



# ENERGY AUDIT CASE STUDY

## TOWER ONE TOWER EAST - BETTER LIVING THROUGH ENERGY EFFICIENCY



Due to the excessive operating costs commonly associated with elderly housing facilities Sustainable Engineering Solutions, LLC was retained by New England Conservation Services as part of a comprehensive energy conservation initiative at the Tower One Tower East Retirement Facility in New Haven, Connecticut. Our goal was to survey the current heating, ventilation and air conditioning systems with the intention to provide recommendations for efficiency upgrades. Multiple site visits were made to the facility to review the mechanical systems in both buildings and gain an understanding of the condition of the existing systems and how they are currently being operated.

The facility consists of two multiple story residential towers with single story common areas, dining facilities and management offices that provide a connection between the two towers. The original residential tower, designated Tower One, is a twenty story structure that was constructed in 1969 along with the dining facilities, offices and common areas. A subsequent phased renovation of floors one through ten took place between 2003 and 2007 and an addition to the dining facility was performed in 2004. The second residential tower, designated Tower East, is a fourteen story structure that was constructed in 1980. The gross area of the entire facility is approximately 268,000 square feet. Each tower was provided with a separate central boiler plant and air conditioning is provided through individual air conditioning units in each residence. The majority of the heating, ventilating and air conditioning systems were found to be original with the exception of an

### Project Facts

Facility Name:	Tower One Tower East
Location:	New Haven, CT
Project:	Energy Audit
Scope of Services:	Identify energy conservation measures related to the HVAC systems and controls
Facility Size:	268, 000 ft <sup>2</sup>
Total Energy Audit Cost:	\$14,000
Energy Audit Cost/ ft <sup>2</sup> :	\$0.05
Annual Energy Savings*:	\$52,000 per year

\*Includes recommended measures and implementation costs



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automated temperature control system upgrade (performed at Tower One in 2002) and a boiler replacement upgrade (performed in Tower One in 2005). As a large facility of this vintage with a high occupant density that operates 24 hours per day with interspersed office and support areas the potential for energy conservation opportunities is very high.

The energy audit discovered a wide variety of potential energy conservation opportunities that range from equipment replacement to control strategies. A significant discovery was the lack of individual occupant control of the hot water radiation in the residences in Tower One. The original design did not include individual control valves for each residence and, as a result, the radiation operates consistently whenever the central boiler plant is enabled regardless of occupant comfort or environmental load. A visual observation during a site visit in January observed nearly half of the operable windows in the residences left open to regulate space conditions. This not only affects energy efficiency but occupant comfort as well. This, along with several other opportunities, was brought to the attention of New England Conservation Services and the owner with the associated energy and cost savings opportunities they represent as part of the project.

“Sustainable Engineering Solutions was able to identify potential energy conservation measures that benefit this facility by saving costs and improving environmental conditions for the residents”.

- John Greeno, Principal

New England Conservation Services

## Project Highlights:

- Addition of residential radiation zone control in Tower One
- Optimization of current constant volume pumping scheme
- Replacement of inefficient packaged roof top air handling units in Tower East
- Replacement of existing boilers with new energy efficient condensing boilers in Tower East
- Addition of variable speed drives and variable speed pumping scheme
- Optimization of current parallel pumping operation
- Adjustment of boiler and pump staging to optimize operating sequence.
- Replacement of existing domestic hot water storage system with instantaneous condensing heater