

3801 Rennie School Road, Traverse City, MI 49684

Energy Services Case Study

Customer: Snowden Development, Inc.

Radio Centre I and Radio Centre II in downtown Traverse City, MI

The Challenge

Snowden Development constructed Radio Centre I in Traverse City as a bid-spec project, whereby an architectural firm designed the building and an engineering firm designed and specified the mechanical equipment. In turn, the engineering firm hired Sheren Plumbing & Heating, Inc. for the mechanical elements.

In 2004, Snowden Development requested Sheren to provide design and mechanical equipment specification, as well as equipment installation and maintenance relating to the heating, ventilating and air conditioning (HVAC) systems for Radio Centre II.

The overriding challenge for Snowden Development was that the design of Radio Centre I did not account for efficient operation and maintenance for the life cycle of the building.

The Objectives

Sheren worked with Snowden Development to determine the following objectives:

- Provide a comfortable working environment for the anticipated clientele
- Develop a system that allows for the lowest possible operation costs (including energy usage and maintenance)
- Contain the system's mechanical room in the smallest possible footprint

The Solution

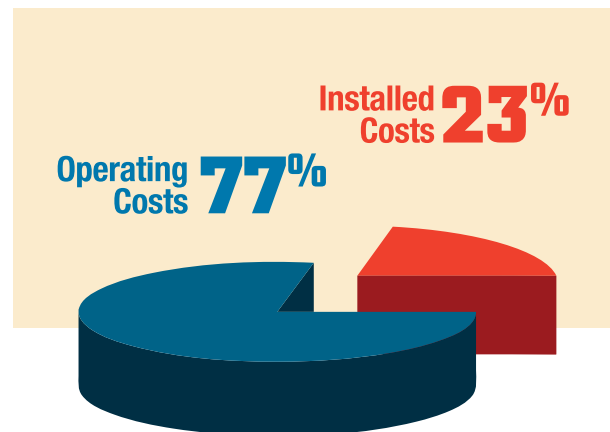
Radio Centre I - Overview

Radio Centre I is a four-story commercial office and retail building located in downtown Traverse City, MI, with 35,098 sq. ft. of rentable space. The mechanical equipment installed by Sheren is included later in this case study.

Radio Centre II – Overview

Sheren teamed with Snowden Development and the construction firm to design the best system not only for the immediate project needs, but also for efficient operation and energy usage of the building's total life cycle.

Radio Centre II is a four-story commercial office building (located next to Radio Centre I) with 24,968 sq. ft. of rentable space. The mechanical equipment specified and installed by Sheren is also included in this case study.



Mechanical equipment installed by Sheren for Radio Centre I

- **2 Raypak boilers rated at 1,999 MBH each, 84% maximum combustion efficiency**
 - a. Each boiler has four stages of heating
 - b. Onboard controls adjust boiler water set point depending upon ambient temperature
 - c. Each boiler stores approximately 100 gallons of hot water

- **1 McQuay RTU air handler for floors two through four**
 - a. Supply air rating at 35,588 CFM
 - b. Minimum O.A. at 4,400 CFM
 - c. Return air fan motor rated at 20 hp
 - d. Supply air fan motor rated at 50 hp (motor does have a VFD)
 - e. Hot and cold coils adjust supply air temperature to 52°F to 68°F depending upon ambient temperature

- **1 McQuay RTU air handler for first floor**
 - a. Supply air rating at 10,000 CFM
 - b. Minimum O.A. 2,660 CFM
 - c. Return air fan motor rated at 5 hp
 - d. Supply air fan motor rated at 10 hp (motor does have a VFD)
 - e. Hot and cold coils adjust supply air temperature to 52°F to 68°F depending upon ambient temperature
 - f. Discharge temperature usually runs cooler on the first floor because of the type of retail space (coffee/snack shop)

- **1 McQuay RTU chiller**
 - a. 2-stage compressor
 - b. 12 evaporator fans rated at 1½ hp each
 - c. Evaporator fans are staged to operate only when required

- **Each office/retail space has Variable Air Volume mixing boxes to deliver final air temperature per the requirements of the space.**

- **The mechanical equipment (boilers, pumps, controls, cold and hot water storage tanks) plus the plenum shaft require 1,027 sq. ft. of floor space, which is 3% of the total area through out the four floors**

Note: The remainder of the mechanical equipment is located on the roof.

