

## **Solar Canopies at Waste Sites in Environmental Justice Communities**

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### **Introduction: Community Solar**

This project focuses on the potential for community solar on reclaimed waste sites. Community solar refers to a solar electric system that is owned by multiple members of the community. For people who do not have the option to put solar panels on their roof, either for technical or financial reasons, community solar offers a chance for participation in the solar energy market.

According to the National Renewable Energies Laboratory, there are three models for community solar, although more could be successful according to the needs and skills of a community. The three types of models defined by NREL are the Utility Sponsored Model, the Special Purpose Entity (SPE) Model, and the Non-Profit “Buy a Brick” Model.

The Utility Sponsored model works with the existing utility company. This can be a beneficial starting point because utilities companies often have the legal, financial and management infrastructure to start a solar project. In addition, many of these companies are owned or partly owned by customers or the public, which means that they can be directed to pursue projects on their behalf. In this model, customers would pay either up front or via an ongoing payment to support a solar project, and would receive the benefits back in a proportional payment or credit on their electrical bill. The customer has no ownership stake in the solar project, as the project is either owned by the utility or a third party.

The Special Purpose Entity model runs a community solar operation as a business. It takes advantage of the opportunity for tax incentives in solar projects, but must also manage the legal and financial complexities of running a business. Because of this, the Special Purpose Entities involved in community solar are typically businesses with the existing resources and capabilities to be able to set up the community solar program and generate a profit by selling to community members.

The Non-profit “Buy a Brick” model describes situations where nonprofits, such as schools or churches, partner with members of the community to develop solar projects. The supporters of the nonprofit use tax deductible donations to help finance the project, which in turn helps lower energy costs for the nonprofit. These models from the National Renewable Energy Laboratory provide an outline for how community solar could work in Massachusetts, but it is not restricted to these models.

The EPA has created the “RE-Powering America’s Land Initiative”, which aims to develop renewable energy on current and formerly contaminated land areas like landfills and mine sites. (Coughlin, J; Re-Powering America’s Land, 2017). It recognizes the economic benefit that can be realized through siting renewable energy on previously underutilized sites, bringing tax

benefits and jobs to the community. EPA views community solar as a part of this effort, and notes that it is a way that lower to moderate income populations can benefit from solar energy. A similar initiative, scaled down to smaller levels, could be useful to communities that have contaminated waste sites, to provide funding to continue cleanup, and also provide benefits to neighbors. In order to assess the potential for this activity in Massachusetts, we evaluated a number of sites where contamination persists in designated Environmental Justice areas, where community solar is likely to be the best approach.

### **Framingham Site**

The Milford National Bank and Trust Company is an office building constructed in the mid-1930s on undeveloped land. This property was used as a contractor's yard for storage of various materials in the form of pipe layers. Franny's Landscape Company since 1984/1985 has used part of the property for storage since. On December 17, 1991 gasoline was spilled onto the pavement near two underground storage tanks (spill number N91-1764). This resulted in gasoline flowing back into abandoned copper feed lines that extend into a basement heating system in the office building. The overfill caused gasoline to seep into the basement and ignite stored items. Zecco of Northborough removed the lines and six cubic yards of "spill waste" and testing of soils post-excitation were completed by DEP. DEP did not list the property as a Location To Be Investigated so the case was closed. The tank has passed tightness tests, but regulations require replacement by August 2017. The site is an office building, parking lot, and storage facilities. A solar canopy would be a viable option for this site due to the feasibility of building solar panels over parking lots and on buildings.

### **Marlborough Site**

The Mobil Station waste site is located at 260 Main St. Marlborough, MA, and is surrounded by numerous residential buildings and businesses. The approximate 2 acre waste site encompasses Mobil Service Station No. 11763, a commercial property titled Parcel 27 (Marlborough Tax Assessors Map No. 81), and portions from Beach Street Brook and St. Mary's Cemetery. The contaminant found at the site was MTBE (Methyl Tertiary Butyl Ether), a petroleum derivative which is extremely water soluble and is located near at least three water sources. The clean up initiated by the LSP's Brian Emery and Christophe Henry has been stalled in phase 2 Tier II extension for the last decade, meaning the most harmful hazards have been removed but total cleanup is not yet complete.

