eat your energy-saving vegetables before you can enjoy your solar energy dessert."*

PUD Utility Services Advisor

Whether you've just started to consider the possibilities of solar energy production, or whether you're about to take the leap, this guide was created to provide you with helpful information on *going solar in Clallam County*.

## Getting Started...



**Step 1: Make your home as energy efficient as you can** by implementing all feasible energy efficiency measures and regularly practicing energy conservation. In doing so, you will help to ensure maximum return on your investment. Clallam County PUD offers a variety of programs to assist you in this effort, so be sure to contact us when you're ready to get started.

**Step 2: Consider your site's sun exposure.** Optimal orientation for PV panels is true South without obstructions. Even minimal shading (e.g., power line shadows) can significantly impact energy production.

**Step 3: Evaluate your roof's condition.** PV systems are designed to last a *minimum* of 20 - 25 years. So if your roof needs replacing within the next 5 - 10, replace it first. *Note: be sure to explore available solar roofing options, i.e., PV systems that are integrated into roofing materials.*

**Step 4: Get a site assessment from a certified PV installer** to ensure that your site can support a PV system.

**Step 5: Obtain bids from several PV installers; check references.** Bids may vary widely. When comparing bids, be sure to compare *apples to apples*, i.e., PV systems of the same capacity, panel composition and warranties.

**Step 6: Select a bid and request the installer's help** in obtaining utility net-metering and production incentives as well as federal tax incentives.



*Bringing Energy To Life™*

[www.clallampud.net](http://www.clallampud.net)

## Terms to Know:

**Photovoltaic (PV):** having the ability to convert the sun's energy to electrical energy (DC).

**PV Cell:** a semiconductor material (similar to computer chips) which absorbs sunlight and converts it to electricity (DC) with an efficiency of 10% - 15%. The (3) main types:

- **Monocrystalline Cell:** cut from a single silicon crystal, the most expensive to produce, also makes the most efficient PV panel available. Rigid, and usually encased in metal-framed glass.
- **Polycrystalline Cell:** cut from a block of silicon, consisting of many crystals. Less efficient and less expensive than monocrystalline cells, usually encased in metal-framed glass.
- **Amorphous Cell:** created by placing a thin film of non-crystalline silicon onto a variety of surfaces, even flexible ones. The least efficient and least expensive of the types, it experiences declining power output during the first few months after installation, before stabilizing. As such, the quoted output of amorphous panels should be post-stabilization.

**PV Panel:** multiple PV cells linked together and framed.

**PV Array/System:** multiple interconnected PV panels. Rooftop arrays are most common, but arrays can also be mounted on poles, verandas, the ground, etc.

**DC Disconnect:** a manual safety device used to cut-off power generated by the PV system during maintenance.

**DC/AC Inverter:** converts the PV array's DC power to AC.

**AC Disconnect:** a safety device, often incorporated into inverters, which isolates the inverter from the grid. This device is required for all grid-tied systems within the PUD's service area.

**Breaker Box and Utility Meter:** the building entry points for PV generated power. If the building is using electricity, the PV system's power will be used first. If electricity use exceeds the power generated by the PV system, utility grid power will be automatically accessed.

**Production Meter:** an electric meter which measures the energy generated by your PV system, required for PUD production incentive programs.

**Spinning Backwards:** what a utility meter does when a PV system generates more electricity than a premises uses and sends excess electricity into the utility grid.

## Costs, Credits & Incentives



### PV System Costs

PV system costs vary with a number of factors including PV panel type, production capacity, inverter capacity, labor, permit fees, racking, wiring, etc.. In Clallam County, the average PV system is 4 - 5 kilowatts (kW). Installation costs in the region average \$8,000 - \$10,000 per kW, or \$32,000 - \$50,000 for a 4 - 5 kW system. Thankfully, production and tax incentives can lower the financial impact of installing a PV system.

**Credits & Incentives** (for details: [www.clallampud.net](http://www.clallampud.net))

**Net-metering:** Once you've entered into a Net-Metering Agreement with your PUD, net-metering allows any unneeded excess electricity to flow into the electrical grid. This causes the meter to "spin backwards" providing you with the full retail value for the excess electricity, or \$0.065/kWh at time of print.

