

## **Renewable Energy in the Community – February 2011**

Renewable energy is considered a key strategy under the Climate Protection Plan.

### **Solar**

Currently, solar energy is Cambridge's best renewable option in terms of on-site energy generation.

**Photovoltaic:** Based on a recent update of the CDD renewable energy map, there are 58 solar photovoltaic systems with 876 kilowatts (kW) of capacity in Cambridge. The capacity of solar PV has been growing in Cambridge as a result of the declining cost of the technology, changes in incentives, and the use of power purchase agreements. As a result, we are seeing larger systems in the 100 kW range. The Cambridge Housing Authority pioneered the use of power purchase agreements with the solar PV installation at Washington Elms.

**Thermal:** Solar hot water is starting to emerge as a significant option. Harvard University recently installed a large solar hot water system on Canaday Hall in Harvard Yard. Some small commercial establishments have installed solar hot water, including Charlie's Kitchen and Irving House. Homeowner's Rehab has been including solar hot water, along with PV, in some of its recent affordable housing projects, including 95-97 Pine Street and 58 7<sup>th</sup> Street. The Massachusetts Clean Energy Center, which now manages the Renewable Energy Trust, is rolling out a new solar hot water rebate for small residences and is working on a similar incentive for large multi-family and commercial customers.

**Air:** Solar air systems another option that can be used to pre-heat air for heating. We are aware of only one system in Cambridge, located at Houghton Apartments.

### **Wind**

There are three sites with wind turbines to the department's knowledge: Museum of Science, Holyoke Center, and Sue Butler's residence (although we believe the small turbine has been de-activated due to neighbor concerns over noise). Generally, Cambridge is not a suitable location for small rooftop wind turbines, due to turbulence caused by our dense urban development pattern nor does the wind blow consistently or strongly enough over the year according to the Commonwealth's wind maps.

### **Biofuel**

Iggy's Bread of the World is the only facility the City is aware of that uses biofuel to provide energy for building energy use. Iggy's purchases biofuel to run a small co-generation system. There are probably some households using biofuel for heating in boilers and furnaces.

The Massachusetts Clean Energy Biofuels Act of 2008 mandated that all diesel and no.2 home heating oil contain at least 2 percent advanced biofuels starting in 2010 and ramping up to 5% by 2013. However, the Department of Energy Resources suspended the mandate in 2010 due to concerns over costs. Concerns have also been raised regarding the life cycle greenhouse gas emissions associated with biofuel production.

Some vehicle fleets are utilizing B20 biodiesel, including the Harvard University shuttle buses.

### **NSTAR Green**

The community can also support renewable energy through participation in the NSTAR Green program. NSTAR residential customers can voluntarily opt to purchase electricity from wind farms in New York and Maine at a premium cost. We believe this is a worthy option, compared to the purchase of renewable energy certificates, because NSTAR has linked both the power and the renewable attributes

of its production through direct contracts with power producers located in the region. RECs by comparison are typically de-coupled from the power.

### **Removal of Barriers/Incentives**

The City has supported renewable energy development with amendments to the zoning ordinance, which explicitly authorize wind turbines and solar power as allowed uses. The green building zoning amendments indirectly support renewable energy through the LEED requirement, which grants optional credits for renewable energy installations. We are also conducting outreach through the Cambridge Energy Alliance with workshops and information.

The development of renewable energy is largely driven by state and federal policy, as well as technological and market forces that drive down the cost of technology. The Commonwealth's participation in the Regional Greenhouse Gas Initiative, the Renewable Portfolio Standard, and the significant incentives such as the solar carve-out program and the Renewable Energy Trust have provided a major push for renewables. Federal tax incentives are also quite generous at the moment.

### **Municipal Renewable Energy**

The City Council set a goal that 20 percent of the municipal power demand be supplied by renewable sources by 2010. The City is meeting this goal primarily by purchasing renewable energy certificates. Some of the goal is being met through the state renewable portfolio standard, which requires utilities to supply a certain percentage of electricity generated by renewable sources, and a small portion by electricity generated by solar installations on city buildings.

The City currently owns about 71 kilowatts of solar photovoltaic capacity. Systems have been installed at City Hall Annex, West Cambridge Youth Center, Frisoli Youth Center, DPW's Frasier Building, and Cambridge Rindge & Latin School. The Water Department is pursuing the installation of a 100 kW photovoltaic system on the roof of the Sullivan Water Treatment Plant. Other sites are being investigated. The City is currently evaluating whether a power purchase agreement, where a private entity owns and operates the solar arrays in exchange for a long-term contract with the city to buy the power being generated, would be a desirable to increase the amount of solar PV on city facilities.

The city has been purchasing a mix of certificates sourced from wind and biomass in western and southern states and some certificates from landfill gas in Massachusetts.

It is likely the City will have to continue to purchase RECs for the foreseeable future as it would be difficult for the City to supply 20 percent of its power from on-site renewable energy generation and the RPS only increases by 1% per year. A large surface area is required to host solar panels. However, the City continuously searches for opportunities to install solar panels.

The City is also working with the MIT Wind Energy Projects in Action to conduct a preliminary assessment of wind energy potential at Danehy Park. While existing information suggests that the site does not have sufficient wind resources for cost-effective wind generation, we hope to definitively answer this question. There are also other factors to consider in a feasibility study of a wind generation facility at Danehy Park including, for example, potential difficulties in providing a suitable foundation given that the park sits on top of a former landfill.