

Renewable Energy

Renewable energy sources offer environmentally attractive alternatives to fossil fuels and nuclear power. Although no energy system can claim to be 100% pollution free, renewables are orders of magnitude better than our conventional energy systems. The U.S. Department of Energy estimates that the annual influx of accessible renewable resources in the U.S. is more than 200 times the total amount of energy used. Technologies for converting these energy sources into electricity or usable heat are improving in efficiency and dropping in price.

The simplest way to utilize renewable energy in buildings is with climate-responsive design—passive solar heating in winter, summertime cooling with natural ventilation, and daylighting.

The field of building-integrated photovoltaics (BIPV) is expanding dramatically, with enormous arrays of PV panels on large, institutional buildings and smaller arrays integrated into individual homes. These typically come in the form of panels that can be wall- or roof-mounted, though PV panels that serve a dual role as glazing and power production are now also available. Solar-domestic hot water systems have quick paybacks in climates where sophisticated freeze-control systems aren't needed.

In colder climates the paybacks are longer, but such systems can still be a very worthwhile investment.

While large-scale hydroelectric facilities are associated with some significant environmental problems (most notably the displacement of humans and other species, and the interruption of fish migration), carefully sited small-scale hydropower may be a good option.

The Union of Concerned Scientists estimates that wind power could supply one-fifth of U.S. electricity demand. Small, home-based wind machines range in output from 250 watts to 10 kilowatts (compared to utility-sized wind turbines can produce more than 750 kilowatts of power).

One issue affecting many renewable energy sources is that their power production varies with the time of day and season. In some cases, the peak production actually matches peak demand—for example, photovoltaic systems generate the most electricity on hot days, when cooling loads are highest. In other cases, different forms of energy storage are needed to match the energy demand with energy production.

Alternative Energy Balance of Systems Components

Inverters convert the direct-current (DC) power produced by the renewable energy system into alternating-current (AC) power needed for most conventional appliances or for feeding site-generated electricity into the power grid. Other power-conditioning equipment, controllers, batteries, and mounting equipment are also included here.

Fronius Grid-tied PV Inverters

Fronius USA LLC
10421, Ste. 1100
Solar Electronics Division
Brighton, MI 48116
Phone: 810-220-4414
www.fronius-USA.com

Fronius manufactures high-efficiency, lightweight, DC-to-AC inverters for residential-scale PV power applications. Most are used for grid-connected applications. The IG line of products has a wide DC-voltage range (150-450 V), and an LCD data display, with a maximum output power ranging from 2.0 to 5.1 kW. The Fronius USA Solar Electronics Division is a branch of the German company Fronius International GmbH.

GE Solar Systems and Modules

GE Energy
231 Lake Dr.
Newark, DE 19702
Toll-free: 866-750-3150
www.gepower.com

GE offers a range of solar electric power systems for residential, commercial, and industrial applications as well as polycrystal PV modules ranging from 66 watts to 200 watts. Grid-tied, remote, or building integrated systems for new construction or retrofit applications are available. In 2004 GE purchased Astropower, thus entering the photovoltaics industry.

GridPoint Connect Backup PV System

GridPoint Inc.
2020 K Street NW
Ste. 550
Washington, DC 20006
Phone: 202-903-2100
www.gridpoint.com

GridPoint Connect provides the balance-of-system (everything but the solar panel array) for a grid-connected PV backup power system. Gridpoint Connect combines the electronics, inverter, charge controllers, recyclable batteries, computer, and other needed components, in a single 'plug-and-play' device. This device connects to the main circuit breaker panel, PV array, communication line, and secure load panel (on which critical circuits are placed). The GridPoint Connect system ensures batteries are fully charged and supplies local power needs, feeding excess power to the grid. If the grid is down, the Connect system will power critical loads from the solar array and/or battery pack.

Inverters

Xantrex Technology
5916 195th St. NE
Arlington, WA 98223
Toll-free: 888-800-1010
Phone: 360-435-8826
www.xantrex.com

Xantrex Technology, formerly Trace Engineering, manufactures energy-efficient DC-to-AC inverters for residential, commercial, mobile, remote, and emergency applications. These are the most widely used inverters for PV and wind power systems. Inverters specially designed for feeding power into the electric grid are available.

Outback Power System Components

OutBack Power Systems
19009 62nd Ave. NE
Arlington, WA 98223
Phone: 360-435-6030
www.outbackpower.com

Outback Power Systems provides balance-of-system components including inverters, solar charge controllers, communication managers, and a range of other components and accessories for stand-alone, grid-tied, or backup photovoltaic power systems. Outback's FLEXware integration hardware allows horizontal or vertical mounting orientations for locations with limited wall space and can accommodate a wide range of power system sizes.

PV Controllers

Solar Converters Inc.
558 Massey Road, Unit 1
Guelph, ON N1K 1B4 Canada
Phone: 519-824-5272
www.solarconverters.com

Solar Converters Inc. is a designer and manufacturer of highly efficient power control products for the renewable energy field. Included among the products the company has developed are Linear Current Boosters, Battery Equalizers, Power Tracker™ charge controllers with Maximum Power Point Tracking (MPPT), Cathodic Protection Controllers, Generator Starters, Battery Desulphators, Constant Voltage Pump Drivers, Voltage Controlled Switches, Solar Lighting Controllers, DC-DC Converters, and more.

Smart Power M-Series Solar Power Conversion

Beacon Power Corporation
65 Middlesex Rd.
Tyngsboro, MA 01879
Toll-free: 888-938-9112
Phone: 978-694-9121
www.beaconpower.com

Beacon Power Corporation introduced the Smart Power line of inverters in 2003, with inverter technology acquired from Advanced Energy, Inc. (previously of Wilton, New Hampshire). The M-Series is a 4000- or 5000-watt grid connected solar inverter capable of operating during grid outages, providing true sine wave backup power to critical loads. The product includes the charge controller, inverter and switchgear all in one outdoor-rated enclosure. The company claims 90% efficiency at full output and 93% efficiency at 50% output.

Solar Controllers

Heliotrope PV, LLC
 3766 Kathryn Ave. Unit C
 P.O. Box 696
 Springfield, OR 97477
 Phone: 541-726-1091
 www.heliotrope-pv.com

Heliotrope PV manufactures electronic charge controllers for PV systems. Though marketed to recreational vehicle users, they are appropriate for any small PV system.

Solaris 3500XP

Alpha Technologies, Inc.
 3767 Alpha Way
 Bellingham, WA 98226
 Phone: 360-647-2360

The Solaris 3500XP system is an integrated 3.5 kW inverter and uninterruptible power supply (UPS) for grid-tied and off-grid photovoltaic applications. The system has a CEC rated efficiency of 91% and the company claims the system maintains its rated output over an operating temperature range of -20 to 50 degrees C. The system is designed to support either 120/240 or 208 VAC output and can include an optional 48 volt DC input for use with a DC generator or additional batteries.

