Program Handbook
Revised January 2015
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Program Overview
Snohomish County PUD is committed to meeting its future growth through conservation and renewable energy generation with a preference for the generation to be located in Snohomish County. To encourage PUD customers to support this commitment, the Solar Express Program was developed to provide financial incentives, education and demonstration projects.

Solar Express is available to Snohomish County PUD residential, commercial and industrial customers for solar installations on their premises. The Program is designed to facilitate the installation of solar systems that offset the customer’s electrical consumption. Financial incentives are provided for photovoltaic (PV) and solar hot water (SHW) systems on suitable buildings, or the premises. All projects must be pre-approved before work commences and must meet the Program specifications.

Get on Board!
Follow the simple steps below to apply for an incentive. A detailed description of the application and payment process is in the How to Apply section (page 7).

Step 1
Submit a completed application package including:
- Signed PUD Application
- Site Assessment
- Bid, PV Watts estimated annual output (PV only) & equipment cut sheets from a PUD-registered Solar Installer
- Signed Net Metering/Interconnection Agreement (for PV systems only)
- One-line diagram for interconnection (for PV systems only)

Step 2
The PUD will review your application package and schedule an on-site energy assessment and pre-inspection.

Step 3
The PUD will issue an Approval to Construct letter with an Energy Services Authorization (ESA) to the PUD-registered Solar Installer and Customer. The approval is valid for 120 days and extensions must be requested in writing.

Step 4
Proceed with solar system installation as approved. Any changes to the system will need to meet PUD specifications and have PUD approval in advance of the completion deadline.

Step 5
Submit the Notice of Completion to the PUD after the system has been signed off by state and/or city code officials and include the following:
- Signed Notice of Completion with electrical inspection date (for PV)
- Signed ESA document
- Invoice documenting total system cost and equipment specs
- Re-submittal of documents where changes were made to system equipment or installation, since initial application.

PV systems are required to be left on at the breaker.

Step 6
The PUD will conduct a final inspection of the installed system, including (for PV) verification of meter locations and labeling.
Step 7 (for PV systems only)

The PUD will install a new revenue meter and production meter. Net metering is in accordance with PUD Rate Schedule 200, and the customer will need to provide the metering base for the production meter.

Step 8

The PUD will issue the incentive payment after all Program requirements have been met, the installation has been approved by the PUD and (if PV) the meters have been installed.

Incentives

Customers who meet the eligibility criteria below that install a solar system utilizing equipment that meets Program specifications are eligible to receive the following cash incentives. All projects must be pre-approved.

Incentive Matrix

<table>
<thead>
<tr>
<th></th>
<th>Incentive</th>
<th>Incentive Limit Per Premises¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential PV</td>
<td>$300/kW</td>
<td>$2,000</td>
</tr>
<tr>
<td>Commercial/Industrial PV</td>
<td>$300/kW</td>
<td>$8,000</td>
</tr>
<tr>
<td>Residential SHW</td>
<td>$500/system²</td>
<td>No limit</td>
</tr>
<tr>
<td>Commercial/Industrial SHW</td>
<td>$500/system²</td>
<td>No limit</td>
</tr>
</tbody>
</table>

¹ All solar hot water incentives are limited to customers with electrically heated water only. There is no limit on the number of systems installed per customer.
² A “premises” means a PUD customer's house or building, together with its land and outbuildings.

Incentive Calculation

PV system incentives will be calculated based upon the nameplate capacity of the equipment.

\[
PV \text{ Incentive} = \left( \text{number of PV modules} \times \text{DC nameplate watts per module} / 1000 \right) \text{rounded to a tenth of a kilowatt} \times 300
\]

The final incentive amount will be based on the actual installed equipment and associated ratings. All incentives are capped at the lesser amount of the project cost or $2,000 per premises for residential customers and $8,000 for commercial/industrial customers.

Example: A system of (22) 280 watt modules, which would have a nameplate capacity of 6160 watts (rounded to 6.2 kilowatts) could qualify for an incentive of $1,860.

Funding and Reservations

Project funding is available on a first-come, first-served basis. Incentive rates and limits, as well as program guidelines, are subject to change without notice and at the sole discretion of Snohomish PUD. Project funding is confirmed when the Approval to Construct is issued. The reservation is valid for 120 days and may be extended by written request and PUD approval.

Program Eligibility

Customer Eligibility

All Snohomish County PUD residential, commercial and industrial customers with an active electrical service account(s) in good standing may be eligible. New Construction customers must have a filed new service request with the PUD’s Engineering Department.

