

## LBE Solar Canopy Webinar (4/15) – Participant Questions

*Disclaimer: This webinar was hosted by the Leading by Example Program at the Department of Energy Resources (DOER), with presentations from Solaire Generation and PowerOptions, to provide participants with a wide range of real life experience and industry expertise. A number of participant questions were addressed to Solaire and PowerOptions, thus they were asked to provide answers directly. Reference herein to any specific commercial product, process or Service by trade name, trademark, manufacturer, or otherwise, does not constitute or imply its endorsement, recommendation or favoring by the Commonwealth or DOER.*

1. If Power Options has one developer - Sun Edison that services all the solar contracts, how are they ensuring the best pricing to customers? Why not prequalify multiple developers and then let them submit a cost proposal when a Power Options customer is looking to install solar or purchase net metering credits?

### **PowerOptions:**

The PowerOptions PPA pricing remains competitive on an on-going basis because it accounts for updated equipment costs, project soft costs, solar incentives and investor tax benefits. It also locks in a cap on the return on investment. While PowerOptions does not guarantee the lowest price to customers, the pricing formula, in conjunction with the favorable terms and conditions of the PPA, provide our members with very competitive terms for a solar deal without the cost and time of doing their own competitive solicitation and negotiation of a contract. While we considered a pre-qualifying approach, what we have found through both this solicitation and our solicitations for natural gas and electricity, is that bidders are less willing to make concessions on pricing and terms unless they are given exclusivity to our consortium. Members would also still have to undergo some form of competitive procurement and negotiation of a contract.

2. Do the columns holding the canopies take away parking spaces?

### **Solaire:**

As mentioned during the webinar, we have installed over 55 MWp DC of systems, which is more than 20,000 cars and have never lost a parking space.

3. Are these SREC revenues current or is this just an example? (DOER)

### **DOER:**

The table included in the webinar (and shown below) shows estimated SREC II revenues per MWh for the length of SREC II Program (through 2025). While these values are fixed-prices for SREC IIs and thus represent a good estimation of revenues per MWh, they are not guaranteed since auction bids are for the volume that bidders are willing to buy for this fixed price in the Solar Credit Clearinghouse Auction. See the Solar Carve-Out II program for more information on the program (<http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/solar/rps-solar-carve-out-2/>)

| SREC Revenue Schedule |       |
|-----------------------|-------|
| 2015                  | \$285 |
| 2016                  | \$285 |
| 2017                  | \$271 |

|       |       |
|-------|-------|
| 2018  | \$257 |
| 2019  | \$244 |
| 2020  | \$232 |
| 2021  | \$221 |
| 2022  | \$210 |
| 2023  | \$199 |
| 2024  | \$189 |
| 2025  | \$179 |
| 2026+ | \$40  |

4. In locations without lots of overnight traffic, is vandalism typically a problem? How is this handled in PPAs?

**PowerOptions:**

The PowerOptions PPA ensures that the system is insured in the event of vandalism. The customer is not responsible for system repairs related to vandalism incidents. There has been no vandalism at systems that are operating or under construction in the PO solar project portfolio to date.

**Solaire:**

Vandalism is an issue for any public properties, though climbing on a canopy is challenging, especially when these structures have high clearance – 11’ to 15’ high at the lowest level.

5. Who insures these systems? I need an insurance company that is familiar with solar canopies.

**PowerOptions:**

The two leading insurers who know the most about solar are GCube and Axis.

6. Would you please clarify your statement that state agencies are not allowed to enter into PPAs? Chapter 25A?

**DOER:**

As mentioned in the webinar, a state entity may enter into a PPA agreement that has been competitively procured through an authorized energy cooperative such as PowerOptions. (See Section 137 of chapter 164 of the Massachusetts General Laws, which authorizes public entities, unless located in an area served by a municipal light department, to participate in programs organized and administered for group purchasing of electricity that has been competitively procured, among other enumerated commodities, services, or similar products.)

However, things get more complicated if a state entity wishes to manage its own competitive procurement of a PPA that also requires the use of state property. In this scenario, a lease of the state property to the project owner would generally be required in order for the developers to secure financing to construct the system. However, disposition of state property by lease for most state agencies requires legislation authorizing the transaction before it can occur (see section 34, Chapter 7C of Massachusetts General Laws). As a result, it follows that at present, it can be difficult for state agencies to competitively procure PPAs for projects on state

property absent legislation authorizing the lease of that property. DCAMM is currently exploring alternative options to allow for a lease as part of the competitive process in procuring a PPA.

7. Does the land below need to be paved?

**Solaire:**

Not necessarily. For example, it is common to install systems on landscaped central parking islands.

8. What is the load PSF of the parking structure installation?

**Solaire:**

The structures are engineered to support loads that vary between between 65 PSF to 0 PSF. Most of our installations have been located in 30 PSF to 55 PSF snow load areas. The higher the snow loads, the bigger the steel required, and the more expensive the system is. Finally, when there is a large snow load, we recommend dual tilt structure where the snow and ice slide safely towards the middle of the canopy.