Owned by David J. Baker and Robert Nichols this waste site was first documented in April 2002 due to the contaminant detection measuring 452 micrograms in a stormwater discharge pipe downgradient from Beach Street Brook. The discharge pipe empties out into the Sudbury Reservoir which is the City of Boston's alternative reservoir. The discharge pipe also connects with the upgradient Clover Hill Road and Beach Street stormwater systems, and a

catch basin system located on Parcel 27 and St. Mary's Cemetery. Further assessment by Massachusetts DEP suggested that MTBE groundwater infiltration was probable somewhere. During the five year partial clean- up it underwent repairs according to its IRA (Immediate Response Action) plan. The plan included substituting fieldstone catch- basins with cement alternatives, replacing old, leaky pipes to alleviate groundwater contamination, and excavating 413 gallons of water and 26.5 tons of soil. An IRA Assessment in 2004 recorded overall stable or decreased levels of MTBE on the waste site due to previous remediation efforts (GES, 2005).

Likely community and governmental groups to lead clean- up initiatives at this site are The Concord Watershed Group, City of Marlborough Conservation Commission, and City of Marlborough Recreation Department. They deal exclusively with protection of wetlands and open spaces, educational and safe exposures to the environment, the preservation of water sources, and legislative aid.

### **Everett Site**

A waste site at 80 Broadway in Everett, MA is home to the Massachusetts Bay Transportation Authority (MBTA) Bus Maintenance Facility, also called the Everett Shops, where the MBTA clean, repair, and fuel their vehicles and store materials. The population of Everett is over 46,000 people with predominantly a white population but also has a large Hispanic or Latino minority population (US Census Bureau, 2015). There are multiple private individuals named as the Licensed Site Professionals responsible for conducting the assessment and cleanup of the hazardous materials at this site.

The site has a long history of hazardous material exposure, beginning in the 1980s. It has been associated with releases of petroleum and other chemicals such as arsenic, lead, cadmium, and chromium. It has multiple Release Tracking Numbers (RTN) associated with the site, based on the multiple hazardous material exposures. In June 2003, arsenic and some PAH chemicals were found, but the case was closed with a Class B-1 Response Action Outcome (RAO) – no cleanup has been conducted because MassDEP did not find a significant risk to public health and the environment (Arcadis, 2011). In June 2016, there was a release of hydraulic oil from an aboveground storage tank, which was cleaned up immediately using absorbent materials to contain the spill and has since been categorized with RAO of Permanent Solution with No Conditions (PSNC) (FS Engineers, 2016).

Most recently, in August 2016, there was a concentration of arsenic found in the soil. There is a release notification for this site, however the site does not have an RAO classification yet, there has been no assessment of the risks, and there has been no cleanup (MassDEP, 2016).

The city of Everett has a Department of Public Works that could undertake the installation of a solar canopy at this site. Given the size of the site and the proximity of the Everett shops to many commercial businesses and developments however, this site does not

seem ideal for the installation of these solar panels. Furthermore, the past clean-ups of the site have been conducted quickly and efficiently and other sites in the city, with more risk to public health, could be more appropriate for the installation of a solar canopy.

### **Jamaica Plain Site**

This waste site is an underground gasoline tank spill at a Texaco gas station that contaminated the groundwater. Test wells were installed around the contaminated area, including the property of area residents, whose property was presumed to have been contaminated with the gasoline. When test wells were installed, a layer of gasoline was found to be floating on the groundwater. The last progress report on the cleanup/recovery (submitted by Weston consulting company) was submitted in 1991. The recovery design was done by Weston and Clean Harbors, Inc. The recovery system was implemented in 1990 and includes an oil/water separator, air-stripper, vapor phase carbon units, and groundwater extraction and recovery wells. The original responsible party was Texaco, notified as such by the Department of Environmental Quality Engineering (DEQE) in 1983. The land currently appears to be owned or used by JP Oil.

Because the land is described as mostly grassy, open area associated with the Texaco buildings, this site seems to be ideal for a solar canopy installation. The conclusions of the monitoring reports were that the system was successful in containing dissolved groundwater contaminants, but was not successful in actually recovering the contaminants from the soil/groundwater. They stated that it was not a very efficient or cost-effective system. Solar revenue could be used for the design and implementation of a more successful groundwater remediation plan. Solar at this site could replace the use of fossil fuels in the recovery operations, and/or provide power for neighbors, repurposing the site as a redeveloped brownfield.

The Jamaica Plain Neighborhood Council, and more specifically the Environment, Parks & Energy Committee, could be candidates for the community solar development at this site, if cleanup is still necessary.