The mechanical equipment specified for Radio Centre II

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- **2 Munchkin 92+% combustion efficiency boilers rated at 399 MBH each**
 - a. Boiler has a variable firing rate.
 - b. Boiler does not store any water.
 - c. Onboard controls adjust boiler water set point depending upon ambient temperature.

- **1 Mighty Therm boiler for the snow-melt system**
 - a. Boiler is 81% combustion efficiency.
 - b. Boiler is rated at 715 MBH capacity.
 - c. Snow-melt system is controlled by a Tek Mar control.

- **32 Climate-Master water source heat pumps**
 - a. Capacity ranges from 20 MBH to 44 MBH, both heating and cooling.
 - b. Each heat pump is located above the ceiling.

- **8 Renewaire Energy Recovery Ventilators (ERVs)**
 - a. Each is side wall mounted and has a capacity of 450 CFM.
 - b. Each ERV is mounted above the ceiling.

- **1 Evapco roof-mounted cooling tower**
 - a. Cooling tower is rated at 48 tons.
 - b. All pumps for cooling tower are located in second floor mechanical room.

- **The mechanical equipment (boilers, pumps and controls) require 244 sq. ft. of floor space, which is 1% of the total area through out the four floors.**

Note: Radio Centre II has over 3,000 sq. ft. of snow-melt system, which is not available on Radio Centre I.

The Results

With Sheren's overall approach based on cost-effective installation and operation of Radio Centre II, Snowden Development is reaping the benefits of a building that is less costly to operate and maintain – and even offers more comfort features such as a snow-melt system.

To illustrate our point regarding cost- and energy-efficient operation, the following two charts demonstrate the energy consumption index (EUI) and the energy cost index (ECI) for Radio Centre I and II. The EUI is energy usage per square foot per year, and the ECI is the energy cost per square foot per year.

The results are a testament to Sheren's unique blend of expertise in Design-Build, Energy Services and HVAC system installation/maintenance.

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Radio Centre II consumes 50.8% less energy per square foot and is 47.6% less costly per square foot to operate compared with Radio Centre I.

CHART No. 1

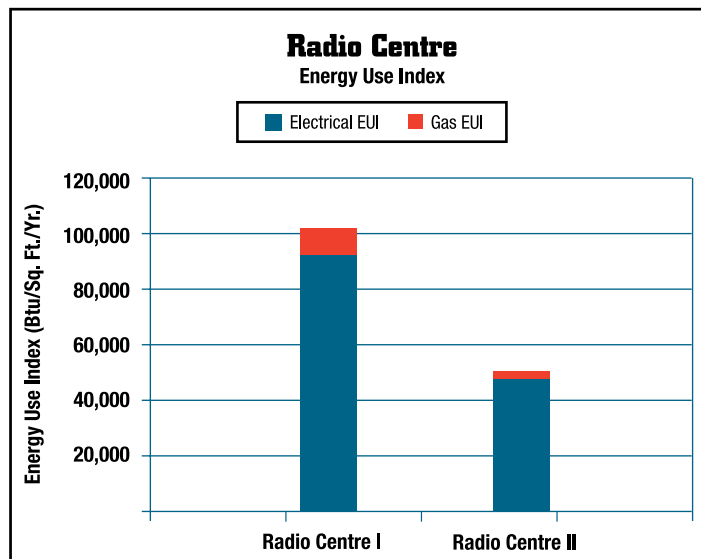


CHART No. 2

