



ACTON LANDFILL SOLAR PROJECT FAQs:

Basic Information:

- ❖ How much energy does the solar project generate? The photovoltaic (“PV”) facility on the landfill is guaranteed to generate over 32.7 megawatt-hours during its 20 year contract.
- ❖ How much greenhouse gases is being avoided? Given the current power mix in New England’s regional grid, the total greenhouse gases being avoided by the PV system on the landfill over the 20 year period are nearly 11,000 MtCO₂e (metric tons of carbon dioxide equivalent). This is the same amount of greenhouse gases used by nearly 1,200 single-family homes during the year 2000. It is also the same amount of carbon taken out of the air in one year by approximately 30 square miles of mature forest.
- ❖ Who uses the energy? The energy will be used by Town buildings such as Town Hall, Memorial Library, the fire departments, and the Public Safety Facility. All electricity produced here is fed onto the grid. NSTAR applies a credit for that electricity on municipal electric bills for our buildings elsewhere on the grid. This arrangement allows us to use all the electricity produced on this site when we need it without having to invest in large batteries for energy storage.
- ❖ How much of the Town’s electricity usage will be covered? In 2014, over 65% of the electricity used by municipal buildings will be produced by the landfill PV system.
- ❖ What are the benefits to the Town? The Town receives guaranteed electricity at a guaranteed rate, which helps with planning and budgeting. Acton receives this low-polluting, sustainable, and local electricity without the cost or risk of maintaining reliable operation of the facility. The Town has the option to buy the equipment at the 7th, 12th, and 20th years of the contract.
- ❖ How much money might it save the Town? If the market rate for electricity remains at least one penny per kilowatt-hour above the fixed contract rate, the predicted cost savings from the landfill solar system totals over \$325,000 for the 20 year period (more than \$15,000 per year). If the market rate stays at the Town’s average 2013 rate or increases, Acton will save over \$1,700,000 over the 20 year period, or \$85,000 per year.
- ❖ Who paid for it? The Town did not pay any money to build the PV system. The PV system on the landfill was bought via a commercial Power Purchase Agreement (PPA) with Ameresco, a solar development company selected by the Town through a public, competitive bid process. Ameresco paid for and owns the system and assumes the risk for its upkeep. Acton signed a contract with Ameresco to purchase the solar electricity produced here for a 20 year period. In exchange for guaranteed electricity sales, Ameresco sells us the electricity at a fixed rate of 10.5 cents per kilowatt-hour (kWh). This rate is currently below the market price for commercial customers such as Acton. Market rates for electricity are expected to rise during the 20 year contract period, resulting in increased savings each year.

- ❖ How much did it cost to build? We don't know the actual cost to build the project, but estimate that it was over \$9,000,000. All costs were paid for by the company that owns the system.
- ❖ Who owns it? The Town of Acton owns the land under the PV system. The panels, mounts, wires, inverters, and all other equipment on the solar facility is owned by Ameresco. Similarly, the Town owns the DPW Building and Nexamp owns all solar equipment on the roof.

More Information:

- ❖ Can local homeowners use the energy generated at the site? Not currently. The energy produced from the solar projects is under a 20 year contract with the Town for use by municipal properties. The Town will have an option to buy the solar equipment as mentioned above. Town meeting decisions made at that time will determine what happens at that point.
- ❖ What about the other solar PV sites in Town? The Town has similar arrangements for the solar PV systems on the DPW building and for some of the public school buildings.
- ❖ How does it work? Solar photovoltaic (PV) panels are made up of many crystalline silicon cells wired together. These PV cells convert the sun's light energy (photons) directly into electrical energy (electrons). On-site inverters transform the direct current (DC) electrical power produced by the panels into alternating current (AC), which is then fed onto the regional electrical grid via overhead transmission cables.
- ❖ What is the expected lifespan? The current contract is for 20 years. PV panels tend to have a useful lifespan of 25 years, but do degrade in their electrical generation capacity with time. The landfill panels are guaranteed, in their 20th year, to produce at over 77% of their initial capacity.
- ❖ What happens at the end of its useful life? If the Town does not purchase the equipment at the end of the 20 year contract, the equipment owners will remove the solar panels and all associated equipment. If the Town decides to buy the solar PV system, all equipment will remain on the premises.
- ❖ Why weren't other types of panels used? This type of PV system is the most economic system in this part of the world. Concentrating solar power is a more efficient power source in ideal solar conditions, but is not suitable for our cloudy climate here in Massachusetts. Additionally, PV panels that rotate from east to west to follow the sun's track in the sky can produce more power than these stationary PV panels, but are not used on top of landfills because their heavy 'footprint' can damage the landfill cap. Thin film, flexible panels also exist, but are currently not as efficient at energy production than the rigid panels seen here.
- ❖ How stable is the landfill underneath it? The Acton landfill was active until 1985 and was capped with clay, as approved by the Massachusetts Department of Environmental Protection, to discourage water from percolating into the landfill. The landfill is generally stable because

the majority of waste decomposition occurred before the PV array was constructed. Engineering estimates at the site predict less than 3 inches of settlement due to loading from the PV system. If necessary, the panel racks can be adjusted to maintain their optimal orientation to incoming solar radiation.

- ❖ What about glare? Solar panels are designed to generate electricity by absorbing the sun's light, so glare will not be produced. The glass used in PV panels is less reflective than water and is not expected to impact airplane pilots or passing drivers. The FAA has already approved systems similar to this along airport flight paths.
- ❖ What about maintenance? During the 20 year contract period, all maintenance and repairs are paid for and performed by the companies that own the equipment.

Sources:

- Acton Landfill BWP SW 36 Post-Closure Use – Major Solar Photovoltaic Array Permit Approval letter with Conditions # X251838. Massachusetts Department of Environmental Protection: 26 September 2012. 14 p. <http://www.mass.gov/eea/docs/dep/energy/solar/pcup-acton.pdf>
- Questions & Answers - Ground-Mounted Solar Photovoltaic Systems. Massachusetts Department of Energy Resources, Massachusetts Department of Environmental Protection, Massachusetts Clean Energy Center: December 2012. 24 p. <http://www.mass.gov/eea/docs/doer/renewables/solar/solar-pv-guide.pdf>
- Commercial Power Purchase Agreement by and between Ameresco Solar Acton LLC and Town of Acton: December 2011.
- Commercial Power Purchase Agreement by and between Nexamp Capital PUB 1 LLC and Town of Acton: February 2010.
- eGRID2012 Version 1.0 Year 2009 GHG Annual Output Emission Rates, US Environmental Protection Agency: 2012. http://www.epa.gov/cleanenergy/documents/egridzip/eGRID2012V1_0_year09_GHGOutputrates.pdf
- Unit Conversions, Emissions Factors, and Other Reference Data, US Environmental Protection Agency: November 2004. <http://www.epa.gov/cpd/pdf/brochure.pdf>