

UNITYPOINT HEALTH DES MOINES



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MECHANICAL ENGINEERING
THE UNIVERSITY OF IOWA

COMPANY PROFILE

UnityPoint Health Des Moines is an integrated health care system that includes the Iowa Methodist Medical Center, Iowa Lutheran Hospital, Blank Children’s Hospital, Methodist West Hospital, more than 50 UnityPoint Clinic locations, and home health care services, UnityPoint at Home. They strive to provide “the best outcome for every patient every time.” As of 2013, 1,033 physicians, 7,663 employees, and 1,069 volunteers served the Des Moines communities with UnityPoint Health – Des Moines. They provide extensive services such as cardiology, behavioral health, cancer treatment, pediatrics, nutrition, and emergency.

PROJECT BACKGROUND

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INCENTIVES TO CHANGE

By repairing leaks in the compressed air system and introducing a leak management plan, UnityPoint can reduce their operating costs and improve environmental impact. Upgrading outdated and leaky windows with higher efficiency windows could reduce the amount of heat transfer through the windows and lower the energy usage required for heating and cooling. The upgraded windows could also eliminate current condensation and infiltration issues that could result in greater patient and staff comfort.

RESULTS:

Repair Lutheran Compressed Air Leaks: During an audit of the compressed air system at the Lutheran facility, the intern found more than 40 leaks. Repairing these leaks could reduce the load on the system, improve overall efficiency, and increase the lifespan of the equipment. The cost of running the compressors could be lowered by as much as 50 percent, which could result in savings of \$3,190 annually. The intern recommends that a leak management plan be implemented for all hospital campuses to maintain efficiency. It is estimated that the cost of an ultrasonic leak detector could be recovered after repair of leaks identified in one survey of the compressed air system at each campus.

Window Analysis: Using an infrared imaging camera, the intern conducted a thermographic assessment of the windows at the Methodist and Lutheran hospital facilities. This assessment yielded valuable information on the relative energy efficiency of the windows installed at each hospital and identified opportunities for improvement, such as faulty seals or insulation. While precise savings estimates of window upgrades are impossible to calculate due to numerous variables, minimum annual savings for each hospital wing were calculated.

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
REPAIR LUTHERAN COMPRESSED AIR LEAKS	\$3,190	62,860 KWH	RECOMMENDED
YOUNKER WINDOW REPLACEMENT	\$6,440	5,724 THERMS	IN PROGRESS
LUTHERAN WINDOW REPLACEMENT	\$4,704	7,960 THERMS	RECOMMENDED
BLANK WINDOW REPLACEMENT	\$1,889	3,290 THERMS	RECOMMENDED

Younger Window Replacement: The current windows in the Younger wing at Methodist Hospital are single pane windows that are more than 30 years old. These windows are ineffective at maintaining comfortable room temperatures and humidity. During winter months, condensation forms on the surface of the windows, creating additional challenges. Replacing the windows with double-pane, low-E coated, argon filled, fiberglass frame windows would improve room comfort for patients and staff and alleviate many of the maintenance challenges associated with the current inefficient windows. An estimated minimum annual savings of \$6,440 in heating and cooling costs is expected.

Lutheran Window Replacement: Similar to the Younger wing, the East and West wing windows are inefficient and prime candidates for an upgrade. Analysis of these windows indicates noticeable heat loss, which can affect staff and patient comfort. East wing also has the highest volume of leaks from deteriorated seals of all the areas surveyed. As a result, the intern recommended that the East and West wing windows also be upgraded to double-pane, low-E coated, argon filled, fiberglass frame windows. An estimated minimum annual energy savings of \$4,704 is possible in addition to the indirect benefits of improved room comfort for patients and staff.

Blank Window Replacement: Most of the windows at Blank Children’s Hospital were installed in 1980 and are losing energy from heat loss, so a more energy efficient window replacement was recommended. While savings will be realized from this upgrade, the unique, custom nature of the Blank Hospital windows will yield a slightly longer payback period than those calculated for the other hospital wings. An estimated minimum annual energy savings of \$1,889 could be achieved, along with the added benefits of improved room comfort for patients and staff.

ESTIMATED CONVENTIONAL AIR POLLUTANTS DIVERTED IN METRIC TONS

For Implemented and In Progress Recommendations

TOTAL FOR ALL SECTORS						
CO ₂	NH ₃	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC
15.65	0.0	0.03	0.0	0.0	0.03	0.02

ESTIMATED GREENHOUSE GASES DIVERTED IN METRIC TONS

TOTAL FOR ALL SECTORS			
MTCO ₂ e	CH ₄	N ₂ O	CFC
14.37	5.46	0.05	0.07

ESTIMATED CONVENTIONAL AIR POLLUTANTS DIVERTED IN METRIC TONS

For Recommendations in Recommended Status

TOTAL FOR ALL SECTORS						
CO ₂	NH ₃	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC
45.92	0.0	0.08	0.01	0.01	0.15	0.02

ESTIMATED GREENHOUSE GASES DIVERTED IN METRIC TONS

TOTAL FOR ALL SECTORS			
MTCO ₂ e	CH ₄	N ₂ O	CFC
48.29	6.69	0.24	0.26