9. How many inches of snow will the dual incline hold and what needs to be done when there is snowfall in excess of that?

**Solaire:**

The canopies are engineered for the local load – i.e. 50 PSF, which is a function of more than the inches of snowfall but is tied to the density of the snow. So the question is hard to answer.

10. Where can I get the slides?

**DOER:**

The slides and recorded webinar are posted here:

<http://www.mass.gov/eea/energy-utilities-clean-tech/webinar-future-and-archive.html>

11. Do you get any extra LEED points for solar canopies or for installing charging stations?

**DOER:**

Under the Building Design and Construction LEED Rating System:

*EV Charging Stations -*

1. Buildings can get up to 1 point under “Green Vehicles” if they both:
  - a. Designate 5% of all parking spaces used by the project as preferred parking for green vehicles and;
  - b. Install at least a level 2 electric vehicle charging station in 2% of all parking spaces used by the project.

(See more information here: <http://www.usgbc.org/node/2613735?return=/credits/new-construction/v4/location-%26-transportation>)

*Solar Canopies -*

1. Buildings can get up to 1 point under “Heat Island Reduction” for placing at least 75% of parking spaces under cover. (See more information here:

<http://www.usgbc.org/node/2613950?return=/credits/new-construction/v4/sustainable-sites>)

2. Buildings can get an additional 3 points under “Renewable Energy Production” based on the percentage of renewable energy that is used to offset building energy costs. (See more information here: <http://www.usgbc.org/node/2612988?return=/credits/new-construction/v4/energy-%26-atmosphere>)

Under the Building Operations and Maintenance LEED Rating System:

(reference: [www.usgbc.org/sites/default/files/LEED%20v4%20EBOM\\_10.01.14\\_current.pdf](http://www.usgbc.org/sites/default/files/LEED%20v4%20EBOM_10.01.14_current.pdf))

#### *Solar Canopies -*

1. Buildings can get up to 1 point under “Heat Island Reduction” for placing at least 50% of parking spaces under cover.
2. Buildings can get up to 5 points under “Renewable Energy and Carbon Offsets” based on the percentage of total energy use that is met directly with renewable energy systems.

#### **Solaire:**

Several of our clients have obtained up to 7 LEED points when installing solar canopies.

12. What type of firm (or list) would perform the preliminary analysis? Is there a state contract through OSD?

#### **DOER:**

There are a number of firms on the statewide energy contract (PRF46) that are likely capable and have experience performing solar canopy feasibility studies. DOER recommends reaching out to potential vendors to determine experience levels and interest. A full list of energy vendors can be found here: <http://www.mass.gov/anf/docs/osd/uguide/prf46.pdf>

13. Are there incentives for private companies with large parking lots, such as shopping malls?

#### **DOER:**

The Leading by Example program’s (LBE) Solar Canopy Grant is only available to state entities. However, private entities are able to utilize the 30% investment tax credit (ITC) offered by the Federal government as well as accelerated depreciation benefits. In addition, private entities may participate in the Solar Renewable Energy Certificate (SREC) market. Each MW of electricity generated by a solar canopy system produces 1 SREC, which can then be sold to produce revenue. (For more information on the SREC II program: <http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/solar/rps-solar-carve-out-2/>)

14. Most of us have requirements for parking lot landscaping and use low impact development storm water. How do they work with solar canopies?

#### **Solaire:**

Solar Canopies can be equipped with water management apparatus, whereby water is collected through a system of rubber gaskets, gutters and downspouts and deposited onto grade or is tied in into the water drainage system of a parking lot, such as storm water system.

**PowerOptions:**

Development storm water and parking lot landscaping is integrated into engineering designs from the preliminary stage to the final canopy design & build stage. The canopy runoff is typically directed to installed downspout(s) and existing onsite storm water catch basins. More complex retention basins can be designed and built if found to be necessary per storm water engineering analysis. Underground storm water collection must be integrated into design early and constructed prior to foundation work.

15. During the winter, how is melting snow runoff dealt with? We are concerned about water discharged to the ground and then freezing and causing safety hazards.

**Solaire:**

It is a legitimate concern as temperature under the canopy might be a couple of degrees lower than outside of the canopy. We recommend that the owner of the parking lot uses the same caution as prior to the installation of the canopy, which means to continue using salts to prevent ice build-up.

**PowerOptions:**

Snow melt/runoff from the canopy is diverted to gutter systems and downspouts and eventually into stormwater basins. Well positioned downspout locations help mitigate freezing/safety related issues, but parking lot surfaces will still require ice treatments to manage potential icing related safety hazards as is done without a canopy.

16. Decking means?

**Solaire:**

Decking means a light gauge material that covers the underside of the canopy to hide the solar PV panels.

