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To: Florida Municipal Governments

cc:

From: David A.L. Smith/Jigar Shah

Date: March 31, 2010

Re: Solar Electricity Proposal

SunEdison is pleased to provide the following proposal to install solar electric (photovoltaic, PV) systems in Florida Municipal Governments. This is an exciting opportunity that will provide Florida Municipal Governments economic development and a clean, secure energy source.

SunEdison simplifies solar by providing customers with financial and project management solutions that allow them to add solar power to their energy mix. Customers with limited resources avoid upfront capital costs for solar energy because SunEdison – through 3rd party investors – will buy, own and maintain rooftop and ground-mounted solar projects. The SunEdison “solar services” approach allows rooftop or land owners to install solar with minimal time investment and no additional capital resources.

SunEdison intends to use BP Solar as the turnkey system designer. A local contractor familiar with solar equipment will be selected to complete the installation at BP Solar’s supervision. BP Solar is one of the most experienced solar contractors in the U.S.. They are also committed to providing a long term, 10-year, energy performance warranty for system purchased with the zero-capital solar services option. The prices included are turnkey prices including all solar installation expenses unless otherwise specified.

The design concept is to attach the PV modules with a patent pending flat roof system. The design will depend on the size of the roof, its ability to bear extra weight and orientation. Other design possibilities include ground mounted and parking shade structures. All of our installation techniques are qualified to withstand required wind speeds for safety and permitting purposes. These installation techniques also represent simple and cost effective ways of installing PV systems that have been utilized for a variety of installations in the U.S.

We look forward to working with you. Please feel free to contact me with any questions or concerns. I can be reached at the number above or via e-mail: jigar@sunedison.com



PROPOSAL & FINANCING OPTIONS:

Florida Municipal Governments

In

Palm Beach County

www.sunedison.com/www.anetenergy.com

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Benefits of Going Solar:

For years, solar power was too complicated for consumers and too capital intensive for commercial investment. Using a pioneering structured finance and service model, **SunEdison simplifies solar** for private, public and nonprofit institutions located in states with solar incentives, like Florida . SunEdison operates as a solar project development company; supported by the belief that solar energy is a critical way to fight global warming, clean the air, meet growing energy needs, and make America energy independent.

Using available incentive programs, straightforward structured financing, and socially responsible investors, SunEdison has been able to package solar to “Host” customers in a way that provides competitively priced solar energy with none of the hassles or risks associated with system ownership. With SunEdison as the solar system “owner,” Palm Beach County Electric Customers would achieve an overall lower cost of solar energy than under self-ownership. This is due to SunEdison’s ability to take available federal tax benefits, secure better volume discounts from solar manufacturers, and achieve optimal system performance through preventative maintenance.

SunEdison’s Offer:

SunEdison offers solar electricity at 50% less than Florida Municipal Governments are currently paying for electricity on this account without any of the other add on costs such as fuel surcharges, storm surcharges, etc. and 50% below the cost of current utility power over a long term contract. And this cost will only increase at 1-2% per year over the 20 year term of the contract.

What SunEdison Team Provides:

- Designs, constructs, owns and operates solar PV system on host customer rooftop(s)
- Structures financing approach by utilizing federal and state subsidies as well as third party financing to offer solar electricity at a reasonable price
- Arranges all necessary liability and force majeure insurance

Host Customer Requirements:

- Execution of a “solar services agreement” at a fixed price schedule for 20 years
- Legal access to rooftop(s) and electrical panel(s)

Benefits to Business Customers:

- Avoid capital costs
- Save money on electricity bills
- Increase the security of its energy sources by diversifying its energy mix with clean solar electricity
- Replicable and scalable solar program – solar services agreement is easily modified for new locations
- Improve environmental commitment and community relations
- Contribute to local economic development (15-20 job-years per MW installed)

SunEdison Advantage:

SunEdison is staffed with experienced renewable industry professionals. SunEdison achieves low pricing by:

- Financing products at the lowest-cost, through a variety of financing options
- Using its extensive industry network to negotiate bulk discounts for equipment and installation services

- Establishing a preventative maintenance program to achieve worry-free system performance

FINANCING OPTIONS

Palm Beach/FPL County Electric Customers has the option of owning the solar system upfront – for which there are several financing options – or buying solar services from SunEdison who finances and maintains the solar system.

