Photovoltaics Fact Sheet
Atlantis Energy Systems

What are Solar Photovoltaics?
Photovoltaics (PV) use solar cells to convert the sun's energy into electricity. When sunlight hits the semiconductors (solids, such as silicon, that conduct electricity) in the solar cells, an electrical charge is generated. The different types of PV include:

- ☼ ***Mounted PV****: panels that are mounted on the roof or walls of a building or on the ground.*
- ☼ ***Building Integrated PV*** *(BIPV): light, flexible, thin sheets of PV that are laid over a thermoplastic roof. Thin film PV is cheaper but less productive than mounted PV.*
- ☼ ***Tiles****: Atlantis Energy Systems manufactures Sunslates (roof tiles) that can be integrated into a roof and look similar to traditional tile or slate roofing.*
- ☼ ***Lamps & Bus Shelters:*** *Street lamps and bus shelter lights run by solar panels are another option for solar installations*

Is PV Right for Your Building?
If you are interested in installing a PV system, there are a few issues to think about to make sure it is the right technology for your building.

1. Will the PV be roof or ground mounted?

Ground mounted PV does not impact the roof, can be oriented due south, and can easily be cleaned off periodically to maximize solar efficiency, but many buildings lack the ground space needed in an urban setting like Chicago or Los Angeles, the roof is usually a better option.

2. What are the dimensions of the available roof area?

Our "Big Foot" mounted panels are 4 ft x 8 ft and can be mounted on flat roofs using a riser mount. The Q6 Sunslate, our mostly used product, is 1.67 ft x 2.75 ft. (*Exposed 1.67 ft x 1.25 ft.*). Along with custom integration, the SP A100 is for spandrel use.

3. How much electricity can be produced from the building's available roof space?

Generally, for each kilowatt of mounted PV installed on a 4:1 slope or greater in Illinois, (approximately 100 square feet), 1325 kWh of electricity is produced annually. Sunslates produce about 950 W per 100 square feet.

4. What is the orientation of the building?

A building that faces south allows the PV system to absorb the most direct sunlight. That said, east and west orientations are also beneficial as solar producers at less output.

5. Is the roof shaded or, are there any other obstructions?

Roofs that are shaded for much of the day or are obstructed may not be suitable for a PV system. A solar shading analysis done by an architect or by Atlantis Energy will assess the roof's production potential.

6. Is the roof in good condition? Will it be re-roofed in the next 25 years?

Roofs should have a long life span, as it is expensive to remove the PV system.

7. How much weight can the roof support?

Typical mounted PV systems weigh 5-10 pounds per ft². Atlantis Sunslated systems weigh 4.5lbs pounds per ft².

8. Is the sunny side of the roof near the electrical room?

To minimize the amount of wiring needed (and thus cost), the part of the roof through which, wires will be pulled to support the PV system should be as close as possible to the electrical room.

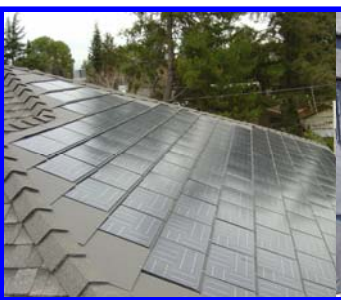
9. Is the building historical or in a historical district?

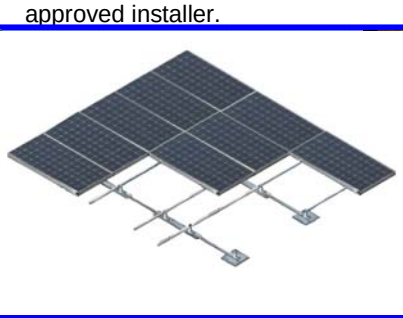
Buildings in a historical district can also support a PV system if they meet with the local approving authorities. Atlantis Energy Sunslates are extremely suited to articulated roofs like Victorian style or other slated and/or tiled roofs. Check with your local Historical Commission's list of historical streets and buildings.

PV Equipment
PV systems consist of solar modules linked together in arrays, mounting equipment, inverters, wiring, and meters. The inverter is necessary to covert the direct current (DC) that the solar cells produce to alternating current (AC) that is usable by the building and grid.

