

2012 Case Study

Mercy Regional Health Center

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Major: Mechanical Engineering
School: Kansas State University

Manhattan, Kansas



Company background

Mercy Regional Health Center (MRHC) was formed in 1996 when Saint Mary Hospital and Memorial Hospital merged. MRHC is a licensed 150-bed hospital with two main campuses: College Avenue Campus and Sunset Avenue Campus. MRHC employs more than 140 physicians and has more than 1,000 employees. Approximately 200 volunteers also serve Manhattan and the surrounding areas with quality health and wellness services.

Project background

Having already invested in and implemented many “low-hanging fruit” type energy conservation projects, MRHC wanted to look at large-scale projects in 2012. On-site supervisor, Danny Woodworth, and other members of the engineering team determined that project research related to increased efficiencies in the laundry services and the main boilers were priority undertakings for the 2012 intern. Many potential efficiency options were researched to determine the best solution for MRHC. Other, smaller projects were also investigated including leak detection and further re-lamping.

Incentives to change

MRHC participated during the summer of 2011 with the Pollution Prevention Institute at Kansas State University. The previous intern, Stephanie Lamb, found multiple areas of savings. Many of these changes are already implemented at MRHC. The savings possible by implementing these programs were large enough for MRHC to request another K-State Pollution Prevention (P2) Intern for the summer of 2012. MRHC is focused on reducing its utility consumption and its environmental impact. Some of the changes made are helping MRHC earn points

towards becoming a Leadership in Energy and Environmental Design (LEED) gold-or platinum-certified hospital. Another incentive program is to become an Energy Star Leader by reducing the company’s overall energy usage by 10%.

Projects reviewed for E2/P2 potential

1. Boiler efficiency

The first project involved methods to increase the current boilers’ efficiency. MRHC has three Scotch-Marine Kewanee boilers from 1959. Improvements were considered from four directions: replacing the burners, installing economizers, re-tubing with rifled tubes, and complete boiler replacement. Burner replacement is the only one of the four recommended. If MRHC only replaces one boiler, it will see an estimated savings of \$13,516, 8,400 kWh/year, and 22,100 therms/year. If it replaces all three, those values will be \$35,533, 22,001 kWh/year, and 58,107 therms/year.

2. Laundry services

The second project involved different ways to decrease spending and energy in the laundry room. The first process researched was ozone laundry. This would decrease the temperature to tap cold and save \$10,280/year. That savings was from the decrease in gas cost (12,198 therms/year), labor savings from time decrease, and decreased dryer time. This was cancelled because of Kansas regulations. The second component researched was a water reuse system. There would be a 70% decrease in water usage (2,209,982 gal/year), resulting in a \$12,164 annual savings. This was not recommended because of how expensive the equipment is. The third alternative was to convert current chemicals used to a product to be released in September by EcoLab called Aquanomics.

This was the recommended solution because it would cut wash time from 55 to 35 minutes, and it didn't require a decrease in temperature. A temperature decrease to below 160°F was not allowed by KDHE regulations. There would be a \$14,121 annual savings that resulted from reducing electricity, gas, and water by 28,125 kWh/year, 2,550 therms/year, and 1,206,114 gallons/year.

3. Re-lamping

Re-lamping was one of the primary areas of work by the 2011 intern, but there were still a few areas of efficiency that could be addressed. Eliminating remaining incandescent bulbs in use and switching them to a 13-watt compact fluorescents saves \$0.22 and 3.3 kWh per year per bulb for the 40W/34A incandescent, and \$0.50 and 7.3 kWh for a 60W bulb was recommended. There is also a company that has a retro-fit kit that converts four-foot linear fluorescent lamps from four-bulb to two-three-bulb lamps using a reflective back. To start with, MRHC would only change those in the basement and the first floor so that patient areas are not affected. After trying them there, if the lights provide enough illumination and aesthetics, they could be implemented elsewhere. Changing the basement fixtures to two-bulb and the first-floor fixtures to three-bulb saves \$2,411 and 34,760 kWh per year.

4. Leak detection

A UE Systems Ultraprobe 9000 was used to detect any leaks, and only two faulty steam traps were found. Savings were estimated to be 1,568 therms/year and \$918/year.

5. Recycling program

Kansas has new regulations on shredding private documents at hospitals, so the shredding that was done in-house has had to be outsourced. Because of this, volunteers that picked up the paper were reassigned to pick up all the recycling through MRHC. They will make the same rounds as before, but now will pick up all containers of plastics, aluminum, and non-confidential paper. A new recycling system was designed and implemented by the Go Green Committee, which included adding more recycling bins throughout the hospital.

6. Dual-flush toilets

The final project investigated was converting all toilets to dual-flush and switching the remaining 3.5-gallon per flush (gpf) toilets to 1.6 gpf toilets. There are 120 toilets in the hospital, 10 of which are 3.5 gpf. The cost to switch only the public and staff restrooms over is \$1,533, and the annual savings is \$199 and 65,700 gallons/year. This is a 35% savings on water per toilet. This mode is recommended to begin with.

Summary of 2012 E2/P2 intern recommendations for Manhattan Regional Health Center

Project description	Annual estimated environmental impact	Annual estimated cost savings	Status
Burner Replacement (One)	8,400 kWh 22,100 therms	\$13,516	Recommended
Aquanomics	28,125 kWh 2,550 therms 1,206,114 Gallons	\$14,121	Recommended
Re-lamping	34,760 kWh	\$2,412	Partially Implemented
Leak Detection	1,568 therms	\$918	Implemented
Recycling Program	39.6 Tons solid waste	Not Available	Implemented
Dual-Flush Toilets	15,330 Gallons	\$199	Recommended
Total savings *	1,221,444 gal 71,285 kWh 26,218 therms 39.6 Tons solid waste	\$31,166	
GHG reductions *	254.790 metric tons CO2e		

* Does not include projects that are "not recommended" or "further research is needed."