Option 1: Palm Beach County Electric Customers buys and owns solar system

There are various financing mechanisms for business customers including state loan programs and long-term leases. In the case of these programs, Palm Beach County Electric Customers would not receive any federal tax benefits and would be responsible for completing all maintenance to ensure optimal system performance (See Appendix 1 for estimated maintenance costs).

Should Palm Beach County Electric Customers choose this route, SunEdison can assist with financing and equipment purchasing options.

Option 2: Palm Beach County Electric Customers enters Solar Services Agreement with SunEdison *

If Palm Beach County Electric Customers chooses the zero-capital approach and were to enter into a solar services agreement with SunEdison, SunEdison would finance the solar system. Palm Beach County Electric Customers would only be responsible for buying the energy generated from the solar panels installed on its rooftops, at a fixed rate as listed on page 10. Palm Beach County Electric Customers would not be responsible for system maintenance since it would not own the solar panels. This solar services agreement also provides the following benefits:

- Palm Beach County Electric Customers does not have to justify and secure upfront project funding;
- Palm Beach County Electric Customers pays less for power than it would under self-ownership because SunEdison utilizes tax benefits and provides lower cost maintenance services on the system;
- Palm Beach County Electric Customers is not subject to system underperformance risk. Instead, it only pays for the solar energy delivered by the solar system; and
- Palm Beach County Electric Customers receives all of the benefits of solar without the hassles and assumed risks and responsibility of ownership.

* Under this option, SunEdison would own the renewable energy credits (i.e. green tags) and a third party investor would own the solar panels on the roof.

Financial Savings and Financial Risk:

In terms of system size, SunEdison will install systems of 50 kW (enough power for 10 homes, assuming 5kW per home). The 50 kW minimum system size is preferred because it reaches a cost effective point for the corresponding labor, engineering, and electronics. This size also allows SunEdison to implement more advanced techniques to offset the most expensive power (i.e. during peak hours of the day) and provide peak demand load shedding (See Appendix 5 for an explanation on demand charges).

Under the SunEdison approach, buildings can save up to 10% compared to coal-based utility power. Over the past few years, utility rates have increased substantially each year.

SunEdison's solar services option ensures all parties to provide high quality services. System performance risk is carried by the system installer, BP Solar, through an energy performance warranty. SunEdison and its investors do not receive full payment if the system produces less power than predicted, which provides a financial incentive for SunEdison and its team to commit time and resources to optimize system performance.

Next Steps:

If this conceptual proposal is of interest, SunEdison would be pleased to move to a more detailed offer. The next steps are:

1. Palm Beach County Electric Customers reviews potential location(s) for solar systems and submits electricity bills and drawings.
 - a. Roof condition must be good, i.e. replacement is not needed in the next 10 years, and the roof must be strong enough to hold 5-9 extra pounds per square foot
 - b. New facilities preferred , but retrofit facilities are fine
 - c. Standing seam metal roofs preferred, but flat roofs with or without ballast are workable
2. Palm Beach County Electric Customers reviews SunEdison's offer and returns the signed non-binding term sheet (see Appendix 3 for the term sheet).
3. SunEdison presents the business case and a detailed solar services agreement for review with projected savings and costs. Terms are discussed to determine if a contract is ready to be signed contingent upon technical and business review.
4. SunEdison (with BP Solar) develops a system design package, creates detailed conceptual drawings and presents the package for Palm Beach County Electric Customers approval.
5. SunEdison helps customer apply to Mountain Electric for the TVA Green Power Switch program for the proposed systems.
6. Palm Beach County Electric Customers executes the solar services agreement, contingent upon final design approval.
7. SunEdison secures permits and begins construction.

Appendices:

- Appendix 1 contains information on operations and maintenance of solar systems.
- Appendix 2 outlines SunEdison's recommendations for a solar system.
- Appendix 3 outlines a *non-binding* term sheet that SunEdison would sign with Palm Beach County Electric Customers to move forward with a solar services agreement.
- Appendix 4 provides answers to the most frequently asked questions about solar.
- Appendix 5 includes an explanation of the demand charge savings.