Certification
Equipment Ratings & Certification
Unlike solar thermal technology, there is no official PV testing group or certification used by the industry. **It is advised that your local utility or government may be of assistance. Atlantis Energy Systems is currently seeking certification as a**

Installer Certification
The North American Board of Certified Energy Practitioners (***NABCEP***) is a voluntary certification program for PV installers or Atlantis Energy Systems approved installer.




Costs

Costs vary for PV systems, but in general, flat roof mounted PV costs about $0.25/kWh over a 20 year time period (this includes rebates but not the selling of RECs).

Financing

Solar Energy Rebate Program

The Renewable Energy Resources Program (RERP) promotes the development of renewable energy in Illinois. This program is funded by the Renewable Energy Resources Trust Fund -- the state's public benefits fund -- and is administered by the Illinois Department of Commerce and Economic Opportunity (DCEO).

Under new program guidelines issued in November 2007, rebates are available for solar-energy systems installed in Illinois after January 1, 2007. The DCEO offers rebates of up to 30% of an individual system's cost, with a maximum individual award of $10,000.

Power Purchase Agreements

A power purchase agreement (PPA) allows for the installation of a large PV system (usually 50 kW or greater) at no upfront cost to the building owner. Instead, the owner pays only for the electricity that is used (*usually at a rate lower than current costs*). The third party owns the PV system and assumes all costs, maintenance, and risk associated with the system's performance. This arrangement allows the third party to take advantage of the tax incentives available to renewable energy projects, but not available to non-profit organizations, such as a university. Additional benefits of the PPA are constant and predictable energy costs, which allow for accurate budget predictions and prevent the surprises of rapidly increasing utility costs. At the end of the 15-20 year contract, the system is either sold to the building owner, removed, or the contract is extended.

Illinois Clean Energy Community Foundation

The Illinois Clean Energy Community Foundation (*ICECF*) was established in December 1999 as an independent foundation with a $225 million endowment provided by Commonwealth Edison. The Foundation invests in clean energy development and land preservation efforts, working with communities and residents to improve environmental quality in Illinois. Three core program areas are typically funded: improving **energy efficiency**, developing **renewable energy** resources, and preserving and enhancing **natural areas** and wildlife habitat throughout Illinois.

Renewable Energy Credits (RECs)

RECs are the property rights to the environmental benefits associated with generating electricity from renewable energy sources. Owners of PV systems can sell the RECs for the electricity that they produce.

If the RECs are sold, the emissions reductions cannot be counted towards the generator's greenhouse gas inventory, and the building cannot claim to be "green powered." However, selling RECs can make project finances much more attractive.

The Illinois Power Agency Act permits renewable energy to be procured either through energy bundled with renewable energy credits, or through the purchase of tradable renewable energy credits on their own. Utilities must retire credits that they use for compliance.

LEED

LEED projects can earn points for installing PV, depending on the category.

LEED Performance Measure	Maximum Points
Existing Buildings	4
New Construction	3
Commercial Interiors	1
Homes	10

Feasibility Studies

Atlantis Energy Systems works with its dealers or can work with others to obtain feasibility studies for any potential sites. These studies will allow Atlantis Energy and its dealers to further quantify the cost, electricity production, and greenhouse gas savings of the system. Variables looked at during a feasibility study include roof condition, roof orientation, shading, available roof space, and current electricity usage and costs.

Other Solar Technologies

If your building has a significant year-round domestic hot water load, you should consider solar PV/Thermal Heating. Our collaboration with Dawn Solar Systems combines the active power production for all your electrical / mechanical & plug loads.

More information can be found on our Solar PV/Thermal, see our Virginia Case Study Fact Sheet or our website.

PV in Illinois

Atlantis Energy Systems has a installed several PV systems including:

Kankakee Community College, Kankakee, IL
Fully integrated PV Curtain wall rated at 42 kW and using 6" Sharp Cells
Lakeside Court, Evanston, IL
480 Sunslates rated at 13.3Wp per tile totaling 6.38kWp and using 5" crystalline photovoltaic.

Interested in Installing PV?
Contact Joe Morrissey to have a free solar analysis done of your site or to obtain further information on Atlantis Energy Systems
916-438-2930