



Case Study: St. Paul's Church, Dedham, MA

St. Paul's Church converted from oil to gas in the main building at the end of 2001. The church lowered its 2002 total utilities budget about 27% and purchased enough renewable energy to offset 100% of its electricity usage.



These are the major energy conservation *capital* actions...

- ❖ **Heating** — Just before Easter 2001, St. Paul's learned that its old oilfired boiler had failed and parts were not available. This prompted the church to undertake emergency replacement with a pair of small, modern 150,000 BTU high efficiency oil boilers, and to make long range plans to install a high thermal efficiency (85 %) 1.3 M BTU gasfired PK hot water boiler that would also accommodate the church's near-term building expansion plans. By Christmas 2001, the new gas unit was on line. The previous year, St. Paul's had converted its nursery school building to gasfired furnace, removing a leaking underground oil tank in the process. St. Paul's also moved forward with installation and aggressive management of 7day programmable thermostats in all buildings.
- ❖ **Air infiltration and Storm Windows** — St. Paul's replaced two deteriorating older metal frame, single pane windows with low maintenance vinyl replacement windows for greatly improved thermal sealing in heavily used office and bathroom areas. The church sealed off several unused ventilation vents that were causing significant drafts. The church has Plexiglas exterior storm windows over all stained glass window units.
- ❖ **Electric Fixtures and Lamping** — NStar completed an energy audit and installed energy efficient replacement fixtures and lamping, including contemporary ballasts.

These are the major energy conservation *management* actions...

- ❖ **Heating** — By the late 1990s, St. Paul's was already making significant progress in reducing its fuel oil consumption without new capital expenditure, and by entering into capped oil price purchase agreements. During the cold winter of 2000, which had 33% more heating degree days than 1998 and 1999, the church managed to use only 18% more gallons of oil. Each heating zone may be programmed for up to 4 temperature changes on each day, based on scheduled activity patterns. Special uses are accommodated by a manual override. Typically thermostats are programmed for a maximum of 68 F during regular occupancy periods, and 60-66F for the Parish Hall, classroom, choir room and kitchen areas when not in regular use. The cavernous sanctuary is held to a chilly 53 F during all non-service periods. Nightly setbacks are typically no higher than 55 F. There is close coordination between office staff, Facilities Manager and Property Chair to communicate needs, monitor compliance and make adjustments as necessary for comfort as well as efficiency.
- ❖ **Electricity** — St. Paul's set the example for parishioners by turning out the lights when not needed, adjusting outdoor lighting timers as days lengthen or shorten, placing timers on bathroom lights and large coffee pots. The church aspires to change attitudes by consistently placing focus on the subject of conservation. St. Paul's talks to committee heads, encouraging them to look after conservation stewardship in their respective areas. St. Paul's prominently displays its energy conservation awards and ReGen certificate.
- ❖ **Personnel** — The church's Facilities Manager is trained to be increasingly vigilant for energy wastefulness, as well as to make adjustments warranted because of changes in use. The manager takes corrective action immediately. The church backs this up with a wellfunded maintenance budget and top tier vendor support.

These are the outcomes...

- ❖ **Heating** — We are achieving our goals by burning cleaner fuels, having greater system reliability, and lowering spending from ~\$10,000/yr in 2000 to ~\$3800/yr for our church building, while maintaining comfort levels.
- ❖ **Comfort** — St. Paul's is able to keep spaces sufficiently warm/cool when needed, at reduced energy consumption levels. The church utilizes a few strategically placed window air conditioners in the summer season.
- ❖ **Electricity** — The church has invested savings in additional lighting in garage, undercroft and classroom areas.

By 'purchasing' 30,000 kWh worth of 100% renewable electricity, St. Paul's supports pollution reduction:

Carbon Dioxide (CO₂): 0.62 lbs/kwh emission offsets (47,083 lbs). **Reduces global warming**
Nitrogen Oxide (NO_x): .0008 lbs/kwh emission offsets (60 lbs). **Reduces smog**
Sulfur Dioxide (SO₂): .0039 lbs/kwh emission offsets (295 lbs). **Reduces acid rain**