Solectria Grid-tied PV Inverters

Solectria Renewables LLC
 360 Merrimack St.
 Building 9, 2nd Fl.
 Lawrence, MA 01843
 Phone: 978-683-9700
 www.solren.com

Solectria manufactures a line of high-efficiency DC-to-AC inverters for residential and commercial PV power applications, especially grid-connected systems. The products cover systems from 12-500kW and can include an optional internet-connected data logger and monitoring system. Solectria also manufactures inverters for connected or 'mini-grid' distributed generation with input from fuel cells, batteries, ICE, or heat engines. Solectria also provides engineering services and custom products for any 1-500kW distributed generation system.

Steca Solar Charge Controllers

SunWize Technologies
 1155 Flatbush Rd.
 Kingston, NY 12401
 Toll-free: 800-817-6527
 Phone: 845-336-0146
 www.sunwize.com

SunWize distributes Steca electronic charge controllers for PV systems. The Sunwize Steca controller is a self-learning controller that uses an advanced control algorithm combining battery temperature, battery voltage, and load discharge rate to determine the true battery state of charge(SOC), automatically adjusting for the capacity and age of the battery.

SunEarth Solar Equipment

SunEarth, Inc.
 8425 Almeria Ave.
 Fontana, CA 92335
 Phone: 909-434-3100
 www.sunearthinc.com

SunEarth, Inc., a manufacturer of solar water-heating equipment since 1978, produces flat-plate solar collectors, ICS and thermosiphon water-heating systems, and ancillary components including residential and commercial racking systems for both solar water heating and PV systems.

Sunny Boy Inverters

SMA America, Inc.
 12438 Loma Rica Dr.
 Grass Valley, CA 95945
 Phone: 530-273-4895
 www.sma-america.com

SMA America offers 2,500-, 1,800-, and 700-watt inverters designed for residential-scale photovoltaic applications. These German-made inverters carry a 5-year warranty and are being specified by some of the leading PV system designers today. The company also offers a larger, 125 kW inverter, as well as PV control and monitoring equipment.

UniRac PV Mounting Systems

UniRac, Inc.
 1411 Broadway Blvd. NE
 Albuquerque, NM 87102
 Phone: 505-242-6411
 www.unirac.com

UniRac produces systems for mounting PV modules. SolarMount® is a system of components for flat and tilted roofs. SolarMount/S-5! is designed for easy installation on standing-seam metal roofs. SunFrame offers building integration, a low-profile and a choice of finishes. PoleTops are ground mounting systems. U-LA is for arrays of 3-kW or more. UniRac recycles all solid waste and purchases recycled materials when available, including 20-25% post-consumer recycled aluminum and 75% recycled steel. In addition, most shipping materials are salvaged or have recycled-content.

Batteries for Alternative Energy Systems

Lead-acid batteries designed for use in solar applications are included here because of their application. Lead is a toxic heavy metal and should be recycled.

Deep-cycle, Lead-acid Batteries

Surrette Battery Company Limited
1 Station Rd.
P.O. Box 2020
Springhill, NS B0M 1X0 Canada
Toll-free: 800-681-9914
Phone: 902-597-3767
www.surrette.com

Surrette Battery Company Limited manufactures specialty batteries. The deep-cycle, lead-acid batteries for solar applications feature dual containers to withstand rough handling and prevent acid leakage. These batteries have a ten-year warranty, and an expected life of 15 years. Surrette is the parent company of the Rolls Battery Company in the U.S.

GridPoint Connect Backup PV System

GridPoint Inc.
2020 K Street NW
Ste. 550
Washington, DC 20006
Phone: 202-903-2100
www.gridpoint.com

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Building Integrated Photovoltaic Roofing

Photovoltaics (PV) enable the direct conversion of sunlight into electricity. Some PV modules are integrated into building components, such as roofing and wall glazings—these are often referred to as building-integrated photovoltaics (BIPV).

Sunslates

Atlantis Energy Systems, Inc.
4517 Harlin Dr.
Sacramento, CA 95826
Phone: 916-438-2930
www.atlantisenergy.org

Atlantis Energy Systems produces Sunslates®, which serve as both a roofing product and a solar-electric power source. Sunslates are fiber-cement shingles into which PV cells have been laminated. Each shingle has a plug-in wiring connection.

UNI-SOLAR PV Shingles and Standing Seam Panels

United Solar Ovonic LLC
3800 Lapeer Rd.
Auburn Hills, MI 48326
Toll-free: 800-843-3892
Phone: 248-475-0100
www.uni-solar.com

Uni-Solar Ovonic LLC PV Shingles and Standing Seam Roofing Panels are installed much like conventional roofing products. They generate electricity while protecting the structure from weather. PV Shingles, measuring 86.4" x 12" with 7 tabs, are interspersed among conventional 3-tab shingles. Standing Seam Panels are available for laminating onto conventional roofing or as a PV-integrated, standing-seam product. Lead wires from each shingle or panel enter the structure through drilled holes in the roof decking. Uni-Solar roofing products use triple-junction amorphous silicon technology.

Masonry Fireplaces

Burning wood creates significant pollution. Emissions of particulates, carbon monoxide, VOCs, and methane are significantly greater from wood stoves than from any other common heating fuel. However, when wood is locally available and can be harvested sustainably, it has no net impact on global warming—because the carbon emissions from combustion are more than compensated for by growing trees. Thus, if wood is burned in a manner that minimizes pollution, it can be a good fuel choice. Products listed here have superior burning efficiencies and reduced particulate emissions in comparison even the best wood stoves. The high thermal mass of masonry heaters and biomass-fueled boiler systems can more effectively capture, store, and release heat over time. The downside of a high-mass masonry heater is that the heat of a freshly lit fire may not be felt in the living space until several hours later. In passive solar homes this may make temperature regulation difficult.

Moberg Fireplaces

Moberg Fireplaces, Inc.
Cellar Building
1124 N.W. Couch St. Ste. 300
Portland, OR 97209
Phone: 503-227-0547
www.mobergfireplaces.com

FireSpaces is a dealer and manufacturer of masonry fireplaces. They also manufacture the masonry Moberg MRC and the Modern Rumford Masonry Fireplace Kit.

Temp-Cast Enviroheat Masonry Heater Kits

Temp-Cast
3409 Yonge St.
P.O. Box 94059
Toronto, ON M4N 3R1 Canada
Toll-free: 800-561-8594
Phone: 416-322-5197
www.tempcast.com



Temp-Cast is a modular masonry heater core kit featuring corner, 'see through,' and bake-oven models. Temp-Cast provides manuals detailing appropriate chimney construction with each masonry heater kit. Masonry materials for the chimney and the heater's exterior are sourced separately.

Tulikivi

Tulikivi U.S., Inc.
P.O. Box 7547
Charlottesville, VA 22906
Toll-free: 800-843-3473
www.tulikivi.com

Tulikivi's masonry heaters, available in over 25 different models, are made from soapstone quarried in Finland. Tulikivi masonry heaters produce a hot, clean-burning fire and efficiently transfer the fire's heat to the living space.

