

# WHY CHOOSE SOLAR POWER

Deciding whether or not you should invest in renewable energy technologies for your organization can be challenging and overwhelming. When used properly, solar power and solar technologies have proven their efficiency, and the benefits for your business and the environment are tremendous. By investing in solar power, you will see an immediate return on your capital investment. This information sheet will assist you in understanding the basics of solar power.

## HOW SOLAR POWER BENEFITS YOUR BUSINESS

**Lower electricity bills** - By installing a solar system to power your business, you will immediately take advantage of lower electricity bills. These savings coupled with State and/or Federal financial programs can offset your capital costs in several years, allowing you to put more of your profits back into your business.

**Control over power cost** - Solar power is a productive and efficient source of renewable energy. By producing your own power, you will stay away from volatile energy costs, allowing you to plan your budget more effectively.

**Being a Green business** - Even if your business is not environmental by nature, your company will be valued by savvy clients who put a premium on sustainable and environmentally friendly business practices, allowing you to capture this growing clientele.

**Visibility for your business** - Nothing says progressive and responsible like a roof or field covered with solar panels. No matter how long you have been in business, your solar panels will bring visibility and high interest in your services and products.



Your cost savings could mean:

**Buying new equipment  
Investing in technologies  
Upgrading your facility  
Hiring new employees  
Improving your workplace  
Offering new benefits**



## WHAT MAKES A GOOD SOLAR SITE

**Orientation** - The orientation of solar panels to the sun affects the efficiency of the system. East facing panels are 81% efficient. South facing panels are 87% efficient. A complete residential solar system is 83% to 85% efficient. In Rhode Island, solar panels are exposed to the sun's photons for about 4.23 hours each day in average, therefore proper orientation is crucial to maximize a solar system.

**Structure** - Not all structures can support solar systems. If the solar panels are to be installed on a roof, the structure must be able to support panel and rack weights, and ballast if applicable. The structural effect to the building due to the increase sail from the solar panels must be analyzed to prevent any building structure failure. Finally, wind loads pushing behind the panels and snow loads in winter are other elements to consider and study.

**Distance to transmission lines** - In the case of commercial solar "farms", generated electricity must be fed into the electrical grid. Proximity and access to transmission lines are key; building new transmission lines can be very costly.

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## SOLAR POWER TECHNOLOGIES

Solar, or photovoltaic, cells are electronic devices that essentially convert the solar energy of sunlight into electricity. Solar technology makes use of the energy of the sun without moving parts or components and without adverse impacts to the environment. However, solar power is an intermittent energy source, meaning that it converts energy as long as there is sunlight. In order to provide continuous power supply, all available output must be taken when it is available, stored for when it can be used, or transported over transmission lines to where it can be used.

### Photovoltaic (PV) systems

The modules or arrays make up the major part of a PV system. For proper functioning, PV systems require other components such as electrical connections, mounting hardware, power-conditioning equipment and batteries. While mounting hardware attach the modules to other structures and position them towards the sun, electric inverters take the direct-current electricity produced and convert it to alternate-current electricity. The batteries store the energy for use when the sun is not shining. To increase the output and provide continuous reliable output, the PV system can be complemented by an alternative energy source such as wind power.

PV systems can be classified into two general categories: flat-plate systems or concentrator systems. The most common solar array design uses flat-plate PV modules or panels. These panels can either be fixed in place or allowed to track the movement of the sun. They respond to sunlight that is either direct or diffuse. In the other hand, concentrators use lenses or reflectors, and focus a large area of sunlight into a small beam to increase power output by augmenting the intensity of light. The primary reason for using concentrators is to be able to use less solar cell material in a PV system. PV cells are the most expensive components of a PV system, on a per-area basis. A concentrator makes use of relatively inexpensive materials such as plastic lenses and metal housings to capture the solar energy shining on a fairly large area and focus that energy onto a smaller area, where the solar cell is.

For more information on:

- Concentrating Solar Power research, visit [www.nrel.gov/csp/](http://www.nrel.gov/csp/)
- Photovoltaic Research, visit [www.nrel.gov/pv/](http://www.nrel.gov/pv/)



## WHAT IS NET METERING

Net metering programs adopted in many states offer the potential for businesses to realize financial benefits from installing renewable energy systems. Net metering allows consumers to offset the cost of electricity they buy from a utility by selling renewable electric power generated at their businesses back to the utility. In essence, a customer's electric meter can run both forward and backward in the same metering period, and the customer is charged only for the net amount of power used. By definition, true net metering calls for the utility to purchase power at the retail rate and use one meter. States have adopted a number of variations on this theme.