17. Slides of this presentation will be available for future reference?  
See question 10.

18. In a PPA does the \$/kwh rate include transmission/distribution charges, or does that even a factor with a PPA since the electricity generated would typically be used on site?

**PowerOptions:**

PPA price is for the electricity generated from the behind the meter PV system. The PPA price doesn't include delivery charges, as the generation is produced and consumed on-site and does not need delivery from the utility distribution or transmission system (hence there are no delivery charges for the on-site generation). An on-site system would reduce the volume of utility delivered kWh to the customer site.

19. PPA - Who pays for the inverter and replacement equipment at 10+ years?

**DOER:**

The owner of the system pays for inverter replacement, routine maintenance and any other equipment replacement that is necessary through the life of the system. In a PPA arrangement, the owner of the system is the installer and they are thus responsible for inverter replacement as well as other O&M costs. Should an agency or municipality buy out the system early, that entity will then be responsible for any O&M that is required.

20. During the construction phase, how long will the facility be without parking? Can the construction be phased to minimize the downtime for parking space availability?

**Solaire:**

Solaire always phases the construction of a project with minimal impact on the daily operations of a facility. Site work can be done after work hours or the week –ends, and steel erection in phases, occupying sometimes no more than 30 parking spots per day. However, it is important to mention that any challenging logistic will delay an effective deployment of a system.

**PowerOptions:**

How long the facility will be without parking depends on the project's foundation timeline, site subsurface conditions and available contractor equipment. The parking could be disturbed for 2 months or as much as 5 months depending on many factors. Construction takes about one week per foundation to complete, but it depends on footing parameters, number of concrete pours, etc. Inspection time from municipal offices or third parties can also add to disturbance term.

It's important to have alternate footing designs/foundation engineering completed in the event of encountering subsurface conditions that could present delays. Subsurface boring are an important step to determine subsurface geology conditions expected in construction and proper boring locations for primary and secondary footing design. The boring work can take place early in the process including soil testing and lab analysis.

Module work can be done with the parking lot being used but it does present additional safety concerns and precaution requirements for the electrical contractors working above parked automobiles. Parking lots cannot be used during the foundation and canopy erection construction phases.

21. How is roosting of birds addressed?

**Solaire:**

Solaire has never had any experience of birds nesting on the canopies . Electro magnetic wave / sounds transmitted by the electrical equipment might be bothering birds. In addition, the potential location for bird nesting is very close to the PV panels, which get hot very quickly during the day making these locations un-hospitable for birds.

22. Any recommendations for increased lightning protection on carport solar arrays?

**Solaire:**

Solaire encountered such requirements only once at a military base, though the installation of such lightning apparatus was abandoned.

23. Does the tilt for snow reduce the capacity factor?

**Solaire:**

Dual Tilt will result into snow accumulating to the middle of the canopy and therefore covering the panels for a longer time than for a single slope canopy where the snow falls on the ground. We have however noticed that the panels warm quickly resulting into snow melting at quite a rapid rate, sometime faster than in situation of snow on a roof installation.

24. How does parking lot plowing operations change for the owner -- e.g. equipment changes, does it take longer, any other impacts on operations?

**Solaire:**

Plowing can be perceived as more challenging due to presence of columns, though: (1) with dual tilt canopies, snow stays on the top of the canopies requiring significantly less plowing, (2), distance between column should be as wide as possible, to facilitate the passage of specialized equipment

**PowerOptions:**

There is little change required for plowing except the need to be more careful near the island foundations for the canopy structures. Slower speeds may be necessary and potentially smaller equipment depending the standard plowing equipment currently used.

25. How did Cronig's hold up during this year's snow?

**Solaire:**

From Rob Myers – South Mountain – Actual installer of the Cronig's market solar canopies

“The canopies at Cronig's fared this past winter very well. Of note:

- The dual incline design eliminated the risk of snow and ice shed onto cars and pedestrians
- The single column design allowed for easier plow access

Intriguingly, the snow retained in the center trough melted quite quickly - more quickly than it did on nearby roofs of the same angle - not sure why. The system production was ~13% less this winter than last, but I recall an inverter service issue this winter that shut the production down for a week or so”

26. What is a typical capacity factor for solar canopies in MA?

**Solaire:**

Typically production in MA is between 1,050 kWh per kWp DC and 1,200 kWh per kWp DC in MA

**DOER:**

Using three years of production data from May 2010 through April 2013, DOER determined that the average capacity factor of solar PV systems in Massachusetts operating during this period was 13.21%. (<http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/solar/rps-solar-carve-out/current-status-of-the-rps-solar-carve-out-program.html> )

27. How many parking spots do you lose?

See Question 2

28. Is lighting from the underside of the arrays the only option for lighting the lot?

**Solaire:**

Lighting under side and on the exterior of the canopies – trim / fascia of the canopies.

29. Do you ever have problems with icicles?

**Solaire:**

Spacing between modules is no more than 0.5" which makes icicles formation quite difficult.