Packaged Solar Heating Equipment

These 'plug-and-play' systems include all of the necessary components for solar thermal systems. A wide range of technologies are employed for solar water heating, including integral-collector storage (ICS) systems, evacuated-tube collector systems, and flat-plate collector systems.

Architectural Solar-Hydronic System

Dawn Solar Systems, Inc.
183 Route 125, Ste. A-7
Brentwood, NH 03833
Toll-free: 866-338-2018
Phone: 603-642-7899
www.dawnsolar.com

The Dawn Solar System® uses looped hydronic tubing concealed in a one-inch layer between the roof or wall sheathing and the exterior finish material to capture solar heat. The collector system has a 25-year warranty and can be designed as an integrated system to produce heated air, water, and electricity from the same roof or wall area. The system is pre-engineered for each application. In cold climates, a closed-loop glycol system is recommended. The system qualifies for government energy incentives.

CopperSun

Sun Systems, Inc.
2030 W. Pinnacle Peak Rd.
Phoenix, AZ 85027
Toll-free: 800-777-6657
Phone: 623-869-7652
www.sunsystemsinc.com

Sun Systems manufactures the CopperSun™ integral collector storage (ICS) solar water heater. The unit is designed for integration into a roof, with flush mounting and a flashing kit for roofing right up to the textured-glass cover plate. Systems are available with either a 40- or 50-gallon capacity. The company is primarily pursuing the new-home builder market in the Sun Belt, as the CopperSun system is not appropriate for heavy-freeze climates.

ECO-Nomad

Architectural & Community Planning Inc.
261 Albany St.
Winnipeg, MB R3G 2A9 Canada
Phone: 204-831-0216
www.economad.com

The ECO-Nomad™ combined mechanical utility container provides utility services to off-grid locations by creating a self-contained, integrated micro-infrastructure, including potable water storage and purification, biological wastewater treatment, water and space heating, electrical supply, and fire protection. All functions can be remotely monitored. The portable 8' x 8' x 16' utility container can be transported by road, rail, water, or air. Designed for extreme winter conditions, uses include remote residential, tourism, or commercial facilities; temporary mining or logging camps; disaster relief; and remote airports and weather stations.

Flat Plate Water Heating Systems

ACR Solar International Corporation
5840 Gibbons Dr., Ste. G
Carmichael, CA 95608
Phone: 916-481-7200
www.solarroofs.com

The Skylite 10-01 is a lightweight, easy-to-ship solar water heater that weighs only 19 pounds. SolarRoof also offers offers a number of closed- and open-loop kits with DC or AC pumps and all the fittings, including systems for hard freeze climates. The company is known for its Fireball solar water heating products.

Gobi Solar Collectors and Helio-Pak Solar Water Heater

Heliodyne, Inc.
4910 Seaport Ave.
Richmond, CA 94804
Phone: 510-237-9614
www.heliodyne.com

Heliodyne is a manufacturer of flat-plate solar collectors and heat-transfer systems for residential and commercial water heating.



Renewable Energy Equipment

Solar Energy, Inc.
5191 Shawland Rd.
Jacksonville, FL 32254
Phone: 904-786-6600
www.solarenergy.com

Solar Energy Inc. (SEI) is a manufacturer and distributor of a variety of solar water-heating systems for commercial or residential applications. The turnkey, drainback SUN HoM system has one or more roof-integrated flat-plate solar collectors and uses a controller and pump to circulate a heat-transfer fluid. When the pump shuts off, water drains to an insulated reservoir to protect from freezing. Solar Energy also sells other alternative energy systems including PV and wind power.

Solahart Solar Water Heating Systems

Rheem Water Heating
101 Bell Rd.
Montgomery, AL 36117
Phone: 334-260-1586
www.rheem.com



Solahart's Free Heat series is a closed-circuit thermosiphoning solar water-heating system utilizing a heat-transfer fluid that circulates around a jacketed water tank. The Free Heat series comes with a 10-year warranty in a range of tank sizes and panel configurations. It is designed for use in virtually any climate. Other models, also available in various sizes, have specific design criteria—including the J series for areas with medium to good solar radiation, poor water quality, or frost conditions; the KF series for low to medium solar radiation, poor water quality, or frost or snow conditions; and the L series for frost-free areas with medium to high solar radiation and relatively clean water supplies. The J and KF series have a five-year warranty. The L series has a 10 year warranty. Solahart is a division of Rheem Water Heating.

Solar Collectors

Integrated Solar LLC
2030 W. Pinnacle Peak Rd.
Phoenix, AZ 85027
Toll-free: 800-927-2326
Phone: 805-928-1881
<http://radcosolar.com/about.html>

Integrated Solar LLC manufactures Radco glazed flat-plate solar collectors and Radco complete drainback solar water-heating systems for areas with freezing weather conditions. The company also produces a line of Radco unglazed solar pool-heating systems.

Solar Collectors

R&R Services Solar Supply
922 Austin Ln., Bldg. D
Honolulu, HI 96817
Phone: 808-842-0011

R&R Services Solar Supply is a manufacturer of copper-tube/absorber flat-plate collectors. The company packages solar water-heating systems for sale throughout Hawaii.

Solar Water Heating

EnerWorks Inc.
252 Hamilton Crescent
P.O. Box 9
Dorchester, ON N0L 1G0 Canada
Phone: 519-268-6500
www.enerworks.com

The Solar Hot Water Appliances from EnerWorks provide auxiliary hot water heating for washing, cooking, and space conditioning. These systems utilize low-flow, natural convection for long-term reliability, reduced first cost, and lower operating cost. The system consists of one or more flat-plate solar collector panels, fluid transfer lines, a stainless steel heat transfer module (designed to fit on any new or existing electric storage-type water heater), and a controller. The manufacturer claims average energy savings of 50% for full-year operation in southern Ontario and Northern U.S., and up to 100% for seasonal installations.

Solar Water Heating Systems

SCHÜCO, LP
240 Pane Rd.
Newington, CT 06111
Toll-free: 877-472-4826
Phone: 860-666-0505
www.schuco-usa.com

Schüco manufactures solar water-heating systems with a controller and pump to circulate a heat-transfer fluid. The system allows for air-purging without accessing the panels. Panels have anodized aluminum hardware and frames. The Solar Thermal Slim Line package is the basic model with two installation options for pitched roofs. The Premium Line has higher system efficiency and a wide range of frame colors and installation options. Schüco also offers custom systems for large installations, apartment buildings, and swimming pools. These products are manufactured in Germany.

Solar Water-Heating Systems

Thermo Dynamics Ltd.
101 Frazee Ave.
Dartmouth, NS B3B-1Z4 Canada
Phone: 902-468-1001
www.thermo-dynamics.com



Thermo Dynamics manufactures a full range of solar water-heating systems with liquid flat-plate, glazed collectors with fused copper tubing and aluminum absorbers. The company also produces the Solar Pump™—a PV-powered pump—and a thermosiphoning heat exchanger.

