

## MassDOT Solar Photovoltaic Energy Program Overview

### Background Information

The MassDOT Office of Transportation Planning and Highway Division are working collaboratively to implement the state-wide Solar Photovoltaic (PV) Energy Program. The purpose of the program is to build ground-mount solar PV generation facilities at multiple state-owned properties within the state highway layout throughout Massachusetts. A minimum of 6 Mega Watts (MW) of solar power generation systems will be provided from this multi-site project.

MassDOT's development of solar PV facilities within the state highway layout is driven by the desire to:

- Create energy savings by producing electricity locally and economically
- Generate revenue by utilizing underutilized state land
- Reduce greenhouse gas emissions via renewable power generation technologies, and
- Support the Commonwealth's green and clean economy

The program began in early 2013 with an overall program design and a preliminary site feasibility study. A Request for Response was issued in the summer of 2013 to solicit best-value project proposals from interested solar developers to "design, construct, commission, finance, operate, and maintain solar PV generating facilities" at one or more locations in the Commonwealth. After an extensive and thorough procurement process, MassDOT selected Ameresco, Inc. to serve as the developer for the project in June, 2014. The two parties had jointly developed and executed the Master License Agreement / Power Purchase Agreement (MLA/PPA) by November 2014.

### Project Benefits

Solar PV arrays of 6 MW aggregated capacity in the Northeast region can generate **7,800,000 kWh electricity per year**, which is equivalent to the average power consumption of 1,285 homes in Massachusetts. Replacing such amount of electricity in the current ISO-NE grid with solar power will lead to **6.8 million pound CO<sub>2</sub> emission reduction**. In addition to power generation and environmental benefits, MassDOT also expects considerable financial benefits from this project.

Under the negotiated power purchase rate and the current Massachusetts Net Metering policy, this project is projected to generate a total of **at least \$15 million in savings/revenue** (aggregated cash flow) over the 20-year contract period. The realized savings will depend on the actual power production and the net metering credit rate of a given time.



MassDOT chose a “Public-Private partnership” business model to implement the program, which allows the agency to benefit financially in multiple ways:

- **Zero upfront capital cost for the state.** The Public-Private partnership requires that Ameresco be responsible for the development, design, construction, commission, operation and maintenance of the solar facilities. The developer will eventually recover its costs over time through federal tax incentives, the state Solar Renewable Energy Credits, and electricity sales.
- **Full utilization of Federal Corporate Tax Incentives.** The involvement of the private developer allows the project to utilize the Federal Investment Tax Credits (i.e., 30% total system costs can be directly subtracted from the system owner’s income tax) as well as the Modified Accelerated Cost Recovery System (tax base deduction centered on an accelerated property depreciation schedule). These incentives bring down the overall project capital costs by more than 50%.
- **A favorable electricity rate schedule for the next 20 years.** MassDOT is committed to purchase 100% power generated from these solar facilities under a predetermined rate schedule; and the negotiated rates are significantly lower than the current utility rates.
- **Energy savings through virtual net metering.** The Massachusetts net metering policy allows qualified host customers (in this case, MassDOT) to obtain net metering credits (NMC) for exporting excess power to the grid. MassDOT will benefit from the difference between the net metering credits it receives from Utilities and the power purchase payments it makes to the developer.
- **Lease revenue.** MassDOT will receive annual rent payments for the developer’s leasing of the land supporting the facilities.

## **Project Sites**

The Phase I of the two-phased program includes a total of ten parcels, which are further divided into two groups (five in each group) based on site development stage, interconnection readiness and municipal permitting process. MassDOT approved and executed the site-specific agreements (i.e., the addenda to the MLA/PPA) for the five Phase IA sites at the end of October, 2014. Construction at these sites subsequently commenced in late November, 2014 (with the exception of the Plymouth site, where a contract amendment was necessary due to the discovery of underground utilities.) Phase IA sites that are presently under active construction and are anticipated to start power production in the summer and early fall of 2015.

Phase IB sites are currently under active development for utility interconnection, final design completion, and applicable non-administrative permit acquirement. Construction mobilization at these sites is

expected to take place in the fall of 2016, pending on the net metering rulemaking progress by the state legislature.

The table below summarizes the planned capacity, projected annual power production, and associated environmental benefits of each of the ten sites.

Phase	Location	Installed Capacity (kW DC)	Projected Annual Output (kWh)	CO <sub>2</sub> Emission Reduction (lbs)	Home Power Demand	Vehicle Mileage Traveled Reduction (miles)
Phase IA	Framingham I90 Interchange 13 N	649	735,706	736,840	121	794,549
	Framingham I90 Interchange 13 S	649	735,706	736,840	121	794,549
	Framingham I90 WB Service Plaza	318	360,485	360,485	59	389,317
	Natick I90 WB Embankment	271	307,206	307,206	51	331,776
	Plymouth Route 3 Exit 5	567	642,751	642,751	106	694,159
Phase IB	Salisbury, District 4 Depot	649	735,706	736,840	121	794,549
	Stockbridge I90 @ Interlacken East 1	649	735,706	736,840	121	794,549
	Stockbridge I90 @ Interlacken East 2	417	472,711	472,711	78	510,519
	Stockbridge I90 @ Interlacken West	649	735,706	736,840	121	794,549
	West Stockbridge I90 Exit 1	649	735,706	736,840	121	794,549
<i>Total</i>		5,467	7,107,100	6,197,391	1,021	6,693,065

Due to regulatory and site condition constraints, the attainable capacity of the ten Phase I sites totaled 5.47 MW DC. Presently, The MassDOT Office of Real Estate and Development is canvassing three additional sites within the state highway layout for Phase II sites, with the intention to achieving or surpassing the goal of a minimal 6MW solar PV generation capacity.

**Contact Information**

Please contact MassDOT OTP project manager Hongyan Oliver, at 857-368-9025 or [Hongyan.oliver@state.ma.us](mailto:Hongyan.oliver@state.ma.us), to receive more detailed information on the project.