



# 1717 East 18th Street Boiler tune-ups, venting improvements, and new heating controls helped this 100-unit co-op balance building heat and save more than \$11,000 a year.

**Project Type**  
One-Pipe Steam  
Heating System  
Upgrade  
**Location**  
Brooklyn, NY  
**Project completion**  
2015  
**Base building  
completed**  
1957  
**Building Size**  
105,000 sf/100 unit  
**Building Type**  
Multifamily  
Residential;  
Cooperative

project team

**Project Owner**  
1717 E 18th Street  
Owners Corp.  
**Property Manager**  
FirstService  
**Residential  
Service and  
Installation**  
Champion  
Combustion

primary  
energy figures

**Simple payback**  
2.7 years  
**Annual ROI**  
\$11,550 (36%)

**Heating Fuel Use  
Savings**



- Before
- After





## project description

We were eager to install new boiler controls to balance heat across the building and reduce energy waste. In the process, we learned more about our system, addressed underlying issues, developed a more energy-conscious community of residents, and saved money. — Dr. Samuel Thomas, President, 1717 E 18th St. Owners Corp.

1717 East 18th Street, a 100-unit co-op in Brooklyn's Madison neighborhood, took a comprehensive approach to improving their one-pipe steam heating system. Combining the latest in heating controls technology with tried-and-true practices for optimizing existing equipment, the co-op completed a scope of work that significantly improved steam system efficiency, reducing heating fuel use by 22% and cutting utility bills by \$11,000 a year. The measures also balanced the building's heat, eliminating hot and cold spots and quieting noisy radiators. Having a champion on the co-op board and building staff support were key to project success.

### summary

When the 1717 East 18th Street co-op board first began exploring ways to increase resident comfort and improve the efficiency of their building's one-pipe steam heating system, installing a new heating control system was at the top of their list. After meeting with a heating contractor, however, the board learned that while new controls could help to reduce boiler run-times, saving fuel and money, a more holistic approach was needed to really improve steam heating system performance.

In order to balance the building's heat, quiet clanging pipes, and maximize system efficiency, the co-op board enlisted heating contractor Champion Combustion to not only install new controls, but to also tune-up the existing boiler and burner and install new vents at the ends of pipe mains and on radiators.

The scope of work helped to even out apartment temperatures across the building and quiet noisy radiators, greatly enhancing resident comfort. The upgrades also improved the boiler's performance and efficiency, reducing expensive heating fuel use by 22% and saving \$11,000 each year. The project will pay back in only 2.7 years.

Active involvement by the co-op board President was crucial to getting the work completed, and resident education and building staff cooperation remain essential to the lasting success of the upgrades. Ongoing monitoring of the heating system using the new internet-based controls and wireless temperature sensors will allow staff to continue fine-tuning the system for even greater comfort and efficiency over future heating seasons.

### existing conditions

Built in 1957, 1717 East 18th Street faced many of the challenges typical in older steam-heated buildings, including: uneven heating with hot and cold spots; overheating with residents opening windows in winter; consequent heating fuel waste; loud, clanging pipes; and occasional radiator leaks.

The building's traditional 'duty cycle' controls relied solely on outdoor temperature readings to determine when to run the boiler (rather than using the median apartment temperature, which more accurately reflects actual heating needs). Moreover, the outdoor sensor was poorly placed to obtain an accurate temperature reading.

## details of the retrofit

Steam distribution system upgrades were completed over the course of two heating seasons, with data obtained via the new control system used to help identify and correct heating imbalances and inefficiencies.

**Control System Upgrade:** Champion Combustion began work at 18th Street in March 2015 with the installation of new *Heat-Timer MPC Platinum R/Net* boiler controls. That summer, they returned to install a steam main return sensor and wireless temperature sensors in a sampling of apartments, and relocated the outdoor sensor. These sensors communicate with the boiler controls to run the boiler only as needed, cutting down on uncomfortable overheating and expensive fuel waste.

**Venting Improvements:** The contractors also upgraded steam distribution system venting for faster and more even heating. Upgrades included installing *Gorton #2* air vents on ground-floor steam mains and replacing existing valves on top-floor radiators with high-capacity *Heat-Timer Varivalves*, set to full-open. This top-floor radiator venting was an indirect way to vent the tops of steam risers—a key component of 'Master Venting.' (While radiator venting is not usually recommended for Master Venting, it worked in this particular case and allowed the co-op to avoid somewhat more intrusive in-unit work that would have been required for riser venting.)

**Boiler and Burner Tune-Ups:** Leading into the winter 2015-2016 heating season, the heating contractor went beyond the regular annual boiler cleaning and tune-up, and adjusted the burner modulation to achieve more efficient fuel combustion and improve the quality of steam produced by the boiler. The contractor also lowered the steam pressure from 5 psi to 2.5 psi. While counterintuitive, this lower pressure allows steam to travel through the distribution system faster and farther, encountering less resistance as it fills pipes and radiators.

**System Monitoring:** Over the course of the 2015-2016 heating season, co-op staff monitored building temperatures using the new internet-based control system. They then worked with the heating contractor to modify steam system settings, including adjusting boiler cycle times, to better balance heat and improve efficiency.

Based on control system data and resident heating complaints, staff also began replacing radiator vents throughout the building with *Varivalves*, adjusting valve settings as needed to maintain resident comfort in each unit. Radiator vent replacement and system tuning will remain ongoing through future heating seasons.

## challenges and lessons

You can get every room to 72 degrees simultaneously and maintain that temperature. The problem is that 72 degrees is too hot for some and too cold for others.  
— Contractor, Champion Combustion

**Resident and Staff Buy-In:** The upgrades completed at 18th Street were relatively straightforward, from a technical perspective. Getting building staff and residents to buy into the proposed scope of work, and to later adjust to changes in apartment temperatures, proved a greater challenge.

While the co-op board President was an early and enthusiastic supporter of the steam system upgrades, the rest of the board was initially a bit more skeptical. The building's Super, who had been working with the existing heating equipment for over ten years, was also understandably hesitant. Ongoing communication with residents and staff about the reasons for, and benefits of, the upgrades was essential to getting their support and consent.

When a few residents complained that the building had become too cold after the steam retrofits were complete, the co-op board President also organized community trainings to educate residents about how the steam system works, and to let them know that old practices, such as leaving windows open in winter, were no longer compatible with a more efficient and balanced system.

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