• For new construction projects, the solar installation premises must be grid-connected to Snohomish PUD
with a permanent PUD meter installed at the time of the final inspection.

- For solar hot water systems, the customer must be offsetting an electric water heater.
- Condominium/Homeowner Associations are eligible if they meet all of the Program Eligibility criteria.
- Individual condominium homeowners or community association homeowners are responsible for obtaining project approval from their homeowners association prior to submitting an application to the PUD.
- Multi-family (more than 4 units), rentals and leased properties must demonstrate project approval from the property owner.
- All existing customers applying for an incentive must have an active PUD account in good standing.

**Installer Eligibility**

The solar systems must be installed by a PUD-registered Solar Installer. Registered Solar Installers are required to maintain, and provide proof of, current license(s), bonding and insurance. They may only supply eligible equipment, install the system to PUD specifications and provide warranties as required by the program. Registered Solar Installers have attended a PUD training session on the Program requirements, specifications and application process. A list of PUD-registered Solar Installers is available at www.snopud.com/solarexpress.

Snohomish County PUD provides an Installer listing for informational purposes only. The PUD makes no warranty, of any kind whatsoever, including, without limitation, the warranty of merchantability or fitness of purpose. Under no circumstances will Snohomish County PUD be liable for indirect, special consequential punitive or exemplary damages. Any contract or communication between any Installer and any customer is exclusively between those parties.

**System Eligibility**

All equipment must be commercially manufactured, new and meet equipment specifications requirements in this handbook. Existing systems or systems under construction are not eligible. All systems must have pre-approval prior to construction to be eligible.

New additions to existing systems are eligible if all program requirements are met. Only the new portion of the system would be eligible for an incentive, subject to the incentive limits established per premises. Existing system information should be submitted with the applications.

Installations shall be properly permitted (where required) and inspected to comply with all applicable codes and standards set forth by the local, state and federal governmental authorities. The system must be optimally sized and placed for maximum annual performance and designed for Snohomish County climate conditions.

- **Solar Hot Water Systems**
  SHW systems must be installed to offset/augment an existing electric water heater. Residential solar hot water systems shall be sized to supply at least 40% of a home’s domestic hot water demand. Commercial/Industrial SHW systems must have at least 35 square feet of collector area. SHW collectors must be SRCC OG 100 rated.

- **Photovoltaic Systems**
  The PV system equipment must be UL listed, 1703 for modules and 1741 for inverters, new equipment that will offset existing on-site, grid-connected electrical loads. PV systems must meet PUD interconnection requirements. A Net Metering/Interconnection agreement and revenue meter are required for all PV installations. The production meter is required only if the customer is participating in the WA state cost recovery incentive (production incentive).
Site Eligibility

Total Solar Resource Fraction (TSRF) accounts for shading, panel tilt, and azimuth (direction relative to south). Eligible sites must have at least 75% TSRF, meaning the solar array will have at least 75% of the sunlight available to a completely unshaded and perfectly oriented array on the same site. Deciduous trees should be counted as solid objects for shading analysis. Documentation must be provided from a Solar Pathfinder or Solmetric Suneye solar site assessment device. Solar access will be confirmed during the pre-inspection by PUD inspectors.

Partial shading of photovoltaic modules can cause large reductions in system output. Even building elements like vent pipes and chimneys must be evaluated when siting modules, especially single and multi-crystal PV modules.

An energy assessment conducted by PUD inspectors or engineers is required to issue an Approval to Construct. There is no charge for this service to Customers participating in the Program.

Interconnection and State Incentive

All PV systems require a PUD interconnection application and Net Metering/Interconnection agreement. The application and agreement can be found on www.snopud.com/solarexpress. PUD Rate Schedule 200 applies to net metered customers. The State Production Incentive agreement is incorporated into the Net Metering/Interconnection agreement as Addendum 1 and participation is optional.

The Customer is responsible for submitting the Renewable Energy System Cost Recovery Certification to the WA Department of Revenue when the system is installed in order to participate in the production incentive. A copy of the approval letter from the state Department of Revenue is required to be sent to Snohomish PUD to participate in the annual incentive payment. If you designate Snohomish County PUD on the certification form, WA Department of Revenue will send the certification directly to the PUD. The certification form can be found at www.snopud.com/solarexpress or www.dor.wa.gov.

Per state law, the signed Renewable Energy System Cost Recovery Annual Incentive Payment Application must be submitted to the PUD every year by August 1st in order to retain credits for the associated fiscal year and to continue receiving the incentive payment. The PUD will prepare the annual application and make it available to participating customers.

