



## Solar Photovoltaics

### Saint Dunstan's Episcopal Church, Dover, MA

St. Dunstan's has a long history of environmental Stewardship, forming an Environmental Stewardship Committee in 1992. Over the years we have instituted recycling, dual-flush toilets, minimized use of disposable cups, plates, etc.

Our youth group's mission trips to New Orleans have made us aware of the impact of global warming and spurred us to think about our carbon footprint. Because our sanctuary and classroom spaces use electric baseboard heat, we use over 33,000 kilowatt hours of electricity annually —making electricity about 75% of our carbon footprint.



In 2008, the parish began investigating the possibility of installing a solar photovoltaic system. We had two firms come evaluate the site and provide estimates which ranged from \$80,000 - \$150,000, and the idea was put on hold. In 2012, we enrolled in a lease program Massachusetts Interfaith Power & Light offered.

#### PROJECT OVERVIEW

**Annual electricity usage:** 33,000 kilowatt hours

**Installation date:** June 1, 2013

**System size:** 23.1 kilowatts

**Annual solar electricity production:** 24,000 kilowatt hours

**Solar design and installation:** Sun Bug Solar      [www.sunbugssolar.com](http://www.sunbugssolar.com)

**Lease terms:** 10-year lease with 2% annual escalator.

**End-of-lease system purchase:** 20% of original cost

## Results

50% Carbon footprint reduction: By meeting two-thirds of our annual electricity needs, the panels will lower our carbon footprint by over 19 tons, decreasing our overall carbon footprint by over 50%. (Our 95% efficient propane furnace which heats the offices and meeting space accounts for the bulk of the rest of our carbon).

- Increasing savings as utility rates increase: In 2013, Eversource charged \$.162 per kilowatt hour (kwh) and the lease worked out to \$.163 per kwh. To date in 2016, Eversource's rate has increased to \$.203 and the solar lease works out to \$.18 per kwh.
- Increased awareness and commitment to addressing climate change. The project to install the panels and their ongoing presence have raised the congregation's awareness of climate change. As a result, in 2016, St. Dunstan's signed on to the Paris Pledge ([www.parispledge.org](http://www.parispledge.org)), and even adopted the intention to be carbon neutral by 2025, well ahead of the Paris Pledge goal of carbon neutrality by 2050.

## Learning

- The intaller estimated the system would produce 27, 500 kwh annually while actual production has been around 24,000 kwh. This is partially due to snow cover on the panels during January and February (especially in 2015) and partially due to the effect of shading which is difficult to estimate.
- The deep snow of the winter of 2015 reduced the amount of electricity expected in January, February and March by about 1/3 over the winter of 2014 which had more normal snowfall.
- The deep snow of 2015 damaged one of the panels. The installer replaced the panel and ensured the system was operating normally at no cost under the system warranty.
- When more than a couple of inches of snow accumulate on the panels, it will "avalanche" off as it begins to melt. We have parking spaces directly below the panels and while no cars have been damaged, we now rope off the area where the snow lands.

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**Massachusetts Interfaith Power and Light, Inc.**  
14 Collins Rd.  
Waban, MA 02468