SUN HoM Solar Hot Water System

Solar Energy, Inc.
5191 Shawland Rd.
Jacksonville, FL 32254
Phone: 904-786-6600
www.solarenergy.com

SUN HoM DHW is a solar water heating system appropriate for all climates. The active-indirect, drainback system uses a propylene glycol mixture (or plain water in non-freezing climates) in the collector panels, and transfers the heat from that fluid to the domestic water using a heat exchanger. When the sun isn't out, the system shuts down. Unlike thermosiphoning systems, this one uses small electric pumps; the hot water storage tanks (available in 80 or 120 gallon sizes) don't need to be above, or even particularly near, the collector panels. The system lends itself well to retrofit applications.

SunChiller

Sun Chiller
220 S. Kenwood St., Ste. 305
Glendale, CA 91205-1671
Phone: 818-240-4500
www.sunchiller.com

The SunChiller provides air cooling as a primary output, with space and water heating also possible. The system uses vacuum-tube heat-pipe solar thermal collectors to heat water, which drives an absorption chiller to provide cooling. Water serves as the "refrigerant," avoiding the use of ozone-depleting compounds. A SunChiller can be used in a hybrid system to provide space heating and water heating in addition to absorption cooling. The system can be configured to provide solar-powered absorption cooling during electrical peak hours, with a more conventional electric chiller taking over during lower-cost off-peak hours. The system combines vacuum-tube solar-thermal collectors, an insulated storage tank, a single-effect water-heated absorption chiller, a cooling tower, an energy management system, and air handler. It is available as an integrated system for commercial buildings requiring air conditioning capacity of at least 10 tons.

SunCoil

Taylor Munro Energy Systems Inc.
11-7157 Honeyman St.
Delta, BC V4G 1E2 Canada
Phone: 604-946-4433
www.taylormunro.com

The SunCoil from Taylor Munro Energy Systems is an active solar water heating system for residential or commercial installations. According to the manufacturer, residential SunCoil systems in temperate climates are typically designed to meet 50-60% of the total annual hot water demand, with up to 100% provided during peak summer performance and more supplemental heat needed during the rest of the year. In tropical climates, the SunCoil can provide 80-100% of the hot water demand. Multiple panels can be used to provide institutional water heating for showers and other domestic use, as well as for pools, hatcheries, and process water. The SunCoil system can also be designed for combined water and space heating.

SunEarth Solar Equipment

SunEarth, Inc.
8425 Almeria Ave.
Fontana, CA 92335
Phone: 909-434-3100
www.sunearthinc.com

SunEarth, Inc., a manufacturer of solar water-heating equipment since 1978, produces flat-plate solar collectors, ICS and thermosiphon water-heating systems, and ancillary components including residential and commercial racking systems for both solar water heating and PV systems.

Sunwell

Taylor Munro Energy Systems Inc.
11-7157 Honeyman St.
Delta, BC V4G 1E2 Canada
Phone: 604-946-4433
www.taylormunro.com

The Sunwell three-season batch (or integral collector storage – ICS) solar water heater from Taylor Munro Energy Systems consists of a stainless steel tank and a parabolic reflector inside an insulated, glazed housing. It is most commonly used as a preheater for a conventional water heater. It runs on line water pressure; no additional pump, tank, or heat exchanger is required. According to the manufacturer, the system can provide up to 100% of a family's water heating energy load in non-freezing climates and up to 40% in freezing climates. The unit should not be used during freezing seasons.

Winston Series CPC Collector

Solargenix Energy, LLC
2101-115 Westinghouse Blvd.
Raleigh, NC 27604
Phone: 919-871-0423
www.solargenix.com

The Winston Series CPC Collector from Solargenix Energy is a residential and commercial solar water-heating system. The basic system is comprised of 12 small compound parabolic collectors (CPC) which focus light onto absorber tubes through which heat-transfer fluid is piped. One to three collectors are commonly used for residential solar water-heating systems, depending on the size of the hot water storage tank. A roof-integrated thermosiphoning configuration is possible with new construction. The collectors carry a 10-year warranty. The system's heat exchanger, SOLPAC, is also available as a separate item. Coupled with one or more solar collectors, it prepackages the components needed to convert existing electric or gas water heaters into solar water-heating systems.

Photovoltaic Collectors

Photovoltaics (PV) enable the direct conversion of sunlight into electricity. Some PV modules are integrated into building components, such as roofing and wall glazings—these are often referred to as building-integrated photovoltaics (BIPV). Packaged Solar Equipment includes 'plug-and-play' systems that include all of the necessary components.

Blue Link Photovoltaic Systems

Solar Market
25 Limerick Rd.
Arundel, ME 04046

Toll-free: 877-785-0088
www.solarmarket.com

The Blue Link 480 grid-connected photovoltaic system from Solar Market™ is a complete, ground-mounted, plug-and-play unit with a rated power production of 480 watts DC. A steel mounting rack supports the solar panels, inverter, and electrical disconnects; a 25' cable for the intertie is included. Installation takes about 30 minutes. A licensed electrician may be required to connect the unit into a home's load center; check with the local electric utility for any additional requirements or restrictions. The array measures 5' x 8'; the system weighs 140 pounds. The PV panels (manufactured by BP Solar) are guaranteed for 25 years; the balance of the system carries a 5-year warranty.

GE Solar Systems and Modules

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231 Lake Dr.
Newark, DE 19702

Toll-free: 866-750-3150
www.gepower.com

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Industry Representation

Solar Energy Industries Association
805 15th St. NW, Ste. 510
Washington, DC 20005

Phone: 202-682-0556
www.seia.org

The Solar Energy Industries Association (SEIA) is the national trade association of solar energy manufacturers, dealers, distributors, contractors, and installers. SEIA's primary mission is to expand the use of solar technologies in the global marketplace. Membership exceeds 500 companies providing solar thermal and solar electric products and services.

PV Modules

BP Solar
630 Solarex Ct.
Frederick, MD 21703

Phone: 301-698-4200
www.bpsolar.com

BP Solar is one of the world's largest solar electric companies, with manufacturing plants in the U.S., Spain, Australia, and India. They manufacture, design, market, and install a wide range of crystalline silicon solar electric products. The highest percentage of BP Solar's sales are to homeowners, builders, and businesses, and they are the largest supplier to the rural infrastructure market, where solar is the

core power source for off-grid communities. In 1999, BP-Amoco acquired Solarex and folded it into BP's PV Division to form BP Solar.

PV Modules

Evergreen Solar, Inc.
138 Bartlett St.
Marlboro, MA 01752

Phone: 508-357-2221
www.evergreensolar.com

Evergreen Solar is a manufacturer of PV modules and the innovator of the String Ribbon™ method of producing solar cells. This technique uses approximately half the amount of silicon as the industry norm. The company manufactures panels suitable for both grid-tied and off-grid installations and offers a 20-year warranty on all its products. Evergreen products are available through various distributors.