**INSPIRED Program:** Through 2020, Clallam County PUD customers residing in WA with approved solar, wind and/or biomass energy production systems may receive incentives ranging from \$0.12 - \$0.54 per kilowatt hour (up to \$5,000 annually), depending on the system type and state of manufacture.

**Washington State Sales Tax Exemption:** Until June 30, 2013, PV systems less than 10 kW in size are exempt from Washington State sales tax.

**Federal Income Tax Credits:** Through 2016, the federal government offers a 30% income tax credit (up to \$500 per 0.5 kW) for the installation of a PV system at your principal residence.

## Frequently Asked Questions



### 1) Does "Solar" really work on the Peninsula?

Yes! Because our long summer days compensate for our cloudy winters, the Peninsula averages 3.5 hours of full sun per day or about 70% of what Southern California gets. In fact, the Peninsula has one of the highest percentages of PV systems per capita in the country.

**2) What's Passive Solar?** Designing buildings such that windows, walls, floors &/or roof store and distribute the sun's heat in winter and minimize it in the summer.

**3) How much roof space does a PV system need?** It's roughly a 1:10 ratio; i.e., it takes about 100 ft<sup>2</sup> of roof area to install a 1,000 watt (1 kW) PV system.

**4) I don't have a south-facing roof. Am I out of luck?** Pole-mounted or ground-mounted PV systems may be an option for your site, though these systems are more expensive due to additional labor and materials costs.

**5) How much energy will my PV system produce?** On the Peninsula, every 1 kW of PV panels generates about 1,000 - 1,200 kilowatt hours (kWh) per year. Most PV panels are warrantied to still be producing 80% of their original output when their warranty expires.

**6) How big a PV system do I need?** It depends on your goals and your home's overall energy efficiency. If your goal is to significantly offset energy costs while minimizing your PV investment, then first review your past utility bills to identify your annual energy usage; use our *Residential Appliances Energy Usage Guide* to itemize costs. Then, make your home as energy efficient as possible and practice energy conservation 24/7. In so doing, your PV system won't need to be as large.

**7) What's involved in a site assessment?** A certified PV installer will: 1) climb on your roof &/or walk your site to assess its orientation and solar potential; 2) inspect your home's electrical system to identify how to best install the system; and 3) answer all your questions.

**8) Will my system provide power during an outage?** A PV system's DC/AC inverter has a built-in safety to shut down the system if a power outage occurs, preventing the system from sending energy into the grid and endangering crews working to restore power.

**9) Should I invest in batteries for my PV system?** If you'd like a back-up power source during outages, an efficient generator would serve you better than a battery bank. As most of our power outages occur during winter storms when days are short, PV systems produce little power to recharge a battery bank. Batteries can be short-lived, providing only as much power as they store.

**10) Do grid-tied PV systems need maintenance?** Since a standard PV system is comprised of PV panels that have a sturdy tempered glass surface (naturally sheds water and dust) mounted 4" - 8" above the roof to prevent branches and leaves from building up underneath, they're nearly maintenance free. However, PV systems with solar trackers that optimize energy production have a motor that requires maintenance.

**11) If I get all the incentives, what's the remaining cost at the 5-year mark for an average 4 kW system?** Given that prices fluctuate over time and vary from installer to installer, the following is only an estimate:

Standard 4 kW System (producing 4,400 kWh/year)	
<b>PV System Installed Cost</b> (tax free until 6/30/13)	\$36,000
<b>Federal 30% Tax Incentive</b>	-\$4,000
<b>Net-metering @ \$0.065/kWh</b>	-\$1,430
Sub-total of Balance Remaining at 5 years:	\$30,570
<b>Scenario 1: INSPIRED Program Incentive (non-WA PV components) @ \$0.15/kWh</b>	-\$2,640
<b>Balance Scenario 1: \$15,530 in credits/incentives</b>	\$27,930
System cost percentage recouped in 5 years:	22.4%
<b>Scenario 2: INSPIRED Program Incentives (WA PV modules &amp; WA inverter @ \$0.54/kWh)</b>	-\$11,880
<b>Balance Scenario 2: \$24,110 in credits/incentives</b>	\$18,690
System cost percentage recouped in 5 years:	48.1%