North Memorial Health

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Organization Background

North Memorial Health is a series of non-profit hospitals, health clinics, and a cancer treatment center providing medical care and services to the Twin Cities and its surrounding suburbs. The North Memorial Health Hospital in Robbinsdale, Minnesota is a Level I trauma center that employs over 3,300 people and houses over 350 beds. The Robbinsdale campus consists of the main hospital building and atrium, the West Hall, the hospital parking garage, the Robbinsdale Medical Building (RMB), the hospital's helipad, and the RMB parking garage.

"Working with MnTAP this summer has been an incredible and unforgettable experience. The people at both MnTAP and North Memorial treated me with kindness and respect, and encouraged me to learn and grow in a multitude of ways. If I could go back and do it all again, I would in a heartbeat. Thank you, North Memorial, and thank you, MnTAP!" ~ JG

Project Background

North Memorial Health has been actively working to decrease its natural gas and electricity consumption to reduce the cost of its utilities and improve its carbon foot print. North Memorial Health enlisted the help of MnTAP to provide a summer intern that could assist with the assessment, justification, and implementation of cost-effective opportunities for short and long-term energy savings. For the summer of 2019, North Memorial's primary focus was increasing the efficiency of its boiler plant and HVAC systems with an overall focus on energy conservation.

Incentives To Change

As a non-profit organization, North Memorial Health is hoping to decrease its energy consumption to gain additional funding for the operation, maintenance, and renovation of the rest of the hospital, to ultimately provide better care to more individuals. North Memorial looked to its current boiler system, requiring 1.27 million therms of natural gas annually, as a major opportunity for savings due to its number of complex components. These components include the boilers, flue stacks, steam equipment (valves, traps, etc.), heating, ventilation and air conditioning (HVAC) system, and the condensate return system.

"This is the second year we have worked with MnTAP interns to investigate opportunities for water and energy reduction that have resulted in savings. This year's intern researched energy reduction ideas including using a smaller summer boiler in non-heating months, adding an exhaust stack economizer, insulating steam valves and traps, and upgrading other equipment for energy efficiency. We are evaluating operational changes based on his findings."

~ Bob Johnson
North Memorial

Solutions

Summer Boiler System

North Memorial utilizes three steam boilers to manage its steam demand. During the summer, the hospital's boiler utilization is 3 to 4 times smaller than in winter. By installing a smaller summer boiler, the greater efficiency of steam production could save 41,000 therms and $19,000 per year.

Stack Economizer

When natural gas is burned to make steam, the combustion exhaust is expelled through boiler stacks. By installing a stack economizer in-line on the three boilers, the heat from these stacks can be recovered and used to preheat water being sent to the boiler and could save 78,000 therms and $37,000 per year.

Summer Boiler and Economizer Combination

By installing an economizer in line of the three current boilers as well as a summer boiler with an economizer built in, there could be an annual savings of 130,000 therms and $56,000.

Removable Insulation Jackets

Most of the equipment involved in the steam distribution and condensate return systems are insulated. Due to some unconventional shapes and/or accessibility, some equipment were not insulated and remain uncovered. Removable insulation jackets could save 2,900 therms and $1,500 per year.

Decrease Operating Boiler Pressure

The boilers currently produce steam at 105 PSI year-round as it is the lowest the pressure point can be set before problems with the winter demand are observed. These issues are not present in summer. By lowering the boiler pressure in the summer the facilities could save 23,000 therms and $10,000 per year.

Occupancy-Based HVAC Controls

The hospital currently uses variable air volume (VAV) controls to modulate the temperature in patient rooms. When these rooms are unoccupied in the winter, the temperature is set to a minimum of 65 F. It is recommended to lower the temperature to 55 F and tie in the VAV controls to the hospital's occupancy database. The software could automatically switch rooms to an unoccupied mode and would save 5,200 therms and $2,500 per year.

New Steam Cooker

The oldest of the two steam cookers in the kitchen is coming to the end of its operating life. By replacing the steam cooker with a natural gas powered ENERGY STAR approved model, the cooking process would become efficient and save 700 therms, 47,000 gallons of water, and $600 per year.

Recommendation	Annual Reduction	Annual Savings	Status
Summer Boiler	41,000 therms	$19,000	Recommended
Boiler Stack Economizer	78,000 therms	$37,000	Recommended
Summer Boiler w/ Stack Economizer	130,000 therms	$56,000	Recommended
Removable Insulation Jackets	2,900 therms	$1,500	Recommended
Decrease Boiler Operating Pressure	23,000 therms	$10,000	Testing
Occupancy-based HVAC Controls	5,200 therms	$2,500	Recommended
Replace Steam-Cooker	700 therms 47,000 gallons water	$600	Recommended

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