PV Modules

First Solar, LLC
4050 E. Cotton Ctr. Blvd., Ste. 6-68
Phoenix, AZ 85040

Phone: 602-414-9300
www.firstsolar.com

First Solar develops and manufactures Cadmium Telluride (CdTe) thin-film photovoltaic modules. First Solar has invested heavily in developing advanced, high-volume manufacturing processes that are considered essential to achieving the low cost required to make solar electricity economically viable across a broad range of applications.

PV Modules

Sharp Electronics Corp. - Solar Systems Division
5901 Bolsa Ave.
Huntington Beach, CA 92647

Toll-free: 800-BE-SHARP
Phone: 630-378-3357
www.sharpusa.com

Sharp Electronics Corporation, a worldwide leader in solar electric technology, offers single-crystal and polycrystalline PV panels. Available modules range from 62 to 208 watts for grid-tied or stand-alone systems. Sharp modules carry a 25-year warranty. Product introductions planned for the future include green, golden brown, and light blue PV cells; triangular modules; AC modules; and thin-film, virtually transparent modules.

PV Modules

Shell Solar
4650 Adohr Ln.
Camarillo, CA 93011

Toll-free: 800-272-6765
Phone: 805-482-6800
www.shell.com/solar/

Shell Solar is one of the world's largest manufacturers of PV modules, producing single-crystal, multi-crystal, and CIS thin-film modules. Shell also offers EarthSafe™ PV kits for residential and commercial installations. These solar electric rooftop kits include mounting hardware, inverter, and 25-year warranty panels. Shell Solar was previously Siemens Solar (and before that Arco Solar) before Shell acquired Siemens in April 2002.



PV Systems

Kyocera Solar, Inc.
7812 E. Acoma Dr.
Scottsdale, AZ 85260

Toll-free: 800-223-9580
Phone: 480-948-8003
www.kyocerasolar.com

Kyocera is one of the world's largest manufacturers of polycrystal PV modules.

Renewable Energy Equipment

RWE Schott Solar, Inc.
2260 Lava Ridge Ct., Ste. 102
U.S. Sales & Marketing
Roseville, CA 95661

Toll-free: 888-457-6527
Phone: 916-774-3000
www.us.schott.com

RWE Schott Solar Inc. (RSS), formerly Schott Applied Power, is a leading manufacturer and distributor of solar power components and systems. RSS produces the world's largest solar power module available, the ASE 300. RSS serves a diverse market including grid-connected residential and commercial systems, and grid-independent agricultural, governmental and utility applications. RWE Schott Solar Inc. is a joint venture of the RWE Group, a global multi-utility concern with core businesses in electricity, gas, water, waste management, and recycling.

Schüco Photovoltaic Modules

SCHÜCO, LP
240 Pane Rd.
Newington, CT 06111

Toll-free: 877-472-4826
Phone: 860-666-0505
www.schuco-usa.com

Schüco offers three models of permanently sealed polycrystalline PV modules that are manufactured and tested to meet international quality standards. Model S 125-SP (49.13" x 31.61") has a rated output of 125 W; S 158-SP (62.2" x 31.5") is 158 W; and S 170-SPU (62.2" x 31.5") is 170 W. Schüco provides a 5-year product guarantee, and a performance guarantee of 90% output at 12 years, and 80% at 25 years. These products are manufactured in Germany.

Solar Turtle

Solar Turtle, Inc.
4901 Cactus Wren Ave.
Tucson, AZ 85746

Phone: 520-883-3356

The Solar Turtle is a photovoltaic power supply and water purification system mostly used for remote cabins and RVs. These systems include 120-watt panels, deep-cycle batteries, an inverter, and General Ecology's SeaGull IV water purification systems. The system can output up to 720 W DC or 2,500 W AC. Most Solar Turtle units include custom features to match customer needs.

Sunslates

Atlantis Energy Systems, Inc.
4517 Harlin Dr.
Sacramento, CA 95826

Phone: 916-438-2930
www.atlantisenergy.org

Atlantis Energy Systems produces Sunslates®, which serve as both a roofing product and a solar-electric power source. Sunslates are fiber-cement shingles into which PV cells have been laminated. Each shingle has a plug-in wiring connection.

Suntech Silicon Solar Modules

Solar Resources
771 Shrewsbury Ave., Ste. 105
Shrewsbury, NJ 07702

Phone: 732-758-1600
www.solarresources.com

Solar Resources distributes PV panels manufactured in China by Suntech Power, which has quickly risen to become one of the world's largest PV manufacturers.

UNI-SOLAR PV Shingles and Standing Seam Panels

United Solar Ovonic LLC
3800 Lapeer Rd.
Auburn Hills, MI 48326

Toll-free: 800-843-3892
Phone: 248-475-0100
www.uni-solar.com

Uni-Solar Ovonic LLC PV Shingles and Standing Seam Roofing Panels are installed much like conventional roofing products. They generate electricity while protecting the structure from weather. PV Shingles, measuring 86.4" x 12" with 7 tabs, are interspersed among conventional 3-tab shingles. Standing Seam Panels are available for laminating onto conventional roofing or as a PV-integrated, standing-seam product. Lead wires from each shingle or panel enter the structure through drilled holes in the roof decking. Uni-Solar roofing products use triple-junction amorphous silicon technology.

Solar Concentrating Collectors

High-temperature solar thermal systems typically use parabolic reflectors to concentrate the solar energy and heat-transfer fluids other than water.

Winston Series CPC Collector

Solargenix Energy, LLC
2101-115 Westinghouse Blvd.
Raleigh, NC 27604

Phone: 919-871-0423
www.solargenix.com

The Winston Series CPC Collector from Solargenix Energy is a residential and commercial solar water-heating system. The basic system is comprised of 12 small compound parabolic collectors (CPC) which focus light onto absorber tubes through which heat-transfer fluid is piped. One to three collectors are commonly used for residential solar water-heating systems, depending on the size of the hot water storage tank. A roof-integrated thermosiphoning configuration is possible with new construction. The collectors carry a 10-year warranty. The system's heat exchanger, SOLPAC, is also available as a separate item. Coupled with one or more solar collectors, it prepackages the components needed to convert existing electric or gas water heaters into solar water-heating systems.

Solar Flat-Plate Collectors

These listings include flat-plate solar collectors used for water and space heating. Building-integrated transpired collectors are also included here.

Air-Heating Solar Collector

Sunsiaray
4414 N. Washburn Rd.
Davison, MI 48423
Phone: 810-653-3502
www.sunsiaray.com

Sunsiaray Solar Manufacturing produces air-heating solar collectors.

Gobi Solar Collectors and Helio-Pak Solar Water Heater

Heliodyne, Inc.
4910 Seaport Ave.
Richmond, CA 94804
Phone: 510-237-9614
www.heliodyne.com

Heliodyne is a manufacturer of flat-plate solar collectors and heat-transfer systems for residential and commercial water heating.



Heliocol Solar Pool-Heating Systems

Heliocol
13620 49th St. N
Clearwater, FL 33762
Phone: 727-572-6655
www.heliocol.com

Heliocol manufactures unglazed polypropylene, solar pool-heating systems.