APPENDIX 1: Maintenance Requirements

While solar systems are ‘virtually’ maintenance-free, there are several key maintenance activities that need to be completed annually and at regular intervals during the lifetime of the system. Maintenance on solar systems varies due to site-specific conditions. However, activities considered standard to every system are listed below.

If Palm Beach County Electric Customers *owned* the solar system, the lifetime maintenance costs would be approximately \$50,000. If Palm Beach County Electric Customers signs a solar services agreement with SunEdison, it **would never** be responsible for these operations and maintenance costs. These costs are included in the solar services agreement. Nor would Palm Beach County Electric Customers be responsible for monitoring or coordinating operations and maintenance – this is a service provided by BP Solar.

Activity	Weekly	Monthly	Semi-Annually	Annually	Every 10 years	Remedy
Check Solar display for output during sunny weather	■					Always check system regularly to spot any problems quickly
Review array output, current and voltage to verify proper operation		■				More substantial, statistical check to make sure array output is not abnormally low -- call BP Solar to fix if array is much lower output than originally designed
Watch for shading by trees, weeds, other obstructions		■				Determine cause of shade and either accept lower power output, remove shade causing item, or move solar array
Inspect the PV array surface for excessive dirt or debris (bird droppings, leaves, etc.)			■			If the surface needs cleaning, a gentle rinse with plain water or mild detergent is recommended.
Inspect the PV modules for cracks/damage				■		Call BP Solar Dealer/BP Solar to check for warranty applicability
Inspect the PV modules for discoloration/cloudiness				■		Call BP Solar Dealer/BP Solar to check for warranty applicability
Inspecting the entire system for loose or damaged wiring				■		Generally easy to repair by installing contractor
Inspecting inverter and/or cleaning any filters or vents to ensure uninhibited air flow				■		Generally easy to repair by installing contractor
Replace Inverter					■	Only when required, no preventative replacement required

Maintenance Contract Options	kWdc	50	Solar Services Contract with SunEdison
Annual System Check-up	\$0.025/Wdc	\$1,000	FREE
Inverter Only Check	\$0.01/Wdc	\$400	FREE
Modules Only Check	\$0.02/Wdc	\$800	FREE
Inverter Replacement	\$0.50/Wdc	\$20,000	FREE
Other Services		\$120/hour	FREE
5 year contract		5% off above prices	FREE
10 year contract		10% off above prices	FREE

APPENDIX 2: Solar System Blueprint

The recommended solution consists of the following offer:

BP Solar Scope:	Design and supply grid-interconnected, roof-top solar electric (PV) systems. Supply technical support services and training. Optional installation services.
Module:	BP Solar 3160 160 watt polycrystalline solar module. 3% maximum power tolerance
Inverter:	SatCon inverter system.
Structure:	Flat Roof ballasted non-penetration system – lays on rooftop, anchor penetrations around the outside
Warranty:	System: 5 year parts and labor system warranty that meets the requirements of the state rebate programs for the equipment purchase option. 10 year energy warranty from BP Solar for Solar Services option. PV modules: BP Solar 25 year limited warranty. Inverter: SatCon 5 year limited warranty.
Includes:	System components including: modules, support system, inverter system, wire kits, and data monitoring system. Design including: site visits, system drawings, engineering review and stamps (not including building structural review, if required). Installation using BP Solar certified contractors. System commissioning. Operation and Maintenance manuals and training. Support for interconnection application, construction permits, and rebate/incentive applications depending on customer preference.
Exclusions:	Site preparation (if any required), extra interconnection equipment (if any required by the utility), permits including utility interconnection.
Timeline:	180 days after signature of contract.
Cash Payment Terms:	10% upon contract signing, 50% upon delivery of equipment, 40% upon receipt of rebates. Quarterly prepayments for Solar Services.
Other Terms and Conditions:	Vary by project.

APPENDIX 3

Term Sheet
For
Proposed Transaction between
Palm Beach County Electric Customers (Host)
And
SunEdison, LLC (Provider)
March 31, 2010

Description of Transaction:

- Purchase of solar power, by Host from a Provider owned facility to be located on the Host's premises.
- Provider to design, construct, own and operate a Photovoltaic Power System (System) as a part of its Solar Services
- Host's premises are generally defined as Palm Beach County Electric Customers buildings.
- Host to provide site for System and to purchase output of System.
- It is the intent of the Host and Provider to execute a Solar Services Agreement (Agreement) generally in accordance with the provisions of this term sheet.

