

University of Iowa Hospitals and Clinics

COMPANY BACKGROUND



The University of Iowa Hospitals and Clinics is a top-tier hospital and medical college. Located in Iowa City, Iowa, it was established in 1898 as a 50 bed hospital and has grown to 762 beds since. The entire facility is more than 3 million square feet and includes many additions and renovations. General Hospital is the oldest structure, with Boyd Tower added in the early 1970s. Other additions of Carver Pavilion, Colloton Pavilion, Pappajohn Pavilion and Pomerantz Family Pavilion have made the hospital what it is today.



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PROJECT BACKGROUND

In a hospital there is not a “process” by which anything is produced; instead the expenses and environmental impacts are associated with maintaining building homeostasis and providing necessary services to its inhabitants. This involves providing electricity, plumbing, heating ventilation and air conditioning (HVAC), dining, and maintaining structural elements such as walls, ceilings, windows and flooring. From

an energy-efficiency standpoint, the hospital can reduce its operating expenses due to utilities in several areas: window façade replacement, replacement of air handling unit, and a preventative maintenance plan.

INCENTIVES TO CHANGE

Investments in energy efficiency can help decrease baseline operating costs by creating an annual savings. Annual savings can have a large impact on a hospital, and respecting the environment also protects the health of University of Iowa Hospital staff and patients.

RESULTS

The purpose of this internship was to find opportunities for the University of Iowa Hospitals and Clinics to reduce energy consumption through improvements to building infrastructure. Several opportunities were found, namely window façade replacement, air handling unit replacement, and the development preventative maintenance plan using a thermal imaging camera.

The Boyd Tower window façade was recommended for replacement. An Energy Star rated window and framing system was suggested as the optimum replacement option. This consisted of double paned argon insulated glass windows, with low-emissivity coating on both inner panes. The suggested framing is fiberglass with foam-injected insulation. Estimated annual savings for this improvement is \$2,500, with 1.4 million gallons of water and 40,000 kWh of electricity saved.

Ten air handling units were suggested for replacement with seven new units, cutting down on the overall number of air handlers. Three recommendations were presented for new air handling units. These new air handlers integrate several new technologies, such as energy recovery and injected foam paneling, to cut down on energy usage. It is estimated that this plan could save approximately \$50,000, 26.4 million gallons of water and more than 770,000 kWh of electricity.

The use of a thermal imaging camera as a part of the preventative maintenance plan was also suggested. This would consist of documenting electrical panels and wiring, moving/rotating parts, and HVAC for the appearance of hotspots or leakages. This documentation will exhibit changes in the system and when/where repairs need to be made. It is estimated that this could save \$13,000 in annual maintenance costs.

Implementation of these recommendations could save \$65,500 in operating expenses. A statistic from the EPA states every dollar saved in operating expenses for a hospital is equivalent to \$20 generated in revenue. Thus, the \$65,500 in annual savings is roughly equivalent to more than \$1.2 million in new revenue. In addition, these recommendations can save 813,000 kWh of electricity, 27.8 million gallons of water, and close to 1,000 tons of air pollutants and greenhouse gas emissions to the atmosphere.



Air Pollutants Diverted in Tons

	Total for all sectors
SO ₂	4.12
CO	0.42
NO _X	1.96
VOC	0.07
PM	0.10

Green House Gases Diverted in Tons (CO₂ Equivalent)

	Total for all sectors
CO ₂	762.23
CH ₄	28.66
N ₂ O	.38
CFCs	9.38

Project	Annual Cost Savings	Environmental Results	Status
WINDOW FAÇADE REPLACEMENT	\$2,500	40,000 kWh 1,400,000 GALLONS OF WATER	RECOMMENDED
AIR HANDLING UNIT REPLACEMENT	\$50,000	773,000 kWh 26,400,000 GALLONS OF WATER	RECOMMENDED
PREVENTATIVE MAINTENANCE WITH A THERMAL IMAGING CAMERA	\$13,000	N/A	RECOMMENDED