PUGET SOUND SOLAR
You make the difference!

ARCHITECT, BUILDER & DESIGNER SOLAR TIP SHEET

Does Solar Work In Seattle?

Yes! Our region's long summer days and temperate climate are ideal for solar photovoltaics (PV). Net Metering is the agreement with the Utility in which energy credits (kWh) are exchanged on a 1-1 basis. This allows solar owners to "bank" kilowatt hours in the grid when their solar is producing more electricity than they are using, which happens mainly early spring through the fall. The banked credits are then used to cover electrical usage at night and in the dark and rainy months of winter, when the solar doesn't produce as much. In this way, the grid acts as unlimited, free storage. In Seattle, solar produces roughly 74% of its output in just six months, between April to September. Learn more at www.pugetsoundsolar.com/FAQ - What is Net Metering?

How Much Solar Does An Average Home Need?

An average house in Seattle consumes about 9000 kWh, (kilowatt hours) per year, which is around 25 kWh per day. It takes 20 to 30 solar panels (sometimes more) to offset 100% of average usage, depending upon:

- What direction(s) the roof faces.
- The degree of shading on the roof.
- Which equipment is selected.

We see electrical use ranging from a low 5 kWh per day to over 200 kWh per day – a huge variation! Many of the larger, all-electric homes use more than 70 kWh per day average in winter due to extra heating and lighting at that time of year.

System Sizing

It's important to understand the Net Metering fiscal year restarts every April 1st. All kilowatt hours still "in the bank" on March 31st are forfeited to the Utility without compensation. For this reason, we design systems to offset 100% of the consumer's average annual electric usage – and no more. The primary way to properly size a solar PV system is by looking at the home's historical electrical usage. We can't accurately estimate how much power a building will use based on square footage or how many people live there. The main factors are the draw of each electrical appliance installed and how much each appliance is used by the homeowner.

Which Kind Of Roofs Are Best For Solar?

Composition shingle, standing seam metal, membrane/PVC, torch-down are the best surfaces for solar PV. Standing seam roofs are ideal for solar, as the mounting system clamps to the standing seams so there are minimal roof penetrations. Membrane and torch-down roofs require professional roofer assistance to waterproof the penetrations, which adds to the costs.

Flat cement tile, corrugated metal and Interlock metal all work but are more expensive due to increased labor costs.

Puget Sound Solar generally install on Spanish tile or shake roofs. We do make exceptions for shake if its new and there's attic access under the array.

The panels, inverters, and workmanship are warranted for 25-years, so it's best to have 10+years of life left in the roof prior to installing solar. The cost to remove and replace a system for a re-roofing project typically runs $200 to $300 per panel.

Electrical System

Most solar connects via a 2-pole breaker opposite the feeders. A 225A (amp) rated bus with a 200A service will cover systems up to around 13kW. For larger systems, we use a supply-side tap.

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Electrical Rough-In For New Builds

A “rough-in” can be done by Puget Sound Solar or your own electricians. At the rough-in, PSS will install some basic system components and install the electrical conduit in the walls from the roof to the electrical panel. Without a rough-in, the conduit is strapped on the exterior of the building. The best time for a rough-in is after the roof and electrical panel are installed and before the walls are closed. Please refer to our rough-in tip sheet for more information. The rough-in is an extra cost - with a discount on the later solar installation.

Design Considerations

- Solar panels work best on South, West, and East facing roofs - in that order. North-facing roofs are generally not appropriate for solar.
- Shade on the roof from trees or adjacent buildings can have large impacts on solar, especially if the trees are to the south of the target area. Any trees or plantings south of the building should be chosen to top off no higher than the gutter when fully grown.
- The ideal roof slope is from 4:12 – 8:12. East and west facing roofs will produce better at lower slopes.
- On flat roofs, a less than 5˚ slope voids the panel warranty, so tilt up racks must be used. These rows need to be spaced to avoid interrow shading. The standard is a 10˚ tilt with rows spaced at least 20” apart.
- Use the PVWatts Calculator, (nrel.gov) to find the optimal tilt and panel azimuth (direction) for your project.
- Standard solar panels are typically about 69” x 40”.
- Panels typically produce from 340W (watts) to 400W each, depending on the manufacturer and cell efficiency.
- Solar typically adds about 3 to 5psf (pounds per square foot) to the dead load of the roof. Ballasted solar systems can add up to 7psf.
- Setbacks (open space) are required by fire code and a general rule of thumb is to leave a clear 18” perimeter on each roof face (except to the gutter).
- Standing seam metal and composition shingle are preferred roof types. For standing seam metal, please call out a solar-friendly seam profile compatible with S-5 clamps.
- Keep obstructions such as chimneys, skylights, and vents north of areas targeted for solar to avoid shading.
- In most cases, the panels sit around 6” higher than the roof, parallel with the roofs slope.

Costs

- The cost to install a system is typically about $2 to $3 per watt - including materials, labor and permitting.
- The entity paying for the system, usually the homeowner, is eligible for the Federal Tax Credit - 26% in 2021-2022, 22% in 2023, and ZERO% in 2024. Builders and developers must own the home for five-years to be tax credit eligible.
- There is a Washington State sales tax exemption on solar and batteries installations (batteries must be installed with solar to qualify) including labor, permit fees and any necessary electrical work to get the system operational.
- Systems are designed to last 25-years.
- Non-standard roof types, steep roofs and three-plus stories all add to the project’s costs.
- Batteries typically cost about $15,000 for a single unit and additional units are $8000 each.

More Resources:

Puget Sound Solar - Seattle, Washington
Project Sunroof - Google.com
Solar Energy: A Guide to Understanding Solar Power - EnergySage
How Solar Works - Solar Washington
Tesla Powerwall blog post - written by a Puget Sound Solar customer