Assumptions:

Pricing and ability to deliver services described herein, subject to the following conditions:

- Minimum incentives in Florida : 35% Tax Credit paid over 5 years
- Permitting and Interconnection work with the City and Electric Utility respectively including any equipment and labor shall not exceed \$0.10 per Watt (direct current) or a maximum of \$5,000.
- Host is creditworthy with respect to underlying financing of the transaction
- The cost of installation is affected by the degree of panel tilt (i.e. whether 10 degrees or 25 degrees).

Capacity:

This will depend on the number of buildings selected by the Host. Standard test conditions shall be defined as the standard procedures comprising solar radiation of 1,000 W/m², 25 C ambient and 1 m/s wind velocity. AC power output is assumed to be roughly 25% less than DC power rating. Maximum system size is currently flexible and set by Mountain Electric.

Energy Production:

Actual energy production will vary based on environmental, seasonal and operational conditions. The Host shall be obligated to purchase 100% of the energy production, unless the Provider, at his sole discretion allows the Host to purchase less than 100% of the energy produced. Energy produced shall be metered at the output delivery point, for purposes of billing and payment.

Term:

The Agreement will extend for a period of 20 years from date of initial operation of the solar system or for as long as the location is in operation by Palm Beach County Electric Customers. If the location is shut down, Palm Beach County Electric Customers must, in good faith and at their expense, help identify another location for the solar system in the local utility area.

Price:

Billing for the energy produced is outlined on a per kWh basis and shall be as follows:

Year	Payment by FPL Electric to Customer for 50 kW system	Annual Payment to SunEdison	Cumulative Savings to Customer
1	\$11,500	\$5,750	\$5,750
2	\$11,385	\$5,692	\$5,692
3	\$11,271	\$5,635	\$5,635
4	\$11,158	\$5,579	\$5,579
5	\$11,047	\$5,623	\$5,623
6	\$10,936	\$5,468	\$5,468
7	\$10,827	\$5,413	\$5,413
8	\$10,719	\$5,359	\$5,359
9	\$10,612	\$5,306	\$5,306
10	\$10,505	\$5,252	\$5,252

* Savings will vary by customer and depend on future utility rates. Solar Service charges will be billed on a quarterly basis based on estimated production and then confirmed once a year in accordance with metered usage. Payment is due upon invoice.

** SunEdison can offer greater savings with longer term contracts.

Ownership of System:

SunEdison and its investors will own the System. It is the intent of the Provider to grant a first security interest in the System, in order to secure, finance, re-finance or otherwise manage the System.

Termination Payment:

The Host shall have the option to terminate his remaining obligation to purchase energy by payment to Provider at any time by paying a termination payment. Such payment shall include future energy purchase obligation plus cost to remove the System installed at facility. As an alternative, the Host may purchase the System at fair market value, determined in accordance with accepted standards at the time of termination.

Maintenance & Operation:

The Provider shall have the responsibility for operation, maintenance and repair of the System. The Host shall provide unrestricted access to the System for the purposes of the maintenance, operation and repair.

Construction:

SunEdison will be responsible for construction. The work will include all labor, materials and equipment required for the complete installation of the System. This work includes utility interconnections as required for the proper functioning of the System (as intended). It also includes, but is not limited to the following:

- Solar panels
- Mounting hardware
- Roof penetrations
- Wiring and connections
- Power inverter
- Service equipment
- Metering
- Permits and approvals

A schedule for construction will be submitted for Palm Beach County Electric Customers approval. Approval may not be unreasonably withheld. Construction will be coordinated to minimize disruption to the Host facility. Any work within the facility public will be scheduled outside of normal hours.

Taxes:

The Price does not include taxes. The Host shall be responsible for taxes, fees or assessments levied by any legal jurisdiction or authority.

Limitation of Liability:

The express remedies and measures of damages provided for in the agreement shall be the sole and exclusive remedies for a party hereunder and all other remedies or damages at law or in equity are waived. If no remedy or measure of damages is expressly herein provided, a party's liability shall be limited to direct actual damages only. Such direct actual damages shall be the sole and exclusive remedy and all other remedies or damages at law or in equity are waived. Neither party shall under any circumstances be liable for consequential, incidental, punitive, exemplary or indirect damages, lost profits or other business interruption damages, whether by statute, in tort or contract or otherwise. The limitations herein imposed on remedies and the measure of damages shall be without regard to the cause or causes related thereto, including the negligence of any party.