ProgressivTube Passive Water Heating Systems

Thermal Conversion Technology
101 Copeland St.
Jacksonville, FL 32204
Phone: 904-358-3720
www.tctsolar.com

Thermal Conversion Technology produces the ProgressivTube® line of integral collector-storage (ICS) systems with 4"-diameter copper pipes in a glass-glazed collector. The collectors are typically for solar preheating of water and are used extensively in Caribbean and Hawaiian hotels. Founded in 1974, the company has sold thousands of the current ProgressivTube® line since its introduction in 1982.

Skyline Solar Thermal Collectors and Systems

SolarRoofs.com Inc.
5840 Gibbons Dr., Ste. G
Carmichael, CA 95608
Toll-free: 888-801-9060
Phone: 916-481-7200
www.solarroofs.com

SolarRoofs.com Inc. manufactures lightweight flat-plate solar water heating systems and collectors. Its Skyline collectors have copper piping and absorber plates with polycarbonate Twinwall glazing. Collectors are available in 26 architectural colors, are SRCC and FSEC certified, and carry an independent structural certification to withstand 150 mph wind. The company offers a variety of systems for different climates, including drain-back and closed-loop with integral PV-powered pump/controller.

SOL 25 and Storage Tank

Stiebel Eltron
17 West St.
West Hatfield, MA 01088
Toll-free: 800-582-8423
Phone: 413-247-3380
www.stiebel-eltron-usa.com

Stiebel Eltron manufactures the SOL 25 Plus flat plate solar collectors and SB/SBB Plus storage tanks for solar water-heating systems. The Berlin, Germany based company has manufacturing plants in Holzminden, Germany and Thailand. The solar collector selective absorber surface is chromium oxide, which offers high performance, but carries significant environmental burdens. The storage tanks are insulated with three inches of polyurethane foam and available in four sizes (39 to 109 gallons) and with one or two heat exchangers.

Solar Collectors

Integrated Solar LLC
2030 W. Pinnacle Peak Rd.
Phoenix, AZ 85027
Toll-free: 800-927-2326
Phone: 805-928-1881
<http://radcosolar.com/about.html>

Integrated Solar LLC manufactures Radco glazed flat-plate solar collectors and Radco complete drainback solar water-heating systems for areas with freezing weather conditions. The company also produces a line of Radco unglazed solar pool-heating systems.

Solar Collectors

R&R Services Solar Supply
922 Austin Ln., Bldg. D
Honolulu, HI 96817
Phone: 808-842-0011

R&R Services Solar Supply is a manufacturer of copper-tube/absorber flat-plate collectors. The company packages solar water-heating systems for sale throughout Hawaii.

Solar Pool Heating Systems

Aquatherm Industries, Inc.
1940 Rutgers University Blvd.
Lakewood, NJ 08701
Toll-free: 800-535-6307
Phone: 732-905-9002
www.warmwater.com

Aquatherm produces unglazed polypropylene collectors designed for pool heating. These are used with existing conventional filtration systems to circulate pool water through the collectors then back into the pool. Most systems utilize an automatic temperature control. The swimming pool serves as the heat-storage reservoir.

Solar Pool Heating Systems

Fafco, Inc.
435 Otterson Dr.
Chico, CA 95928
Toll-free: 800-994-7652
Phone: 530-332-2100
www.fafco.com

Fafco is the oldest manufacturer of solar water-heating equipment in the U.S.—since 1969. The company manufactures a line of pool-heating systems.

Solar Thermal Flat Plate Collectors

Alternate Energy Technologies
1057 N. Ellis Rd., Unit 4
Jacksonville, FL 32254
Toll-free: 800-874-2190
Phone: 904-781-8305
www.aetsolar.com

Alternate Energy Technologies is a manufacturer of copper-tube, flat-plate collectors with a nontoxic collector coating.



Solar Water-Heating Systems

Thermo Dynamics Ltd.
101 Frazee Ave.
Dartmouth, NS B3B-1Z4 Canada
Phone: 902-468-1001
www.thermo-dynamics.com

Thermo Dynamics manufactures a full range of solar water-heating systems with liquid flat-plate, glazed collectors with fused copper tubing and aluminum absorbers. The company also produces the Solar Pump™—a PV-powered pump—and a thermosiphoning heat exchanger.

SunEarth Solar Equipment

SunEarth, Inc.
8425 Almeria Ave.
Fontana, CA 92335
Phone: 909-434-3100
www.sunearthinc.com

SunEarth, Inc., a manufacturer of solar water-heating equipment since 1978, produces flat-plate solar collectors, ICS and thermosiphon water-heating systems, and ancillary components including residential and commercial racking systems for both solar water heating and PV systems.

SunMate Hot Air Solar Panel

Environmental Solar Systems
119 West St.
Methuen, MA 01844
Phone: 978-975-1190
www.environmentalsolarsystems.com

Sunmate® is a side-mounted residential solar thermal collector constructed of aluminum, double-sealed glass, and polyisocyanurate insulation. A 100 CFM, 7W fan on an automatic thermostat pulls cool air from the home, channels it through the absorber plate, and circulates hot air back into the home. Sunmate can also be used for fresh air intake in tight houses. One panel heats up to 300 square feet, and panels can be installed in parallel.

Solar Heating Balance of System Components

These listings include specialized components and materials for solar thermal systems other than the actual panels or collectors.

Phoenix Solar Water Heater

Heat Transfer Products, Inc.
120 Braley Rd.
P.O. Box 429
East Freetown, MA 02717
Toll-free: 800-323-9651
Phone: 508-763-8071
www.htproducts.com

The Phoenix Solar Water Heater provides a heat exchanger to transfer heat from solar collectors (or other alternative sources), along with a back-up gas burner that operates at 97% thermal efficiency. The gas burner is located halfway up the tank and a solar heat exchanger is located at the bottom, keeping water at the bottom of the tank cooler and maximizing the solar collector's efficiency. The Phoenix comes with auxiliary hook-ups so it can be connected to air handlers or radiant heating systems. These units are available in 80- or 110-gallon corrosion-resistant 316L-grade stainless steel tanks that are wrapped in two-inch non-HCFC polyurethane foam insulation. The unit is direct-vent and rated for zero clearance from combustible surfaces.

SOL 25 and Storage Tank

Stiebel Eltron
17 West St.
West Hatfield, MA 01088
Toll-free: 800-582-8423
Phone: 413-247-3380
www.stiebel-eltron-usa.com

Stiebel Eltron manufactures the SOL 25 Plus flat plate solar collectors and SB/SBB Plus storage tanks for solar water-heating systems. The Berlin, Germany based company has manufacturing plants in Holzminden, Germany and Thailand. The solar collector selective absorber surface is chromium oxide, which offers high performance, but carries significant environmental burdens. The storage tanks are insulated with three inches of polyurethane foam and available in four sizes (39 to 109 gallons) and with one or two heat exchangers.

