



Steps in the Solar Electricity Series

STEP 7

1. Building and Site Assessment
2. Conservation and Efficiency
3. System Options
4. System Components
5. System Sizing
6. Costs
- 7. Installation**
8. Operation and Maintenance
9. Electricity Use Worksheet

For more energy information, go to <http://energy.tennessee.edu>.

Installation

Pre-Installation Considerations

Before installing a solar electric system, check local building codes, subdivision covenants and zoning ordinances or regulations. Contact your local electrical or building inspector to determine requirements. The National Electric Code (NEC) Article 690 provides requirements for designing and installing a safe, reliable and code-compliant solar electric system. Using NEC criteria will ensure local code official approval. Check whether a building permit is required if installing a system on an existing building.

Review the covenants and contact the HOA Board or the management company if you live in an area with a homeowner's association (HOA). You may need to educate local building code officials and local representatives if you are the first in your area to install a renewable energy system. Contact your utility company to ask if it requires a specific Underwriter's Laboratories (UL)-certified inverter. The UL has developed a series of inverter safety requirements (UL 1741).

Other installation issues might include historic district guidelines/restrictions and future shading. Will any trees on your property or nearby property grow and shade the system panels? Be sure to communicate with neighbors about your plans and determine if they might plant trees or add an addition to a home that may shade your panels. Some government jurisdictions have solar access zoning regulations that prevent the blocking of the sun required for operation of any solar energy system. Tennessee law (66-9-201) allows the creation of easements to protect solar energy rights. This requires negotiation with neighboring property owners.

Who Will Install Your System?

Proper installation of your solar electric system will ensure maximum electrical output. Hiring a qualified company or contractor is recommended because proper installation entails numerous considerations and requires attention to safety (roof work, electrical hook-ups, etc.). Some manufacturers will extend a system's warranty if installed by one of their trained contractors. Some utility rebates will only be given if a system is installed by a trained and certified professional, and TVA (Tennessee Valley Authority) requires that the system be installed by a certified professional before it can be connected to the grid. Protect yourself and feel confident you are hiring a qualified professional by asking questions about experience, licensing, certifications and customer service.

Experience

Does the company or individual contractor have experience installing and providing maintenance for the type of system you want installed? Do they warrant their installation work? Do they provide system commissioning? Ask for the contact information of other customers, and, if possible, take time to see those systems and ask the owners about their experience with the system and the level of customer service received.

Licenses

All installation should be done by licensed contractors and electricians. However, some counties or jurisdictions have their own requirements. Always refer to your jurisdiction's electrical code before engaging with any installers or contractors. Note: A licensed electrician is required to connect grid-tied systems to the utility's grid.

Insurance

Be sure to ask about and see confirmation of liability and workman's compensation insurance. Have they taken safety training?

Certifications

Many installers take specialized training and exams to receive certifications. The North American Board of Certified Energy Practitioners (NABCEP) is one group that tests and certifies solar electric and other renewable energy system professionals. Their website lists NABCEP-certified professionals in each state (www.nabcep.org).

Trade organizations

Ask the company or installer if he/she is a member of a trade organization such as the Solar Energy Industries Association (SEIA). Are they a member of the Better Business Bureau (BBB)?

System Monitoring

Many companies now offer a system monitoring service that allows them/you to monitor the system through a web-based computer program.

Where Can You Find an Installer?

The Solar Energy Industries Association and its state chapters often provide lists of solar energy system companies by state or city. The Tennessee Solar Industries Association (<http://tennesseiasolar.com>) lists individual contractors that install renewable energy systems. You can also search the local phone book yellow pages.

Comparing Bids

Get bids from more than one company and compare. Have bids specify the system type, size, electricity output, warranty and maintenance requirements in addition to cost.

- Ask the installer if he/she installs packaged systems and whether the system or the individual components are UL certified.
- Because different PV panels generate different amounts of electricity, ask for the maximum generating capacity (measured in DC watts or kilowatts) under a Standard set of Test Conditions (STC) or under PVUSA Test Conditions (PTC). Or, ask the electricity output of the system at the inverter.
- Ask for an estimate of the amount of electricity the system will produce on an annual basis in units of kilowatt-hours (kWh) that will actually reach your electrical load.

- Ask how the panels will be attached to the roof/what type of mounting system will be used.
- Ask about whole system or individual component warranties. Some solar rebates require a minimum system warranty. Installers may offer longer warranties.
- Ask that the bid include the following costs: installation, initial set-up and commissioning, all hardware, required National Electric Code (NEC) signage, permits, sales tax and warranties.
- Some companies will also research and complete the paperwork for available federal, state, local and utility incentives. Be sure to ask if they are including incentive deductions in their cost estimates, and be aware some incentives arrive after the system is installed and that you will typically need to pay the full, initial cost up-front.

Are You a “Handyman” or “Handywoman”?

If you decide to install your own system, be sure to educate yourself and take time to attend classes, workshops or trainings where you can learn from qualified instructors. The system will have to be inspected and approved before it can be connected to the utility grid.

Whether you hire a contractor or install the system yourself, make sure it is done correctly and safely.

References

- National Electrical Installation Standards. (no date). Retrieved April 3, 2014, from http://www.neca-neis.org/state/state_regs.cfm#tennessee.
- National Renewable Energy Laboratory (produced) for U.S. Department of Energy. (2009, January). Own Your Power! A Consumer Guide to Solar Electricity for the Home. DOE/GO- 102009-265.
- U.S. Dept. of Energy. (2010, Oct.). Community Solar Access. Retrieved February 8, 2011, from http://www.energysavers.gov/renewable_energy/solar/index.cfm/mytopic=50013.
- U.S. Dept. of Energy. (2011, Feb.). Installing and Maintaining a Small Solar Electric System. Retrieved February 16, 2011, from http://www.energysavers.gov/your_home/electricity/index.cfm/mytopic=10820.
- U.S. Dept. of Energy. (2012, July). Planning a Home Solar Electric System. Retrieved March 1, 2014, from <http://www.energy.gov/energysaver/articles/planning-home-solar-electric-system>.

Original work created by Montana State University Extension and the University of Wyoming. Adapted for use in Tennessee by Elizabeth Gall, Department of Biosystems Engineering and Soil Science.

R01-5120-101-028-14 SP 758-H 14-0204 04/14 100

Programs in agriculture and natural resources, 4-H youth development, family and consumer sciences, and resource development. University of Tennessee Institute of Agriculture, U.S. Department of Agriculture and county governments cooperating. UT Extension provides equal opportunities in programs and employment.