Insurance:

The Provider shall bear the risk of loss with respect to the system. The Provider shall not at any time cover any consequential damages of the Host.

Law:

The Agreement shall be interpreted and enforced in accordance with the laws of the state of Delaware.

I agree to the terms above and acknowledge that this is document constitutes a statement of intent and not a binding legal commitment.

Name & Title

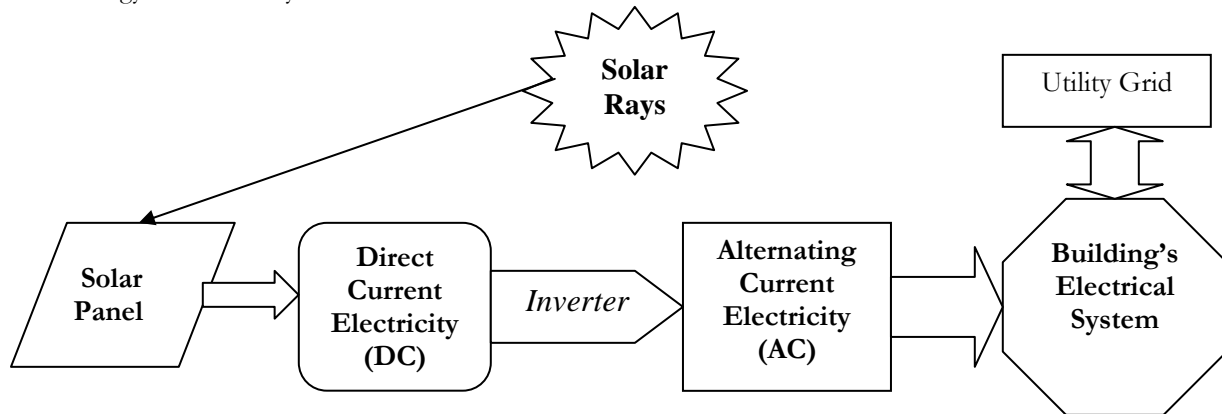
Date

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APPENDIX 4: Solar Energy FAQ

How does solar power work?

Solar photovoltaic (PV) panels turn the sun's light into direct current electricity. Photovoltaic cells are light sensitive and produce an electrical current in the presence of sunlight. Then, an inverter converts direct current (DC) electricity to alternating current (AC) electricity. The inverters feed high-quality electrical AC power to the building's existing electrical system, and, in most cases, the utility grid supplies the rest (see picture below). A typical solar module converts 13-16% of the sun's energy into electricity.



How much solar power is available?

In one-half hour, enough of the sun's energy reaches the Earth's surface to meet the planet's *annual* energy demand. A typical commercial installation generates 120 kilowatts (kW) of power – enough to power an average of 24 American homes. While the Southwest enjoys particularly good solar resources, the entire US has adequate solar resources.

Is solar energy really environmentally safe?

Photovoltaics (PV) provide among the safest methods of known power generation. They are silent, produce no emissions, and use emission-free fuel. Solar panels make extensive use of recycled materials and use waste from the silicon industry as raw material. Over 80% of the world's solar panels are made from silicon, the second most common element on the earth's surface. Silicon is non-toxic in PV modules. A standard PV module will re-generate the energy used in its manufacturing process in less than three years.

Can a solar PV system really produce all of the electricity my building needs?

A typical commercial/office user can put solar systems on their roof or on available land around the building. The solar systems can be placed around air conditioning or satellite units on the rooftop. SunEdison recommends sizing the solar system to offset just the building's most expensive peak power. The solar panels need not be visible from the ground, which can – in some cases – avoid architectural design complaints.

How is solar energy beneficial to me and my community?

