



First Congregational Church of Stoneham: A Catalyst for the Community

Background: First Congregational Church (FCC) Stoneham was founded in 1729 as the first church in the Town of Stoneham. The original building was constructed in 1840 and is listed on the National Register of Historic Places. A two-level brick addition to the building, part of which is used for the Purpose School, was constructed in the early 1940s. The building comprises a total area of 12,000 sq. ft.

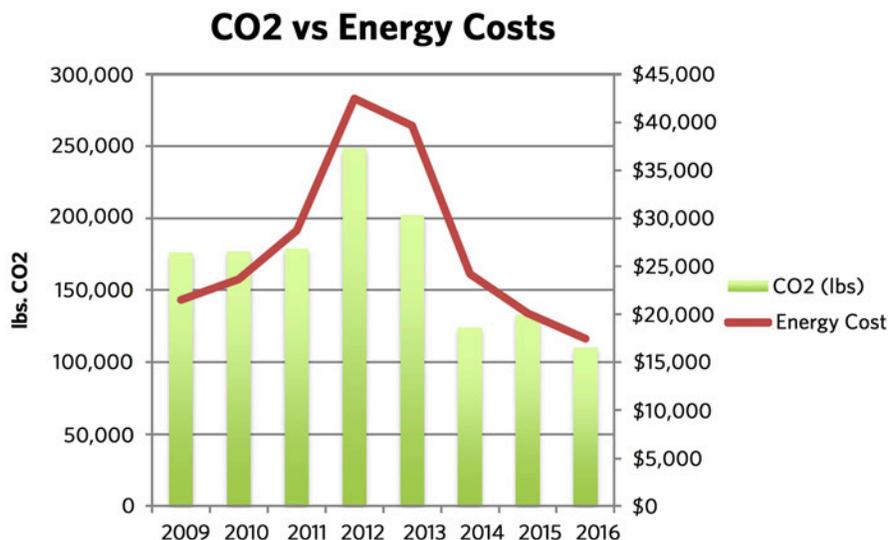
Driving Factors for Implementation of Energy Improvements: The Trustees were prompted to take a close look at their 175-year-old church building and adjacent 1940s era addition in response to soaring electricity and water bills coupled with drafty windows and a sanctuary and meeting rooms that were difficult to keep at a comfortable temperature, particularly in the winter. The old oil-burning boiler was clearly in need of replacing. Incandescent lighting around the church was costly, both in terms of electricity consumption and maintenance costs associated with frequently replacing bulbs.

Furthermore, the church wanted to maintain its role as a leader in the community and wanted to model good behavior in response to the climate change crisis.

Results: As demonstrated in the graph below, calculated CO2 emissions and energy costs for the church have decreased dramatically between 2012, the first full year before improvements began and 2016, the most recent year for which complete data is available.

- Carbon dioxide emissions in 2016 were 62.7 metric tons less than in 2012
- Energy costs in 2016 were \$25,013 lower than in 2012!

Those reductions are **before** the new 35 kW solar PV system is taken into account! The carbon dioxide reductions are equivalent to the emissions from 13.2 passenger cars driven for a year or the electricity consumed by 6.6 homes for one year.



Energy consumption and costs do vary from year to year due to differences in heating and cooling degree-days, which influence energy demand related to heating and cooling, as well as fluctuations in the price of energy. Average energy costs from 2009-2013 were \$31,195 and CO2 emissions were 89.1 metric tons, (196,419 lbs.) per year. From 2014-2016 costs were \$20,587 and emissions 55.5 metric tons (122,309 lbs.) of CO2. That's an average reduction of \$10,608 in costs and 33.6 metric tons (74,110 lbs.) of CO2 per year.

Summary of Improvements:

The Trustees of FCC Stoneham invested in the following improvements:

2013	<ul style="list-style-type: none"> A Weil McLain model 88, series 2 steam boiler capable of burning either oil or natural gas was installed in October. It replaced a 40-year-old oil-burning boiler. The new boiler was required to be used only with oil until the chimney could be lined.
2014	<ul style="list-style-type: none"> Through the MassSave program, FCC Stoneham worked with AECOM to do a full LED lighting retrofit, which was fully completed in 2015. Available incentives covered seventy percent of the cost so FCC only had to pay \$11,400 of the total \$38,000 cost. AECOM estimated an annual energy cost savings of \$4,800 and a simple payback of 2.3 years. The chimney was lined in April 2014 and the boiler (installed in 2013) was switched to natural gas.
2015	<ul style="list-style-type: none"> Began an ongoing project to upgrade all windows in the building (most of which, if not all, were single-pane casement windows) with vinyl-clad, double pane energy efficient windows. The project started with the windows in all five classrooms in the school building as well as all the south-facing windows of the office portion of the building. Installed a new efficient 75-gallon gas-fired water heater in July. It replaced a very old concrete lined electric water heater. In October, a new Mitsubishi MSZ-FE18NA mini-split ductless heat pump was installed in the chapel so that it could be removed from the main heating system and provide heating or cooling only when needed. New thermostats were installed in the sanctuary, chapel, Purpose School, and Fellowship Hall. Insulation was added in the drop ceiling area above the church office and in one of the classrooms. In December, the boiler (installed in 2013) was switched back to oil to take advantage of record-low oil prices.
2016	<ul style="list-style-type: none"> The window upgrade project continued with new windows in the choir room, food pantry and lower level bathrooms. In April, the boiler (installed in 2013) was switched back to natural gas and the Trustees committed to using natural gas exclusively going forward. SunBug Solar installed a 35kW roof-mounted solar PV system on the church roof toward the end of 2016. FCC Stoneham signed a power-purchase agreement (PPA) with InSource Power to buy the solar energy at a significant discount over a twenty-year period rather than purchase the panels outright. The system became operational in December.

2017	<ul style="list-style-type: none"> In conjunction with the 35kW PV system, starting in May FCC Stoneham partnered with SunBug Solar to provide additional incentives for church members to install solar on their homes. SunBug has offered a discount to church members and is matching the amount of that discount with an equivalent donation to the church that can be used for energy or building improvements, or any other needs the church may have.
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According to FCC pastor Rev. Meredith Allen, “We believe we are created in the image of God, and we honor God and our neighbor when we choose to protect the environment. This is our mandate as inheritors of the Judeo-Christian tradition. By going solar and confronting the deadly threat of climate change, we hope to be a catalyst for our entire community.”

For more information contact: Ben Jacques, Board of Trustees or
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