

EEl Healthcare Case Study

September 2011

Energy Efficiency Case Study St. Joseph Medical Center

The challenge: Improve the care environment and reduce energy costs

Project Summary

- Retro-commissioning project began in January 2011.
- Total project costs - \$388,400; current ROI - 1.75 years.
- YTD - \$222,728 in total energy savings for both buildings.
- YTD - \$162,965 in energy savings for the hospital.
- YTD - 59,765 in energy savings for the clinic building
- YTD - 1,428 tons of carbon emissions avoided.

For a complete listing of EEl energy-efficiency programs and services, visit our website:

www.eeiengineers.com

Or call

800.869.6902

BACKGROUND

In 2005, the St. Joseph Medical Center (SJMC), in Bern Township, PA opened as a replacement hospital for the original 1952 healthcare facility. The new hospital, part of Catholic Health Initiatives, provides a complete range of advanced medical and surgical services on a state-of-the-art health campus. After the new hospital opened, the original building was converted into the St. Joseph Clinic (SJC).

THE CHALLENGE

The primary objectives for the SJMC and SJC facilities were to reduce energy consumption and costs. The 369,000 square-foot hospital required a significant



St. Joseph Medical Center, in Bern Township, PA opened in 2005

amount of power to operate, which resulted in energy bills that were well over the hospital's energy budget. Immediate changes needed to be made to lower the energy consumption of both facilities.

The clinic's HVAC control systems were obsolete and problematic, attributing to excessively high utility bills. The building systems had been originally designed to serve an acute health-care facility and ran continuously.

Energy Analysis:

EEl Healthcare was selected to provide a preliminary energy audit for both buildings. To understand just how efficient the facilities were, EEl Healthcare calculated the Energy Utilization Indexes (EUIs) for both buildings.

Energy efficient hospitals operate at 180,000 to 220,000 BTU per square foot. SJMC was operating at an EUI of 292,526 BTU per square foot. Likewise, SJC was operating at an EUI above 260,000 BTU per square foot.

EEl Healthcare also used the ENERGY STAR's® Portfolio Manager for a second analysis of the buildings. The Energy Star Portfolio Manager compares the

St. Joseph Medical Center - Bern Campus

ENERGY/UTILITY USAGE

Gross Square Feet:	369,105								
Annual Electricity Usage:	12,274,732 KWH x	3413 BTU/KWH	=	41,894 X 10 ⁶ BTU					
Annual Natural Gas Usage:	66,079 MMBTU		=	66,079 X 10 ⁶ BTU					
Total Energy Usage:				107,973 X 10 ⁶ BTU					
Energy Utilization Indexes:		BTU/Square Foot							
Utility	Actual	Projection	Potential Savings						
Electricity BTU/SF:	113,501	39%	95,277	39%	18,224				
Natural Gas BTU/SF:	179,025	61%	149,023	61%	30,002				
Total BTU/SF:	292,526	100%	244,300	100%	48,226				
Energy Utilization Indexes:		\$/Square Foot							
	Actual	\$/SF	Projection	\$/SF	Potential Savings	\$/SF	Potential % Savings		
Electricity \$:	\$ 939,170	\$ 2.54	\$ 788,377	\$ 2.14	\$ 150,793	\$ 0.41	16%		
Natural Gas \$:	\$ 635,747	\$ 1.72	\$ 529,205	\$ 1.43	\$ 106,542	\$ 0.29	17%		
Total \$:	\$ 1,574,917	\$ 4.27	\$ 1,317,582	\$ 3.57	\$ 257,335	\$ 0.70	16%		

SJMC: Utility analysis provides energy utilization and potential savings

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The solution: A comprehensive retro-commissioning program

energy performance of a facility to similar buildings nationwide on a scale of 1-100. Buildings with a score of 75 or over are eligible for the Energy Star label.

Both buildings had Energy Star ratings below the 25th percentile of energy performers for their type and size. This confirmed that there was room for energy efficiency improvement for the hospital and clinic building.

THE SOLUTION

EEI Healthcare's Energy Savings/Retro-Commissioning program was the ideal solution to the hospital and clinic building challenges.

"This was more than just changing lighting fixtures. We needed real engineering help that would impact the way our central plant and HVAC equipment operated on a system level," said Glenn Bailey, Facility Director of both buildings.

Pete Sabeff, P.E. and Ross Church, P.E., of EEI Healthcare, conducted the initial energy audit. They worked closely with Glenn and his staff to develop a prioritized list of energy conservation opportunities. "We wanted to identify energy saving opportunities that had a payback of two years or less," said Pete.

EEI Healthcare collaborated with the hospital's facility team using targeted functional tests and the building's automation system (BAS) trend analysis to survey, investigate and provide recommendations for energy efficiency improvements.

Air Handler Upgrades:

Several steps were taken to improve the hospital's ventilation systems, including air handling units (AHU), which are part of a heating, ventilating, and air conditioning (HVAC) system.

In particular, air blenders were

installed in each AHU to eliminate the stratification of outdoor and return air. Air volume offsets were adjusted to accommodate the over-night shutdown of unoccupied areas. This reduced airflow and the power used by the fans.

Equipment Optimization:

The operation of the hospital's central energy plant equipment were optimized.

Building Control Upgrades:

The pneumatic control system serving the clinic building was replaced with a BAS to allow occupied/unoccupied scheduling of the AHUs.

Training and Documentation:

Training sessions for the building operators and maintenance staff were provided to Glenn and his team as part of the retro-commissioning program.

Training is a critical component

to ensure lasting improvements. Clear documentation of the new control strategies was incorporated into the existing maintenance procedures.

"With the help of the EEI, we are the road to achieve our goal for this project," Glenn said. "We've saved approximately \$152,000 from both facilities so far this year and we are still implementing additional improvements. As the project goes forward, we will continue increasing our energy efficiency and become a greener facility. We are extremely happy with the results so far."

R-Cx Program Benefits

- Technical assistance and financial analysis to initiate and complete the project.
- Energy upgrades that translate into savings on the monthly energy bills.
- Training provided to all facility staff for the installed energy upgrade measures.
- Operations and maintenance manuals updated for the installed energy upgrades.

ABOUT ST. JOSEPH MEDICAL CENTER: St. Joseph Medical Center, a member of Catholic Health Initiatives, is a full-service hospital and teaching facility. It provides a complete range of advanced medical and surgical services on a state-of-the-art health campus located outside the City of Reading, Pennsylvania. The medical staff includes more than 375 physicians supported by nearly 1,500 highly-trained nurses and other clinical professionals and support staff. Their passion is delivering standard-setting medical care, guided by Core Values of Reverence, Integrity, Compassion and Excellence.

ABOUT EEI HEALTHCARE: EEI Healthcare is a facility consulting firm, specializing in building commissioning, retro-commissioning, LEED certification, facility assessments and mechanical/electrical/plumbing consulting services. These services are customized to meet client objectives and focus on quality assurance and sustainability. EEI's professional and technical staff members have an average of 18 years of experience in building systems. Since 1984, EEI has been serving its clients from offices located throughout the United States including Washington, California, Arizona, Colorado, Kansas, Missouri, Kentucky, Tennessee, Texas, North Carolina, Washington DC, and Virginia. Our goal is to meet your needs and exceed your expectations!