- Reduces Pollution. Serves as a clean, renewable energy source.
- Improves energy security. Reduces oil & natural gas demand, especially from foreign sources.
- Increases electricity grid reliability. Power outages occur due to system overloads. Solar reduces the burden on existing utility companies by producing energy during peak hours of daylight when the system is most strained.
- Reduces energy costs. When purchased through power purchase agreements, solar power is a hedge against future utility price increases.
- Benefits Health. The American Lung Association cites 70,000 deaths per year from coal-fired pollution. This pollution is also the #1 source of asthma and other health problems.
- Creates jobs. Solar installation adds local construction and manufacturing jobs.

What happens on cloudy days? At night?

Contrary to popular belief, solar panels *do* produce electricity on cloudy days. While the weather (and amount of clouding) is unpredictable, the amount of solar energy that hits the earth each year varies by less than 5% from year to year. However, the amount produced is approximately 10-20% of the electricity produced on sunny days. Since solar systems are dependent on light (direct or indirect), the solar energy user must balance their overall energy supply with supplies from the electricity grid at night. During that time, buildings with solar panels automatically receive power from the utility company.

Isn't solar expensive?

It can be, but government subsidies make it much more affordable. Solar can be expensive *without* state incentives due to manufacturing costs (solar panels themselves account for between 40-50% of the total cost of an installed solar energy system), relatively low production volumes and long payback times. Solar *is* affordable in states with solar incentives, such as California, Connecticut, Hawaii, Illinois Massachusetts, Nevada, Florida , Oregon and Rhode Island. With the unique SunEdison financing model, customers gain the benefits of solar energy at a price equal to or below current electricity rates without the upfront costs.

On a dollar-per-kilowatt basis, solar is much more expensive than other fossil fuels. However, solar does not have fuel costs, which must be incorporated into the cost of fossil fuel generation. In addition, solar energy is delivered on-site while electricity generated by fossil fuels must be transported via transmission and distribution grids. This transportation costs money, strains the transmission system and creates vulnerabilities in the security of the power supply.

Will my utility bill go down with solar?

Yes, using solar energy during the most expensive – or peak – hours of the day can reduce one's electricity bill. The amount the electricity bill goes down depends on the size of the solar energy system and the rate schedule the customer is currently on (i.e. whether it is a flat rate or a time of use rate). With solar, one uses less electricity and enjoys peak demand savings. The periods of peak demand coincide with when the sun shines brightest and when the solar panels produce the most electricity. With the SunEdison arrangement, the user's electricity bill will go down by the amount of solar energy produced – and a percentage of these savings would be paid to SunEdison over the contract term.

Doesn't going solar involve a complicated process?

The process can be complicated if one does not know how to navigate through it. One must determine how much solar to install, what type of panels to purchase, what dealer to buy the panels from, how to finance the purchase, how to maintain the panels and what the cash flow of savings will be. An alternative is to work with SunEdison, who simplifies solar and takes care of the details of purchase, financing, installation and maintenance – so host customers do not have to. SunEdison host customers simply sign a long-term power purchase agreement and pay for energy generated on a quarterly basis.

How do I know if my building is a good candidate for solar power?

The property should have clear, unobstructed access to the sun for most of the day, be south facing and be free from shade. If the location looks promising, a solar provider can trace the sun's path and determine whether the business would benefit from a solar system. All types of roofs can work, as long as they have a minimum of 10 years of additional life. The roof should be able to bear 9 extra pounds of additional weight per square foot and have at least 10,000 square feet of non-shaded roof space per 120 kW. Composition shingles are easiest to work with while slate roofs are the most difficult.

What are solar services?

As provided through SunEdison's program, solar services are designed to represent all of the benefits of solar power. These benefits include: electricity savings, demand savings, insulation benefits, maintenance services, and a long-term hedge against rising energy costs. Generally these solar services are supplied under a contract similar to an energy savings contract over a long period of time. This time horizon ensures that the project investor has enough time to recoup the investment. Solar services are most popular in states with financial incentives, where solar services can be provided at or below the price of coal-fired electricity.

Why use the SunEdison model? Why not buy the solar panels outright?

The majority of solar systems are purchased outright by those who can afford to pay the upfront capital costs and those who do not have an alternative option. Solar financing programs have recently been established, many of which require customers to take out a loan to cover the purchase cost. In this case, capital is tied-up for nearly 15 years and customers are responsible for ongoing maintenance costs (See Appendix 1 for estimated maintenance costs over the system's lifetime). Most customers want a shorter payback for capital investments, which is not possible if solar is purchased outright. In the SunEdison model, SunEdison owns the solar assets and takes care of installation and maintenance, so customers do not have to. The host customer simply signs a solar services agreement and enters into a long-term power purchase agreement.

