

The National Electric Code and You

John Wiles

In my trips around the country testing photovoltaic systems and presenting seminars on PV and in the numerous phone calls I get, I am frequently asked: "Does the National Electric Code (NEC) apply to me and my alternate energy system?" My response is: "It depends." Applicability of the NEC or other codes varies from state-to-state, county-to-county, city-to-city, and rural area-to-rural area.

NEC -- Just Paper, But....

The National Electric Code is merely one of many "codes" published by the National Fire Protection Association. It was developed and is maintained by volunteers from the electric power industry which include representatives from the utility companies, the public sector, the electric equipment manufacturers, and others. The PV industry is represented by a member on Panel No. 3 (where our PV Article 690 is discussed) who is sponsored by the Solar Energy Industries Association.

The NEC was developed to provide a standardized, country-wide set of guidelines for connecting and handling electric power safely at the final destination after it leaves the utility power distribution system. The utility companies are provided guidance in their power generation and distribution system operation by the National Electric Safety Code (NESC), a document published by the Institute of Electrical and Electronic Engineers (IEEE). Both of these codes assume and require that standardized devices be used to handle the power and make the connections so that a specialized, custom engineering effort is not required every time electrical power is used. The utility companies have very high, industry-established standards on the equipment they use. The term "utility grade" usually means very high reliability, durability, safety, and cost. After the power leaves the utility distribution system, the NEC provides guidance on the manner and method of connecting the power handling and generating equipment (including alternate energy system). The NEC requires that electrical power be handled by equipment that is designed, tested, and approved to national standards by a nationally recognized testing organization.

Most, if not all, of the ac electrical equipment used in households and commercial businesses throughout the United States has been tested, listed, labeled, or otherwise approved by Underwriters Laboratories (UL). UL has been around almost as long as the NEC and tests

many other categories of products such as the fire rating of roofing products. Local electrical inspectors are familiar with UL approved products and readily admit they do not have the time, knowledge, or funding to determine the suitability of testing done by the manufacturer or other laboratories. In some metropolitan areas, certain fabrication shops are recognized by local electrical inspectors as building equipment such as custom panel boards to UL standards. UL not only tests and approves products, they more importantly establish the material, construction, and interface standards that apply to electrical equipment.

The Code and You

The NEC is "just" a document. However, in most states, many major cities, and a large number of counties and other jurisdictions, the NEC has been legislated into the construction codes as a law. This means that if an electrical power system is installed in a manner that does not conform with the requirements of the NEC, then it does not meet the requirements established by law. There are numerous variations on this basic tenant. Many jurisdictions have local codes that supplement the NEC -- in some cases in a more restrictive manner. The local code may be the previous edition of the NEC. For example, the 1987 NEC may still be the legal code in 1991 in Podunk USA. In some areas, landowners having 40 acres or more do not have to comply with electrical or sanitary codes. In other cities, the electrical or building inspectors have gone on record that direct current or PV power systems are not going to be inspected. In some states, the inspectors are examining every PV-powered billboard, water pump, and stand-alone installation. A few states allow homeowners to do their own wiring, others require a licensed electrician. A telephone call to your local building inspector or electrical inspector will quickly reveal the requirements in your area and whether your system comes under a city, county, state, or possibly no code at all.

Guidelines and Suggestions

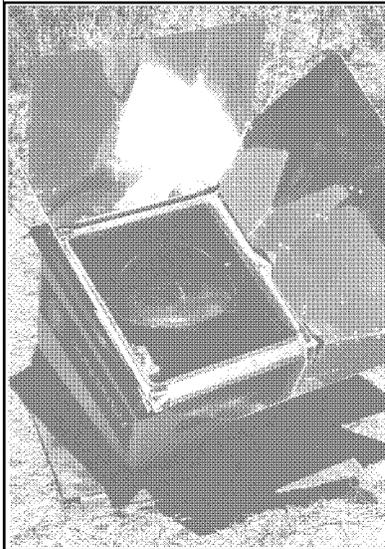
The National Electric Code provides safety guidelines for power systems used by the general public -- that's you and me. If these guidelines were followed in the installation of PV systems and the equipment carefully chosen, the PV system reliability and safety would in most cases increase significantly as would the durability, and performance. While your alternate energy system may never be inspected and your local laws may not even require code compliance, it may be to your benefit to follow the guidelines in the NEC. You can buy a copy of the NEC from the local electric supply company, look at a few houses being wired, make friends with an electrician, and review the suggestions in these Code Corner articles. They are just that -- suggestions. I do not attempt to interpret the NEC, I just paraphrase it and highlight the material that appears to be associated with our alternate energy systems. The local inspector, if any, has the final say.

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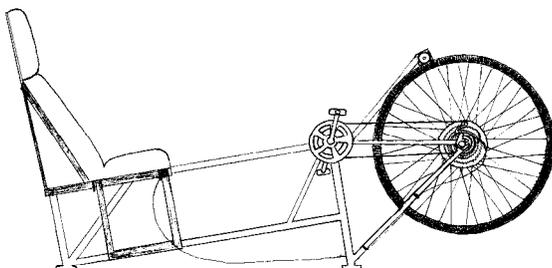
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