Solar Hydronic Check Valves, Differential Thermostats

Heliotrope Thermal
4910 Seaport Ave.
Richmond, CA 94804

Phone: 510-237-9614
www.heliotropethermal.com



Heliotrope Thermal offers low-resistance spring/ball brass check valves designed for the high temperatures and pressures of solar domestic hot water systems. The cleanable valves have sweat-union connections, silicone O-rings, and can be installed on vertical or horizontal lines. Delta-T electronic controllers are differential-temperature thermostats designed to regulate the operation of solar hydronic heating systems by monitoring collector and storage temperatures and automating pumps or blowers appropriately. They can also provide system freeze protection, and high- or low-limit shut-offs. Heliotrope Thermal, like Heliotrope PV, is a successor to Heliotrope General, a branch of Heliodyne, Inc.

Solar Pumping Components

Solarnetix Inc.
777 Warden Ave.
Toronto, ON M1L4C3 Canada

Phone: 416-699-6746
www.solarnetix.com

Solarnetix is the North American distributor of hydronic heat and solar pumping components made by the German company, Pommerening Armaturenwerk (PAW GmbH & Co. KG). Components range from brass check valves and flow gauges to complete distribution systems designed for the high temperatures and pressures of solar domestic hot water systems. Neatly packaged in insulated wall-mount packs.

Solar Water Storage Tanks

Morley Manufacturing
P.O. Box 1540
Cedar Ridge, CA 95924

Phone: 530-477-6527

Morley manufactures storage tanks used for solar water-heating systems.

Solar Water Storage Tanks

Vaughn Manufacturing Corporation
26 Old Elm St.
P.O. Box 5431
Salisbury, MA 01952

Toll-free: 800-282-8446
Phone: 978-462-6683
www.vaughncorp.com

Vaughn Manufacturing produces stone-lined storage tanks specifically for solar water heating systems. Vaughn tanks have removable copper-finned heat exchangers enabling periodic cleaning of the coil to maintain maximum performance. The tanks—which are lined with centrifugally applied Hydrastone for corrosion protection—come in 65-, 80-, and 115-gallon capacities, and can also be made to custom dimensions.

Viessmann Solar Water Heating System

Viessmann Manufacturing Company Inc.
750 McMurray Rd.
Waterloo, ON N2V 2G5 Canada

Toll-free: 800-387-7373
Phone: 519-885-6300
www.viessmann.ca

Viessmann manufactures solar water-heating components which can be purchased separately, or together as part of a fully integrated system package. Components include a number of different collectors and storage tanks, pumps, controllers, and balance-of-system components. Viessmann offers a lower-cost Vitosol 100 flat-plate solar collector and the Vitosol 300 evacuated-tube solar collector. Both hot water tanks, the stainless-steel Vitocell B 300 and the more economical steel Vitocell B 100, use HCFC-free polyurethane insulation and have dual heat exchanger coils that accommodate both solar and conventional-boiler heat input.

Winston Series CPC Collector

Solargenix Energy, LLC
2101-115 Westinghouse Blvd.
Raleigh, NC 27604

Phone: 919-871-0423
www.solargenix.com

The Winston Series CPC Collector from Solargenix Energy is a residential and commercial solar water-heating system. The basic system is comprised of 12 small compound parabolic collectors (CPC) which focus light onto absorber tubes through which heat-transfer fluid is piped. One to three collectors are commonly used for residential solar water-heating systems, depending on the size of the hot water storage tank. A roof-integrated thermosiphoning configuration is possible with new construction. The collectors carry a 10-year warranty. The system's heat exchanger, SOLPAC, is also available as a separate item. Coupled with one or more solar collectors, it prepackages the components needed to convert existing electric or gas water heaters into solar water-heating systems.



Solar Vacuum-Tube Collectors

Evacuated tubes offer higher efficiencies and better performance in cold weather than conventional flat-plate collectors, though cost is typically higher.

Apricus Evacuated Tube Solar Collectors

Maine Green Building Supply
111 Fox St.
Portland, ME 04101
Phone: 207-780-1500
www.maine绿色建筑.com

Apricus manufactures evacuated-tube solar collectors in Nanjing, China for worldwide distribution. The borosilicate twin-glass vacuum tubes passively track the sun (because of their round shape). A selective coating on the inner tube provides minimal reflection and maximum solar-radiation absorption, while the vacuum reduces heat losses via conduction and convection. If the vacuum is ever lost, the silver-colored barium layer at the end of the tube, acquired during manufacture, will turn white, allowing the faulty tube to be identified and replaced. The copper heat pipes use a phase change fluid to effect one-way heat flow to the header pipe. Water is intermittently pumped through the header pipe where it absorbs heat. The system has a 10-year limited warranty, and Apricus is ISO 9001 certified.

Sunda Evacuated Tube Solar Collectors

Sun Spot Solar & Heating, Inc.
PO Box 55
Delaware Water Gap, PA 18327
Phone: 570-422-1292
www.sssolar.com

Sun Spot Solar offers the Seido line of evacuated tube solar collectors manufactured by Beijing Sunda Solar Energy Technology Co., Ltd. These collectors use an aluminum solar absorber plate mounted in a long glass vacuum tube; the vacuum reduces heat losses via conduction and convection. Heat is transferred from the absorber plate to a small "heat pipe," which acts as a heat-exchanger in a fluid-filled manifold. The fluid in the heating circuit does not flow through the collectors. The vacuum tubes are made with low-iron tempered glass designed to withstand 35mm (1.38 inch) hail. The tubes have a six-year warranty.

SunTube Collector

Sun Utility Network, Inc.
4952 Coringa Dr.
Los Angeles, CA 90042
Phone: 323-478-0866
www.sunutility.com

Sun Utility Network is the U.S. distributor of NEG's SunTube evacuated-tube solar water-heating systems. SunTube panels can be used for residential and commercial water heating, space heating and cooling, water pasteurization, and desalination applications.

Thermomax Evacuated Tube Solar Collectors

Aurora Energy Inc./
Thermo Technologies
9009 Mendenhall Ct.,
Ste. E
Columbia, MD 21045
Phone: 410-997-0778
www.thermomax.com



Thermo Technologies (formerly Advanced Solar Technologies) is the east-coast U.S. distributor for Thermomax, a European company with manufacturing facilities in Italy, Northern Ireland, and Wales. Thermomax produces an evacuated-tube solar collector system using heat-pipe technology to transfer heat to a manifold. (Heat pipes use a phase-change fluid to effect one-way heat flow, obviating the need for complex controls.) Standard-sized tubes are ganged together to produce any size system from small residential to large commercial and are typically configured into a closed-loop antifreeze system. The selective absorber surface is an environmentally friendly Tinox® titanium nitride oxide coating from Germany. Thermo Technologies also offers balance-of-system components and design services.

Swimming Pool Plumbing Systems

Products listed here include specialized systems to use solar thermal energy for pool water heating.