Equipment Specifications

General Specifications

Materials used outdoors should be sunlight/UV-resistant, NEMA (National Electrical Manufacturers Association) approved and rated for outdoor locations. The system and its components are required to be designed to withstand the extreme temperatures and weather conditions for the system location. For example, a system located in Edmonds will have different design conditions than one located in Darrington.

Dissimilar metals that have galvanic action (such as aluminum & steel) must be isolated from each other using standard industry practices. Aluminum must not be placed in direct contact with concrete materials. Only high quality fasteners may be used, with a preference for stainless steel. Structural members shall be either: corrosion-resistant aluminum (6061 or 6063), hot-dipped galvanized steel (per ASTM A123), coated or painted steel (not allowed in marine environments), or stainless steel (preferred for marine environments).

Equipment shall be permanently affixed to a structure located on the customer's property and installation shall be completed in a timely and workmanlike manner. The installation must be of industry standard and workmanlike quality by a licensed Installer according to the National Electrical Code (for PV) and Uniform Mechanical Code (for SHW). Electrical equipment must be listed for the current and voltage requirements of the application. Modified equipment that voids UL listing or manufacturer's warranties is not allowed.

All required over-current protection must be accessible for maintenance. DC disconnect must be provided so that the inverter can be safely removed for service. The PUD does not require an AC disconnect for single-phase, 120/240 volt systems under 25 kW with a self-contained meter, as described in the PUD Electrical Services Requirements (ESR).
All components must be installed per manufacturer’s specifications. PV systems must be grid connected, per PUD interconnection standards, with a valid Net Metering agreement in place, and have a utility grade accumulating kilowatt-hour production meter if the Customer has chosen to participate in the state Renewable Energy System Cost Recovery Incentive.

**Array Mounting**

Collector orientation may not be more than 90 degrees east or west of true south (not magnetic south).

If roof mounted, the roofing material beneath the installation must appear to have at least 15 years of useful life remaining to ensure that the roof will not need repair or replacement early in the solar system's operational life. The customer will affirm this on the Program application and the Installer should confirm the estimation.

Augmentation of roof structure may be required by building department if ability to support added loads of solar system is questionable. Array racking and mounting systems must be designed to meet local wind, snow and seismic load requirements. All roof penetrations must be sealed with industry-approved methods. All mounting equipment must be installed per manufacturers’ specifications.

**Performance (PV only)**

Array must be sized to operate within the current, voltage and power limits approved and warranted by the inverter manufacturer. The temperature-adjusted array voltage must remain within the inverter limits at the historical record high and low temperatures for the system’s location. Wires must be sized to keep voltage drop at or below 2% in the DC conductors from the array to the inverter, including the existing wire whips on the PV modules. Voltage drop should be calculated using temperature adjusted Vmp (max power voltage) of the array for the location’s record high temperature. Wires must also be sized to keep the voltage drop at or below 2% in the AC conductors from the inverter to the service panel to maintain the AC voltage within the inverter’s operating limits. Voltage mismatch caused by partial shading of the array, different orientations of strings within the array and by variations in module voltages will be minimized, allowing the inverter to operate within its maximum power point window. Inverter amperage should be checked for accuracy during installation.

Manufacturers rate panel output + or – 10%, inverter inefficiency and line losses equate to a reasonable performance range of + or – 20%. Installer shall warrant 80% of the PV system’s estimated output, as calculated by PV Watts computer simulation program, available free of charge through www.nrel.gov, for two years. The estimate shall be provided in the original bid.

**Battery-based Systems**

Batteries must be located in a secure enclosure that meets seismic requirements and is weatherproof as needed. Flooded lead acid batteries must be enclosed away from occupied spaces and ignition sources, and must be vented to the outdoors. Battery banks above occupied spaces must have adequate spill containment. Access to live battery terminals must be limited per code.

Battery interconnect and inverter cables must be properly sized, with secured crimps and lugs on ends. Charge controller and inverter settings must be appropriate for the installation’s batteries, and set for optimum grid-tied performance.

Temperature compensation probes for inverter and/or charge controller must be installed to control proper battery charging. Array configurations must operate within current and voltage limits of charge controller, accounting for temperature-adjusted array voltage under record high and low temperatures for that location. Customer manual must include instructions for operation, maintenance and safety procedures for batteries, charge controller and inverter.

**Metering & Interconnection (PV Only)**

A new electronic kilowatt-hour revenue (net) meter and production meter (if participating in the state Renewable Energy System Cost Recovery program) will be installed and maintained by the PUD to replace the existing
A utility grade accumulating kWh production meter is required for all PV systems participating in the state Cost Recovery Incentive program and is located between the inverter and the service panel. A variance application must be submitted as part of the interconnection application if the production meter will be greater than 15 feet from, or not within sight of, the revenue (net) meter. The PUD supplies and installs this meter on the customer/installer supplied meter base at the same time as the revenue meter replacement. A fee is charged for this installation and is payable by check at any PUD local office.