How long will the solar panels last?

With regular maintenance, solar panels generally last 35 years or longer. While their typical level of efficiency is 13-16%, their performance degrades at approximately 0.5% per year. Most solar manufacturers provide a 25 year warranty for their PV panels. SunEdison offers a full system warranty to guarantee a high-performing system for 10 years. This ensures that the solar installer has the incentive to provide the best service and that the system will produce power, worry-free for an extended period of time.

Are photovoltaics (PV) a mainstream technology?

Photovoltaics were born in the United States with the invention of the silicon solar cell at Bell Labs in the 1950s. Initially, they were used to power satellites and remote applications such as emergency roadside telephones and traffic sign boards. Now that more solar systems are being sold worldwide, solar is affordable for industrial and commercial use in states with solar incentives. There are currently 3,300 megawatts of solar installed worldwide – enough to power 660,000 homes. The solar industry is now almost as large as the wind industry and continues to grow at more than 25% per year. The cost of PV technology continues to come down as the industry grows, which makes solar increasingly price competitive compared to traditional electricity sources. Solar is expected to be cost effective without incentives by 2012 in some states.

Is there a difference between solar photovoltaic (PV) and solar thermal?

Yes. Photovoltaics (PV) refer to the direct conversion of sunlight to electricity through solar panels. They are made of semi-conducting materials similar to those used in computer chips. When sunlight is absorbed by these materials, the solar energy knocks electrons loose from their atoms, allowing the electrons to flow through the material to produce electricity. Solar thermal provides a way to generate heat using a solar collector – usually flat with a black absorption plate – to gather solar radiation that heats the water and/or air for commercial, industrial or domestic use.

What about other alternative energy sources, such as wind and fuel cells?

Solar systems produce highly predictable output, based on more than 30 years of national data. They have low operations and maintenance costs because they do not have moving parts. With solar, there are few zoning or aesthetics issues. Solar installations provide a visible, tangible environmental commitment on behalf of the company that hosts solar systems. Wind farms often have to be built far from the final user and have moving parts which require more operation and maintenance costs. To avoid vibrations and wind impediments, small wind systems have to be placed more than 1,000 feet from nearby buildings (as opposed to panels on top of buildings). Fuel cells have not been commercially available for long enough to ensure predictable production. They normally use fossil fuels, creating fuel price risk, and require space inside a building.

What are the disadvantages of solar?

Solar is more expensive to install than fossil fuels on a dollar per kilowatt basis. It remains a small player in the world's energy portfolio, which keeps the costs higher than those of other energy sources. Solar energy requires customers to remain in their location for long periods of time, or else to be able to transfer the costs for the solar system to the next building owner. Even though solar is growing at more than 25% annually worldwide, it accounts for less than 0.01 percent of the world's total energy supply. In the U.S. for example, total solar shipments are approximately 400 megawatts per year – not nearly enough to meet the nation's electricity needs. When more significant investments are made and sustained by states through solar incentives, manufacturing and energy usage costs will decline, making solar mainstream without subsidies.

Why don't more states offer solar incentives?

Currently, 48 states and a U.S. territory have some type of solar or renewable energy incentives – including investment credits, rebates, sales tax, and/or property tax waivers. Some of these incentives depend on whether the host customer is a residential or commercial customer. The PV systems installed since 1988 provide enough electricity to power 250,000 American homes or more than 8 million homes in the developing world.

How do storms affect solar panels?

Most manufacturers produce corrosion resistant frames and many are designed to withstand high wind speeds and one-inch hailstones at up to 50 mph. However, solar panels do not operate when they are covered with snow. Snow must be manually brushed off or melted by the sun to resume normal operations. The snow generally melts quickly when panels are exposed to sunlight. Tilted panels (v. flat roof models) can be up and running a day after being covered with snow due to their tilt angle, even in cloudy conditions.

Where can I find more information?