Heliocol Solar Pool-Heating Systems

Heliocol
13620 49th St. N
Clearwater, FL 33762
Phone: 727-572-6655
www.heliocol.com

Heliocol manufactures unglazed polypropylene, solar pool-heating systems.

Solar Collectors

Integrated Solar LLC
2030 W. Pinnacle Peak Rd.
Phoenix, AZ 85027
Toll-free: 800-927-2326
Phone: 805-928-1881
<http://radcosolar.com/about.html>

Integrated Solar LLC manufactures Radco glazed flat-plate solar collectors and Radco complete drainback solar water-heating systems for areas with freezing weather conditions. The company also produces a line of Radco unglazed solar pool-heating systems.

Solar Collectors

Sealed Air Corp. - Solar Pool Heating
200 Riverfront Boulevard
Elmwood Park, NJ 07407

Toll-free: 201-791-7600
Phone: 510-887-8090
www.sealedair.com

Sealed Air Corporation is primarily in the packaging business but also produces a line of flat-plate solar collectors for pool heating.

Solar Pool Heating Systems

Aquatherm Industries, Inc.
1940 Rutgers University Blvd.
Lakewood, NJ 08701

Toll-free: 800-535-6307
Phone: 732-905-9002
www.warmwater.com

Aquatherm produces unglazed polypropylene collectors designed for pool heating. These are used with existing conventional filtration systems to circulate pool water through the collectors then back into the pool. Most systems utilize an automatic temperature control. The swimming pool serves as the heat-storage reservoir.

Solar Pool Heating Systems

Fafco, Inc.
435 Otterson Dr.
Chico, CA 95928

Toll-free: 800-994-7652
Phone: 530-332-2100
www.fafco.com

Fafco is the oldest manufacturer of solar water-heating equipment in the U.S.—since 1969. The company manufactures a line of pool-heating systems.

Wind Energy Equipment

Most large wind-power systems are installed in centralized wind farms, with the power fed into electric utility grids. Included here are smaller wind turbines that are more appropriate for individual homes or commercial buildings. Like PV systems, these generators may be designed for use in grid-tied or off-grid applications.

AIR and Whisper Series Wind Turbines

Southwest Windpower
1801 W. Rt. 66
Flagstaff, AZ 86001

Phone: 928-779-9463
www.windenergy.com

Southwest Windpower manufactures 400-, 900-, 1,000- and 3,000-watt wind turbines for on- and off-grid residential and industrial power generation. The 400-watt unit can also be used to power telecommunication stations, and the 1,000-watt unit can be used to pump water.

ARE Wind Generators

Abundant Renewable Energy
22700 N.E. Mountain Top Rd.
Newberg, OR 97132

Phone: 503-538-8298
www.abundantRE.com

ARE wind generators are manufactured in Oregon, USA, and distributed worldwide by Abundant Renewable Energy. The ARE110 wind generator is rated at 2,500 watts and is available in 48-volt models for battery-charging applications and in a high-voltage model for grid-connect systems. The ARE442 is rated at 10,000 watts and is available as a grid-connect system.

BWC Excel Wind Turbines

Bergey Windpower Co., Inc.
2200 Industrial Blvd.
Norman, OK 73069

Phone: 405-364-4212
www.bergey.com

Bergey Windpower manufactures three models of wind generators for residential and small-scale commercial applications. The BWC XL.1 is rated at 1,000 watts, the BWC Excel-R is rated at 7,500 watts, and the BWC Excel-S is rated at 10,000 watts.

Jacobs 31-20 Wind Turbine

Wind Turbine Industries Corp.
16801 Industrial Cir. SE
Prior Lake, MN 55372

Phone: 952-447-6064
www.windturbine.net

Wind Turbine Industries' Jacobs 31-20 generator is rated at 20,000 watts. Jacobs wind turbines range in size from 10kW to 20kW, with rotor sizes ranging from 23 ft. (7m) to 29 ft. (8.8 m). These systems can provide power for a broad range of applications, which include Grid Intertie (utility bill reduction) or off-grid/remote battery charging. Other Jacobs turbines (also known as "Jakes" and made in the 1930s) are no longer manufactured but, due to their exceptional durability, are still widely available as used and rebuilt machines.

OY Windside Turbines

Tangarie Energy LLC
18 Deer Path
Hillsborough, NJ 08844

Toll-free: 866-994-6500
www.tangarie-energy.com

Tangarie Energy is the U.S. distributor for vertical wind turbines produced by OY Windside Production Ltd. of Finland. Designed for power production in extreme conditions, these turbines are also appropriate for a variety of other on and off-grid applications including population centers, parks, and residences. The soundless (0 db) turbine is safe for birds and bats and have been used as part of power-generating sculptures. The Windside is not affected by turbulent wind, can generate even in freezing and snowy conditions, and starts to generate power at wind speeds as low as 1.5 m/s (3.3 mph) to 2.8 m/s (6.2 mph), depending on model, and can operate at wind speeds as high as 30 m/s (66 mph), 40 m/s (88 mph), or 60 m/s (132 mph) depending on model.

Skystream 3.7

Southwest Windpower
 1801 W. Rt. 66
 Flagstaff, AZ 86001
 Phone: 928-779-9463
 www.windenergy.com

The Skystream 3.7™ is a grid-connected, residential-sized 1.8 kW wind turbine that is designed for quiet operation at low wind-speeds. The 12-foot diameter, curved-blade rotor starts producing power at a wind speed of 8 mph and reaches full output at 20 mph. The wind turbine can be mounted on a 35 ft single pole, with towers up to 110 ft available. At an average windspeed of 12 mph, the Skystream 3.7 will produce about 400 kWh per month. The complete installed system costs approximately \$7,000 to \$10,000, including generator, controls, inverter, and tower.

This Space is Available for Your Notes

Urban-Appropriate Wind Turbines

WES Canada
 2952 Thompson Rd.
 P.O. Box 552
 Smithville, ON L0R 2A0
 Canada

Phone: 905-957-8791
 www.windenergysolutions.ca



WES Canada, in partnership with manufacturer WES Netherlands, offers the Tulipo—a medium-sized, low-noise, low-RPM 2.5 kW wind turbine appropriate for building-integrated urban installations. Larger 80- and 250-kW commercial turbines are also available. These turbines were formerly manufactured under the name Lagerway.

Wind Turbines

Proven Energy, Ltd.
 Wardhead Park
 Stewarton, Ayrshire KA3 5LH Scotland, UK
 Phone: +44 (0)1560 485 570
 www.provenenergy.com

Proven Energy, Ltd. manufactures four turbine models, rated at 2,500 watts (2,500-5,000 kWh annual output), 6,000 watts (6,000-12,000 kWh annual output) and 15,000 watts (15,000-30,000 kWh annual output). Proven Energy has three American distributors: Lake Michigan Wind and Sun can be reached by phone at 920-743-0456 and is online at www.windandsun.com; Solar Wind Works can be reached by phone at 530-582-4503 and is online at www.solarwindworks.com; Remote Power Inc. can be reached by phone at 907-457-4299 and is online at www.remotepowerinc.com.