Manhattan Co-op's Restored Vacuum Steam System Cuts Gas Use by 15%

By Emily Myers

At Cabrini Terrace, a 217-unit co-op in Manhattan's Hudson Heights, the board has returned the original steam heating system to its former glory and shaved 15% off the building's gas usage. The co-op has vacuum-return steam heating, a system developed in the 1930s and installed at Cabrini Terrace when it was built in the 1950s. "It's old technology but it's efficient," says Kenneth Stropoli, sales application engineer at the HVAC contractor, GS Dunham, and an expert on the variable vacuum system, known as Vari-Vac.

Variable vacuum systems are designed to provide a steady flow of steam during heat season. However, the system at Cabrini Terrace was no longer functioning as intended. Deteriorated parts and quick fixes meant the boiler was instead cycling on and off. Rather than having consistent heat, the building was always heating up and cooling down. "We'd drifted away from the design basis for the system," says board member Anastasia O'Malley. This caused excessive fuel use, radiator noise and overheating in apartments. *(cont. below)*

Keen to address these issues and simultaneously cut emissions in order to be compliant with Local Law 97, the board spent $320,300 restoring the many components of the original vacuum system. “The original design had baked into it a number of energy saving features and the objective was to restore the energy efficiency features one by one,” says William Zoha, founder and CEO of Prescient Energy and the building’s energy consultant.

A key driver of energy efficiency in a vacuum heating system is that steam can be created at lower temperature. “That’s what produces savings,” O'Malley says. The project, from first consultation to completion, took two years, ending just as heat season began last year. The parts replaced and reinstalled included steam traps, adjustable radiator valves, a new vacuum pump, and new Vari-Vac heating controls. Individual radiator valve and trap replacements were also needed in each apartment. “Constant communication and updates to this project were critical to its success,” O’Malley says. *(cont. below)*

One of the biggest challenges for this and any vacuum system is to create an entirely closed pipe distribution loop. “If you are not able to create and maintain a vacuum in the system, it’s not going to work properly,” says Stropoli. This so-called tightness in the system is something that requires ongoing maintenance. “We knew if we could get the building tightness up to par that they’d really be seeing benefits,” Stropoli says. The entire system is annually checked for leaks.

The co-op used their reserves funds to cover the cost of replacing the vacuum system components. Under the bylaws, replacing the system parts within the units — the radiator steam traps and valves — was the responsibility of shareholders. The co-op helped households pay for the work by offering a credit of $200 per radiator, thereby meeting 42% of the cost for shareholders.

Based on data from 2023, Cabrini Terrace's annual Local Law 97 penalty exposure beginning in 2030 was $24,000. A 15% reduction in natural gas puts the building on track to put a dent in this. To further lower their penalty exposure, the building recently installed a combined heat and power (CHP) plant to help generate electricity and take care of the building's domestic hot water. "This means we'll be able to switch off the boiler in the summer," O'Malley says. In addition, the co-op, which was an early adopter of solar back in 2007, is exploring replacing and upgrading their rooftop panels with more efficient models.

CONNECT WITH US

www.habitatmag.com