PV systems that incorporate batteries and/or additional generators, may require additional metering. Solar metering requirements are identified in the PUD’s Electrical Service Requirements (ESR), available at www.snopud.com (click on Construction). Sample metering diagrams can also be found at www.snopud.com/?p=1492.

Interconnection requirements and application, Net Metering/Interconnection Agreement, and state cost recovery incentive specifics are available online at www.snopud.com/solarexpress. The Net Metering/Interconnection Agreement outlines the specifications and fees associated with interconnection and the WA state production incentive.

**Other Requirements**

**Warranties**

Installer must provide written warranty providing the following minimum 2 year guarantees from the date of state and/or city code official sign-off: 1. PV system will produce 80% of estimated AC output, 2. Equipment shall be free from defects in materials and workmanship. The warranty shall cover all labor for any repairs resulting from equipment defects or Installer’s workmanship.

- **PV equipment warranty:**
  - PV Modules – 20 years at 80% production of rated output
  - Inverters – 5 years against manufacturer defects
  - Workmanship – 2 years

- **Solar Hot Water**
  - Collectors – 10 years
  - Workmanship – 2 years

**Customer Manual**

Upon completion of installation and before final project approval, Installer must provide the Customer with a system owner’s manual (“Customer Manual”) and instruct the Customer on proper system operation and maintenance. The Customer Manual provides accurate system documentation for the current system owner, maintenance staff or service company staff, as well as future owners. The Customer Manual must contain, at minimum, three sections:

1. System Design and Operation
2. Warranties and Installation Documentation
3. Manuals and Data Sheets

The PUD inspector may verify the Customer was provided this manual during the final inspection.

**Renewable Energy Credits**

Renewable Energy Credits (RECs) are associated with the environmental attributes of a system that generates electricity from a renewable fuel source and are separated from the system’s energy production. For PV systems constructed or installed with a cash incentive through the Solar Express Program, the PUD will own all RECs associated with that solar system upon the final PUD approval of the system(s). If a customer wishes to retain
RECs from a solar system constructed or installed without PUD incentives, then the production output of that solar system must be separately metered from the production output of the solar system(s) that is (are) constructed with PUD incentives. Additional utility meter fee(s) may apply.

**Projects NOT Eligible for Program**
- Installations operating or under-construction.
- Off-grid installations
- Solar pool and spa heating
- Systems with equipment that does not meet Program specifications
- Systems that are rated above 100 kW DC nameplate capacity
- Installed solar systems that do not meet PUD specification, interconnection (PV only) or applicable building codes and/or did not have pre-approval
- Additions to existing PV systems where the incentive limit has already been reached for solar installations at that premises

**How to Apply**

**Step 1 – Site Assessment**
Before applying for an incentive, have a solar site assessment to determine if your site is suitable to make efficient use of solar energy for producing electricity or hot water. Solar designers and Installers perform this service and may charge a fee for this service.

**Step 2 – PUD-registered Installer Bid**
If the site assessment demonstrates at least 75% Total Solar Resource Fraction (TSRF), contact one of the PUD’s Registered Solar Installers for a system bid (or they may have provided the solar access information). They will also need to supply: a one-line diagram of the system, manufacturers’ cut sheets for the PV panels, voltage inverter and/or hot water collectors, net metering and interconnection paperwork (for PV systems), PV Watts estimated PV system AC annual output calculation, and the site’s solar access percentage documentation.

**Step 3 – Submit an Application**
Complete a PV and/or SHW application. Submit the application(s) and applicable additional required documents to: Solar Express (M/S E2) | Snohomish County PUD | PO Box 1107 | Everett, WA 98206-1107 or e-mail to: solarexpress@snopud.com.

**Step 4 – Pre-Inspection and Energy Assessment**
The PUD will contact the applicant to schedule an on-site pre-inspection and energy assessment of the home or facility. The assessment will identify cost-effective improvements that can be made to reduce energy usage, and there will not be a charge for this. The PUD has a variety of incentive programs to help with the costs of energy conservation equipment, products and services, for residential, commercial and industrial customers.

**Step 5 – Approval to Construct**
Upon approval of the application, verification that the equipment and proposed installation have met program specifications and that the PUD’s System Protection Engineering has approved the proposed system (for PV installation), the PUD will issue an Approval to Construct letter to the Customer and PUD-registered Solar Installer. The PUD recommends you receive an Approval to Construct letter before signing a sales contract. If work begins prior to the Approval, the application/project will be ineligible for the PUD incentive.

