

Solar Electricity In Vermont

By David Palumbo, founder, Independent Power LLC

Germany is located further north and is, also, cloudier than Vermont. That is an interesting fact here in Vermont because Germany leads the world in solar electric systems installed. If an area cloudier than Vermont, and located further north, can have success with solar electricity than certainly Vermont will also have success with PV.

The solar electric industry is one of the fastest growing economic sectors on earth. Photovoltaic power, or PV for short, is produced when the light from the sun falls on a PV panel. Sunlight has photon energy that produces electricity when coupled with the semi-conductor properties in a PV panel. Scientists have known of the possibilities for solar electricity for almost two hundred years. Albert Einstein won a noble prize on the photoelectric effect in the early nineteen hundreds. It was not until the 1950's that developments in the semi-conductor industry made production of PV panels possible. They were first used with great success in the cold and harsh exposures of space to power the electronics in satellites orbiting earth. Next PV was used to power remote locations such as industrial and military outposts all over the globe as well as off-grid homes (houses not connected to utility power). Of great interest is the fact that over 95% of the PV panels in use since the 1960's and 70's are still producing power.

Worldwide sales have been increasing by 30% to 40% annually for several years now. Major corporations and influential investors have recognized that solar electricity has, by far, the greatest potential for generating power worldwide of any renewable energy source. In fact it dwarfs the potential for all other renewable energy sources combined.

In the past ten years most of the growth in the PV industry has been driven by grid-connected systems in major urban and suburban areas around the world. PV panels are going up on the roofs of manufacturing plants, supermarkets, even on the walls of skyscrapers. Anywhere the sun shines there is an opportunity to make clean, renewable power. Of all of the various types of renewable power, solar is the easiest to site properly. Just point the panels to the southern sky (here in the northern hemisphere) and make sure that there is little to no shade on the panels during the daylight hours. Ground mounted locations can work just as well as roof top PV arrays.

Grid-tied PV systems have many advantages over off-grid systems that require storage batteries. Laws in Vermont (as well as most states) mandate that your utility power company buy back any excess electric power your PV system produces at the going retail rate. This is called net metering. Your utility uses any extra solar power that you have generated, over and above what you are using to power your own home, on its grid to help power your neighborhood. They keep track of the excess power you have generated as credits on your account. You draw against these credits during cloudy periods. In this way, solar electricity your PV system generated in June can be used to lower your power bills in cloudy November.

Many countries, and some states in the US, are paying a premium for PV power over their retail rates. Why is it such a big deal? What is so special about PV power? I could go on for more words than this story allows, but here are a few facts for starters. PV power matches the peak demand times for most utilities, that is a huge advantage. Power made in the middle of the night is not as valuable, as the demand for power is low then. In California and Germany utilities are already paying from 35 to 50 cents

per kWh for peak PV power! Peak power for most utilities is from noontime to 6:00 pm. PV power is also much easier to properly site and install than other renewable energy sources. PV power is just as effective when installed on small to mid sized systems, both on residences and small businesses, as when installed in large arrays. There is no efficiency loss for residential sizing as there is for wind power. Wind is always more powerful and effective the higher the turbine is and the larger the blades are, whereas PV simply has to be installed in sunlight with no shade on it to reach it's maximum efficiency for a given area. There are no moving parts and maintenance is "little to none" on typical grid-tied PV systems. Harsh, cold climates do not bother the PV panels; they have been well tested in the harshest climates on earth, as well as in space.

People often ask about payback when making the sizable investment necessary to have a PV system installed (from \$ 12,000 and up). The payback in terms of reducing the amount of carbon dioxide your home is responsible for, is immediate. For every kilowatt of PV power installed there is a reduction in carbon dioxide emissions of 1,350 pounds per year. This number takes into account the lower levels of sunlight here in Vermont versus sunnier areas. PV significantly contributes to the reduction of greenhouse gases when installed here in Lamoille County, just as it has in Germany. In terms of financial payback, PV systems are a good hedge against the significant price increases in electric rates that will be coming over the next five to ten years. Just this past winter peak rates on the wholesale power market went to \$1.00 per kilowatt-hour! Utility insiders have projected retail electric prices may rise up to the 50 cent per kWh range within ten years. Homeowners who have installed net metered PV systems are seeing anywhere from 25% to 95% reductions on their electric utility bills. Of course efficiency is still the first thing homeowners should do before investing in a PV system.

You may also wonder about how much energy it takes to manufacture the PV panels. In Vermont it takes only three years of generation for the PV's to produce more power than it took to make them. Keep in mind that many solar electric panels are still producing power after 40 years of generating power!

Please notice the omission of the wording "alternative energy", the industry now uses Renewable Energy to best describe what solar, wind, hydro, biomass, and geothermal accomplish. Worldwide the industry has gone mainstream and is no longer just an alternative. What we offer will increasingly be seen as a necessity.

There are incentive rebates offered by the State of Vermont. For more information go to www.ercvt.org/incentives/. And the federal government has tax rebates for both residential and commercial solar installations. These tax credits are especially attractive for commercial installations.

In my own business here in Lamoille County (Independent Power LLC) I have seen a large increase in sales. With over 300 PV systems operating, both grid-tied and off-grid, I can vouch for how effective a professionally designed PV system can be here in Vermont. Please call me at 888-7194 if you have any questions.