### **Conclusion**

The Re-Power America's Land Initiative and Community Solar models are feasible and underutilized methods of financing waste-site remediations, and generating energy and revenue for communities. The Jamaica Plain Texaco Station, Marlborough Mobile Station, Milford National Bank and Trust Company, and Everett MBTA Bus Repair shops exemplify the significance and value these programs can bring to sites and their communities. This initiative, if downsized to the state or local level, could exploit viable sites and communities that would benefit immensely, both in economic and social benefits. Businesses and communities alike should be encouraged to explore the Community Solar Models feasible to them.

## Works Cited

Arcadis US Inc. (2011, March 24). *Bill of Landing Closeout for Post RAO Soil Excavation and Removal, 80 Broadway Everett, Massachusetts, MassDEP RTN: 3-0312*. Retrieved April 20, 2017, from <http://public.dep.state.ma.us/fileviewer/Scanned.aspx?id=302778>

Coughlin, J., Grove, J., Irvine, L., Phillips, S., Moynihan, L., & Weidman, J. (n.d.). *A Guide to Community Solar*. Retrieved April 20, 2017, from

FS Engineers. (2016, August 5). *Release Notification Form and Immediate Response Action Completion Statement In Support of A Permanent Solution Statement Report for Transmission Fluid Release MBTA Everett Maintenance Facility*. Retrieved April 20, 2017 from, <http://public.dep.state.ma.us/fileviewer/Default.aspx?formdataid=0&documentid=361823>

Goldberg-Zoino & Associates, Inc (1988, September). *Centre Street Site Remedial Action Plan II: Groundwater Treatment Evaluation*. Retrieved April 21, 2017, from <http://public.dep.state.ma.us/fileviewer/Scanned.aspx?id=103019>

Ground Water & Environmental Services Inc. *Mobil Station 11763 (Formerly 01-POA) & Commercial Property, Tax Map 81 Parcel 27, Marlborough MA Immediate Response Action Completion Report*. Groundwater & Environmental Services Inc., Westford, MA, 2005,

Kraybill ,R., Lynn, G. (1991, May 22). *Performance Report: Texaco Service Station Site Jamaica Plain, Massachusetts*. Retrieved April 20, 2017, from <http://public.dep.state.ma.us/fileviewer/Scanned.aspx?id=103013>.

Luby, Thomas P. "Phase I Initial Site Investigation, Tier I Classification, & Phase II Conceptual Scope of Work." Enstrat Strategic Environmental Services, 9 May 2014. Web. <http://public.dep.state.ma.us/fileviewer/Default.aspx?formdataid=0&documentid=256568>

MassDEP. (2016, August 23). *Site Information: Site Number: 3-0033776*. Retrieved April 21, 2017, from <http://public.dep.state.ma.us/SearchableSites2/Site Info.aspx?textfield RTN=3-0033776&searchType=ALL&CurrentPage=1>

RE-Powering America's Land. (2017, February 07). Retrieved April 20, 2017, from <https://www.epa.gov/re-powering>

US Census Bureau. (2015) Retrieved April 20, 2017, from  
<https://www.census.gov/quickfacts/table/PST045216/2521990,00>

### **Waste Sites**

Framingham:

[http://public.dep.state.ma.us/SearchableSites2/Site\\_Info.aspx?textfield RTN=3-0031510&searchType=ALL&CurrentPage=1](http://public.dep.state.ma.us/SearchableSites2/Site_Info.aspx?textfield RTN=3-0031510&searchType=ALL&CurrentPage=1)

Marlborough:

[http://public.dep.state.ma.us/SearchableSites2/Site\\_Info.aspx?textfield RTN=2-0014267&searchType=ALL&CurrentPage=1](http://public.dep.state.ma.us/SearchableSites2/Site_Info.aspx?textfield RTN=2-0014267&searchType=ALL&CurrentPage=1)

Everett:

[http://public.dep.state.ma.us/SearchableSites2/Site\\_Info.aspx?textfield RTN=3-0000312&searchType=ALL&CurrentPage=1](http://public.dep.state.ma.us/SearchableSites2/Site_Info.aspx?textfield RTN=3-0000312&searchType=ALL&CurrentPage=1)

Jamaica Plain:

[http://public.dep.state.ma.us/SearchableSites2/Site\\_Info.aspx?textfield RTN=3-0000249&searchType=ALL&CurrentPage=1](http://public.dep.state.ma.us/SearchableSites2/Site_Info.aspx?textfield RTN=3-0000249&searchType=ALL&CurrentPage=1)