As part of the Energy Policy Act of 2005, all public electric utilities are now required to offer net metering on request to their customers. Utilities have three years to implement this requirement.

- Net metering is a financial incentive for customers who install renewable energy systems.
- Customers tend to see lower bills with net metering. The payment system does not have to be disrupted as the utility company does not have to account separately for electricity produced by customer-generators. In general, net metering customers do not produce more electricity than they consume during billing periods; the customer only pays a reduced bill.
- Net metering participants are more aware of energy consumption, and tend to consume less energy than is generated. Studies, including some sponsored by utilities, have shown direct, measurable benefits for having generation located close to the end user.

Merchant power, where the power is generated for sale to the 'grid' and sold at a wholesale rate, is typically done on larger wind facilities, rather than servicing local point loads. In New England, this wholesale rate is about \$.055 per KwHr, which is the ISO's 'avoided cost'.

You can find specific information about net metering in your State on the Interstate Renewable Energy Council website [www.irecusa.org/index.php?id=90](http://www.irecusa.org/index.php?id=90)

# WHY CHOOSE SOLAR POWER



## FUNDING AND INCENTIVES

Federal and State governments offer several tax incentives and funding opportunities to assist with the development of solar power and to help alleviate the up-front, capital cost.

### **Systems Tax Credit**

Under present law, a federal-level investment tax credit (ITC) is available to help consumers purchase solar systems for both residential and commercial solar installations. Owners of solar systems can receive a credit for 30% of the total installed cost of the system. The ITC, written into law through the Emergency Economic Stabilization Act of 2008, is available for equipment installed from October 3, 2008 through December 31, 2016. The value of the credit is now uncapped, through the American Recovery and Reinvestment Act of 2009.

### **The Production Tax Credit (PTC) Extension**

In October 2008, Congress acted to provide a one-year extension of the Production Tax Credit (PTC) through December 31, 2009. Under present law, an income tax credit of 1.0 cents/kilo-watt-hour is allowed for the production of electricity from utility-scale solar systems.

### **Rapid Depreciation**

Double-declining balance, five-year depreciation schedule (I.R.C. Subtitle A, Ch. 1, Subch. B, Part VI, Sec. 168 (1994) (accelerated cost recovery system)) is another federal policy that encourages solar development by allowing the cost of solar equipment to be depreciated faster.

To find out about more Federal incentives, visit [www.dsireusa.org](http://www.dsireusa.org). The website also offers a list of incentives for each 50 States.

### **DID YOU KNOW?**

Solar power currently supplies about 0.1% of the U.S. electricity needs and less than 0.02% of the world's energy demand.

Covering 4% of the world's desert area with photovoltaics could supply all of the world's electricity. The Gobi Desert in Mongolia alone could supply almost all of the world's total energy demand.

Only 12% to 18% of the sun's solar energy is converted to electrical power by the silicon in a solar panel.

Typically, property value increases when solar is added. A typical building appreciates 50% - 75% of the solar system cost. A building appreciates \$10 - \$25 for each \$1 reduction in the annual electrical bill. (Cut your electrical bill by \$1,000 a year and your home increases in value by \$10,000 to \$25,000.)

Fossil fuel-fired power plants produce more than 40% of the United States' total emissions of carbon dioxide responsible for global warming. Fossil fuels are America's primary source of energy, accounting for more than 70% of current U.S. electricity generation.

### **For more information on solar power and other renewable energies, visit:**

U.S. Department of Energy, Energy Efficiency and Renewable Energy, [www.eere.energy.gov](http://www.eere.energy.gov)

Solar Electric Power Association, [www.solarelectricpower.org](http://www.solarelectricpower.org)

American Solar Energy Society, [www.ases.org](http://www.ases.org)

U.S. Department of Energy, [www.energy.gov](http://www.energy.gov)

American Wind Energy Association, [www.awea.org](http://www.awea.org)

National Renewable Energy Laboratory, [www.nrel.gov](http://www.nrel.gov)

Interstate Renewable Energy Council, [www.irecusa.org](http://www.irecusa.org)

Energy Information Administration, [www.eia.doe.gov](http://www.eia.doe.gov)

DSIRE, Database of State Incentives for Renewables and Efficiency, [www.dsireusa.org](http://www.dsireusa.org)