The Approval to Construct will be valid for 120 days and funds will be reserved. If the project is not completed within 120 days, Customers or Installers may request an extension prior to the expiration date to avoid cancellation of the funding reservation.
Step 6 – Project Construction
Upon PUD notice of Approval to Construct, the PUD-registered Installer begins project installation. It is recommended to verify any modifications in the system installation that may affect eligibility with the PUD. The installation must also meet the requirements of labeling in the PUD’s Electrical Service Requirements (ESR), available at www.snopud.com (click on Construction). Complete all state and local code inspections and approvals prior to Step 7.

Step 7 – Notice of Completion
Upon completion of the project including “sign-off” by state and/or local code officials, submit a Notice of Completion. The Notice should include the following documentation.

- Revision of any original application information to reflect the as-built system
- Final invoice with total project cost, including any change orders
- Signed Energy Services Authorization (ESA) form
- Warranties that meet the Solar Express requirements

Send Notice of Completion to: Solar Express (M/S E2) | Snohomish County PUD | PO Box 1107 | Everett, WA 98206-1107 or e-mail to: solarexpress@snopud.com.

Step 8 – Final Inspection
A final on-site inspection will be conducted once the Notice of Completion is received. The PUD inspector will confirm the equipment installed and that the installation and metering meets PUD specifications.

Step 9 – PV System Interconnection
If the installation is approved, the PUD Metering Department will set an electronic revenue meter and production meter (optional). Residential PV systems are required to be left on at the breaker so that the PUD’s Meterman can verify that the inverter meets UL 1741 standards when meters are set.

Step 10 – Payment
PV incentive payment will be issued after all interconnection requirements are met, meters are set and the system(s) has final approval. SHW incentives will be issued after the system has final approval by a PUD inspector. The Customer may designate an alternate payee for the incentive on the Solar Express Application.

The PUD is not responsible for any taxes that may be imposed on your business or yourself as a result of your receipt of incentive funds.

Step 11 – PV System State Production Incentive
PV systems may be eligible for the state Renewable Energy Cost Recovery Incentive (production incentive), which is based upon actual system production at a rate dependent on the equipment installed per WAC 458-20-273. This is currently a credit on the PUD bill throughout the year and requires the confirmation letter from the state Department of Revenue that the system is certified and the annual submittal of the Annual Incentive Payment Application by August 1st of each year. The annual application must be received each year to retain the credits for the associated fiscal year and future credits.

Additional Considerations
Inspections
All projects will be inspected prior to the Approval to Construct confirming application information. An in-progress inspection may be completed if determined necessary by the PUD inspector or Program Manager. A final inspection will be performed by the PUD inspector upon Notice of Completion, which is sent to the PUD after the City and/or Labor and Industries official(s) have “signed off” the project, if required. For PV installations, an inspection after the project is completed is required to verify meter locations and PUD electrical requirements.
Discrepancies

The PUD will review all documentation for accuracy and completeness. If additional information is needed, the Customer will be contacted and requested to send the information within 14 calendar days.

If the application is found to not meet Program specifications, the Customer will have 30 calendar days to revise the application to conform to the Program specifications. All projects that do not meet Program requirements after the 30 day period will be cancelled.

For solar installations that do not meet the installation specifications during the final inspection, a deficiency letter will be sent to the Installer and Customer with 30 calendar days to correct the problem.

Changes from Approval to Construct

Any changes from the original project submission, after receiving an Approval to Construct, will require submission of modified project documentation with the Notice of Completion. If approval that the modification will meet PUD specifications is needed, the Customer or Installer is encouraged to contact the Program Manager before proceeding.

Program Forms

- Customer application/agreement – PV
- Customer application/agreement – SHW
- Net Metering agreement (including production incentive)
- Interconnection application for PV Systems
- Notice of Completion (available through the PUD website at www.snopud.com/tradeallies)
- Washington State Renewable Energy System Cost Recovery Certification (optional, and to be submitted to the WA Department of Revenue)

Forms are available at:

Online: www.snopud.com/solarexpress
Email request: solarexpress@snopud.com
Energy Hotline Request: 425-783-1700, Monday through Friday, 8 AM to 5 PM (toll-free in Western Washington & outside the Everett local calling area at 1-877-783-1000, extension 1700)

Program Contact

Solar Express (M/S E2)
Snohomish County PUD • PO Box 1107 • Everett, WA 98206-1107
425-783-1700
email: solarexpress@snopud.com