- Financial Incentives for Solar. *Database of State Incentives for Renewable Energy (DSIRE)*: www.dsireusa.org
- General Information on Solar. *Solarbuzz.com*: www.solarbuzz.com
- Guide to Investing in the Renewable Energy Industry. *Clean Edge*: www.cleandge.com
- Solar Technology and Trends. *National Renewable Energy Laboratory (NREL)*: www.nrel.gov
- Solar Trade Association. *Solar Energy Industries Association*: www.seia.org
- Scientific Analysis and Advocacy. *Union of Concerned Scientists*: www.ucsusa.org
- Clean Power Estimator. www.clean-power.com/bp/default.asp

Sources: U.S. Department of Energy – Energy Information Administration and U.S. Department of Energy – Energy Efficiency and Renewable Energy, Solarbuzz, National Renewable Energy Laboratory, Solar Energy Industries Association

APPENDIX 5: Explanation of demand charge savings

Definition of Demand Charge:

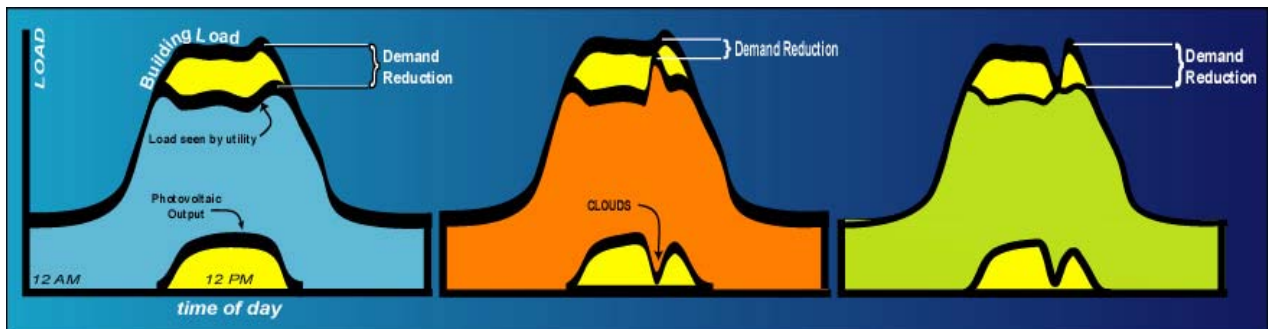
A demand charge is the amount charged by a utility for the *highest* average amount of power needed. This amount can be recorded during any one time period – which ranges from 15 minutes to one hour – within a normal billing cycle. Since the sun shines the brightest when buildings have the highest energy needs, the energy created by the sun can “shave” peak energy demand (often called loads) and reduce the demand for electricity at retail – and often high – demand rates.

The correlation between photovoltaic (PV) output and building loads is not perfect, however. Since demand charges are assessed based on the *highest* load during a given time period, certain events – such as a cloud passing over the solar system during a peak load period or a slight difference between the building peak demand and solar peak supply – could reduce the positive role that solar panels play in reducing peak electricity demand. In other words, a quick increase in demand – such as when a cloud passes over the solar system and its PV output is reduced – would increase demand charges for the *entire* billing period.

Solar Load Controller as Remedy to Demand Charges:

One way to remedy is to equip the solar system with a device called a solar load controller (SLC). The SLC enables peak demand reduction by managing the end-use load drivers – i.e. building temperatures – in response to load and temperature variations. The SLC acts as a tool to curtail demand *if* and only if actual demand is near peak demand for the month so that the demand at that time does not hit the peak demand.

To set the SLC, the building user selects an allowable amount of temperature adjustment to evaluate how high the corresponding level of increase in solar demand reduction would need to be. As shown in the figure below, a small amount of load control (right) can substantially increase demand reduction achieved with solar energy alone (center) if conditions are not ideal (left).



Thermostat Adjustments:

An effective means of implementing solar load control is to adjust thermostat settings during the cooling months (i.e. May – September). The building occupant would choose:

- The maximum daily discomfort the building occupants are willing to allow (in degree-hours of temperature increase);
- Seasonal building load profiles;
- The building’s cooling balance point (i.e., the outdoor temperature above which the building requires cooling); and
- The building’s load-temperature coefficient (i.e., the load increase per temperature increase trend). The correlation between load and temperature can be estimated from past electricity bills by comparing the highest summer demand and the off-season demand.