

The Apartments at Boott Mills



- ▶ Combined Heat and Power (CHP)
- ▶ Natural gas-fired cogeneration
- ▶ High-efficiency natural gas-fired boilers
- ▶ Lowell, Massachusetts

Historic Mill Apartments Gain Energy Efficiency with Cogeneration

Incorporated in 1835, the Boott Cotton Mills in Lowell, Massachusetts is one of the oldest surviving textile millyards in the nation. While its roots are planted firmly in the past, a new apartment project located within the historic mill complex uses energy and heating technology with an eye toward the future.

About 70% of the electric power for non-residential parts of The Apartments at Boott Mills comes from on-site power generation. These include a community area with a media/theater room, fitness center, lobby lounge, and laundry room with an adjacent television lounge, as well as the residential office, according to James Harger, Vice President of Maintenance for Winn Residential. The company owns and operates the 154-unit apartment building, which was completed in late 2005.

Winn Residential is no stranger to cogeneration – it owns 11 properties in Massachusetts that use the energy-saving technology, and is building another in Wethersfield, Connecticut. The company has about 78,000 apartment units nationwide, including some at military facilities. Winn Residential owns about a third of these, and manages the other two-thirds, according to Harger. In Massachusetts and neighboring Connecticut, he adds, there are good rebates and incentives that make combined heat and power (CHP) projects a sensible investment.

“They (Winn Residential) are probably one of the most pro-active of the large developers/property managers in terms of utilizing cogeneration and other high-efficiency applications throughout their portfolio,” says Frank Duggan, Account Executive for National Grid,

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which supplies natural gas to the complex and which provided a financial rebate for the Boott Cotton Mills cogeneration project. "It makes a building super efficient as far as energy conservation goes."

Engine heat increases boiler efficiency

"When you generate the power on site, you're actually using the heat from the engine to benefit the efficiency of the boiler plant," says Duggan. "A cogeneration unit's overall efficiency (thermal + electrical) is 83% efficient generally."

Cogeneration, Duggan adds, is becoming a widely accepted technology to lower operating costs.

Harger first ventured into cogeneration more than 15 years ago, in an effort to lower electric bills at one Winn Residential-owned apartment complex. The plan worked, saved money, and was expanded to other company-owned buildings. Cogeneration is used in three Winn properties in Brookline, four in Medford, and one each in Boston, Cambridge, Lowell, and Salem.

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Estimated annual savings for the Boott Cotton Mills cogeneration project is \$35,000 to \$45,000 a year, according to George Dubin of GD Consulting Engineers in Quincy, Massachusetts, who designed the system. The cogeneration plant consists of a 75 kW Tecogen natural gas-fired cogeneration module and four natural gas-fired Patterson-Kelley Thermific® boilers, each 85% efficient and capable of supplying 2 million Btus. Additional by-product heat from the cogeneration module is piped into a condenser water loop with water-source heat pumps, and a separate storage tank with a heating coil, to pre-heat domestic hot water.



Cogeneration makes economic sense

"Economically, it made sense," says Dubin. "The facility is on the National Register of Historic Places, and was entitled to a 25% tax credit for construction. In addition, National Grid provided a \$40,000 rebate for the cogeneration. It works and it's making money."

At Winn Residential's fee-managed property, mid-rise Maverick Landing apartments in Boston, the cogeneration system includes a high-efficiency natural gas absorption chiller/boiler, according to Harger.

Another Winn Residential property, the 307-unit Village at Brookline, obtains 800,000 kWh of electricity from cogeneration, with the rest of the property's electric load of 2.2 to 2.3 million kWh





coming from the local electric utility. Thermal energy from the property's three cogeneration units is used for heating domestic hot water all year, and for space heating during winter months, Harger says.

"Where it works best for us is in the properties where we are paying for the utilities, instead of the residents" says Harger. "If we pay for the utilities, the rent stays the same, but we reduce our operating costs with the cogeneration."

Residents don't notice any difference in apartment buildings with cogeneration, he adds.

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