

# THE SOLAR PATH

## A PHOTOVOLTAIC PRIMER



Dedicated to all the photovoltaic pioneers  
who were told that electricity from sunlight was  
too expensive and wouldn't work in Maine, and  
who went ahead and made it happen anyway.

by

**Sandra Mason Dickson**

Have you been told that solar power is now less expensive?  
Have you thought of getting solar but don't know where to start?

If you've waited for the price of solar to come down, you need wait no longer. Photovoltaics (solar electricity) that once competed economically only with fossil fuel generators for remote power needs is gaining use in homes and commercial applications across Maine as more people take personal responsibility to reduce their carbon footprint and lower their utility bills.



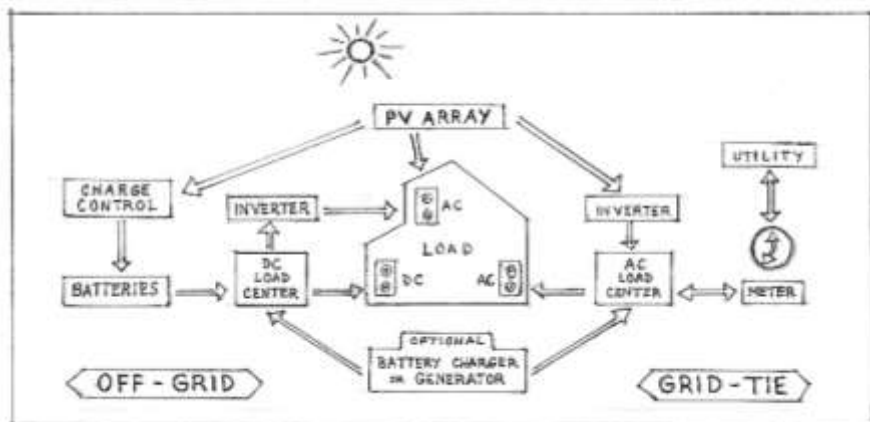
*THE SOLAR PATH* is an overview of PV designs, both off-grid and utility-tied, from very basic to full home and commercial solar electrification. It includes photos, a glossary of terms, and a list of Maine PV dealers/installers.

Author Sandra Dickson has promoted PVs since 1980. She and her husband live in a PV/utility home and support conservation in St. George and on Monhegan Island.

24-page booklet available:  
Mail order \$5 (includes tax & shipping)

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*PVs may be used off-grid or utility-tied for low power needs like lights and cell phones or large loads like appliances and cars, and with or without storage batteries or back power.*

*Concept illustration by Sandra Dickson*

## CONSERVATION AND SOLAR ENERGY -

In the past forty years, the basic principles of conservation and solar energy have not changed. As the earth revolves around the sun, the rate of insolation for any given spot is determined by timeless elements: latitude, seasons, daily weather, time of day, and shading.

Another basic principle is that as conservation measures for lights, space heating, hot water, and refrigeration increase, energy use decreases.

Since the 1970s, ecology and renewable energy have been a growing part of our culture. As Maine became a destination for many back-to-the-landers, a new wave of homesteaders began to settle on abandoned farms and in remote areas not yet serviced by utility power. Jobs were not always available, and many were living on low budgets, but they were willing to embrace a rustic lifestyle in order to escape over-populated areas with air pollution and high crime rates.

The cost of power line extensions led many to PVs. Depending on the distance required, it is not uncommon for a grid-tie connection to cost \$10,000, and that's before the monthly bills begin to arrive.



*The first PV system on Monhegan Island was installed at the author's home in January 1980. It has been the only source of electricity for forty years, providing power for lights, stereo system, laptop, printer, food blender, telephone answering system, and to recharge cell phones, cameras, and a cordless vacuum cleaner.*

*Installed by David Sleeper, Brook Farm*



*In 2002, the owners of Green Bean Catering bought 9 PV panels from Talmage Engineering for this completely off-grid system. It has 16 deep-cycle marine batteries and a back-up generator for winter. The two refrigerators are super-insulated with the motors on top. The ranges in the house and shop kitchen run on propane. Power conditioning installed by SolarWinds NorthernLights*

## COMMUNITY POWER and SOLAR FARMS –



*Before Central Monhegan Power was created, PV systems had begun to replace the forty noisy generators that rumbled throughout the rustic village. Today, the power company's two oil-run turbines are supplemented by a 40-panel solar array with a 10 KW industrial inverter contributing 3% of CMP's customers' power. Meanwhile, many island cottages continue to get 100% of their electricity from the sun.  
Installed by ReVision Energy*



*The St. George Transfer Station array greatly reduces CMP bills for the Town Office/Fire-Ambulance Dept., the Transfer Station, fire stations at Rte. 73 and Port Clyde, the sand & salt shed, and the ballfield. The town buys power at a reduced rate for six years and may purchase the system in the seventh year for half price.  
Installed by ReVision Energy*



*A solar farm sends large-scale power through the grid. Utility customers who can't install PVs on their own roof may buy power through direct purchase of shares, receiving energy credits or purchasing power at a reduced rate of 10-15%. This system is nestled on a hillside in Bradford, Vermont*

In the past fifteen years as the price of solar panels has been dramatically reduced, Maine has seen an impressive increase in residential, commercial, and community PV installations. Aside from better affordability, part of the increase has come from the Public Utilities Commission's requirements that include net metering and increase the number of users allowed for each solar farm.

The current solar tax credits are set to expire at the end of 2021 unless public demand succeeds in getting an extension.

## **PVS & SOLAR HOT WATER –**

*At the author's home in Port Clyde, the upper PV panel charges batteries for 12Vdc lights during power outages. Some solar lights are used regularly to save utility costs.*

*The small PV panel runs a pump to circulate water through tubes to a basement storage tank. Solar hot water supplements the furnace heating system, preheating cold well water so it takes less energy to bring it up to temperature.*

*Installed by Jonathan Coggeshall*







*The 30-panel grid-tie system for Hedgerow's house, nursery, gallery and shop lowers monthly bills and demonstrates the usefulness of solar electricity. Heat tapes are used in the greenhouse to start seedlings.*

*In the first 15 months after it was installed, the system saved 200 trees and 26,400 pounds of carbon emissions.*

*Installed by ReVision Energy*



*This 8 kW array provides power to Skoglunds' B&B in summer and energy credits from CMP in winter. The ground/wall mount, built in stages by the owner, allows room to expand that would be limited on a rooftop.*

*Assistance provided by Revision Energy and Michael Donnelly*



*A PV system is sometimes coupled with a wind turbine for power at night. The turbine may be connected directly to batteries or an inverter. These 75-watt panels supply energy to the house and feed unused power into the grid. The panels on this page were mounted by the owner. Purchased from Talmage Engineering*



*Slightly larger in size than their predecessors (above) but far more powerful, these 250-watt panels each have a small 12-VDC-to-110-AC inverter and are part of a 1.5 kW grid-tie system that provides daytime power to a year-round home. Electric bills rarely exceed \$13 thanks to conservation, Energy Star appliances, wood heat, and propane.*





*The PV array in this end-of-the-road year-round home provides up to 240 KWHs daily, reduces monthly utility bills, and charges marine batteries for power-outage backup. Installed by Talmage Engineering and Harbor Builders*



*The energy-conscious owners of this 26-panel system cut monthly utility bills in half. Installed by ReVision Energy*



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