EXHIBIT 5
DATE Jan 25, 2013
HB 5

Montana Department of Environmental Quality

CASE STUDY

State Energy Program

State Buildings Energy Conservation Program

Walt Sullivan Building

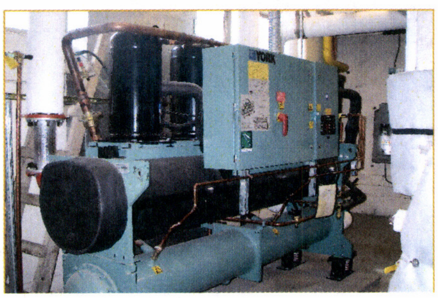
Project Completion
Early 2011

Project Budget
$597,059

Project Funding
Federal: $365,000
State: $192,059
Utility Rebate: $40,000

Annual Estimated Savings
$29,793
Electrical: 115,830 kWh
Gas: 2,000 dKt

CONDENSING BOILER



CHILLER UNIT

WALT SULLIVAN BUILDING

Located in the Capitol Complex in Helena, the Walt Sullivan Building is home to the Department of Labor and Industry (DLI). The building was constructed in the 1960s and then expanded to roughly 55,000 square feet in 1972. Each section has its own heating and cooling equipment, but inefficiencies were resulting in high energy costs as well as uncomfortable working conditions for staff.

"We were committed to addressing these problems but didn't have sufficient funding until the opportunity arose to combine the State Building Energy Conservation funds with other monies," said Tammy LaVigne, former Centralized Services Administrator, DLI, and now deputy chief information officer, ITSD, Department of Administration.

NO CONTROL

The original section of the Walt Sullivan Building was served by a single-zone ventilation air handler, which ran continuously from 5:30 a.m. to 8:00 p.m. Monday through Friday, and which was fed by a steam boiler that delivers heat to this section of the building through perimeter fan coils via a water-loop system. The boiler's Hi/Low-staged gas burner configuration created on/off cycling, reducing the boiler's number of firing cycles and thus lowering its efficiency. Further inefficiencies occurred as a result of the constant volume pumping system, which operated year-round.

The newer section of Walt Sullivan was served by a multi-zone air handler. It too ran constantly, providing tempered ventilation air 24 hours a day. The area's primary heating and cooling were provided by perimeter four-pipe fan coil units which, before the upgrade, were controlled manually and often left operating while the building was unoccupied. The fan coils were fed by a hot-water boiler during the heating season, which maintained hot water temperatures of 180° F.

MORE COMFORT, LOWER COSTS

To lower energy use in the Walt Sullivan building, the 75-ton chiller was replaced with a more efficient digital scroll chiller that resets the chilled water supply temperature between 54°F and 44°F, based on ambient air temperature. During the cooling season, this water system is disabled from 6 p.m. to 6 a.m. to conserve energy. The inefficient gas burner on the boiler in the original section was replaced with a modulating burner that adjusts the hot water temperature between 140°F to 180°F, depending on ambient air temperatures. The hot water boiler in the 1972 addition was replaced with three high-efficiency condensing boilers, which reset hot water supply temperatures to a range between 100°F and 160°F.

To upgrade the constant volume pumping system for the entire Walt Sullivan building, variable frequency drives (VFD) were installed and three-way valves on the perimeter fan coil units were converted to two-way valves that allow the water loop to reduce pump speed when needed.

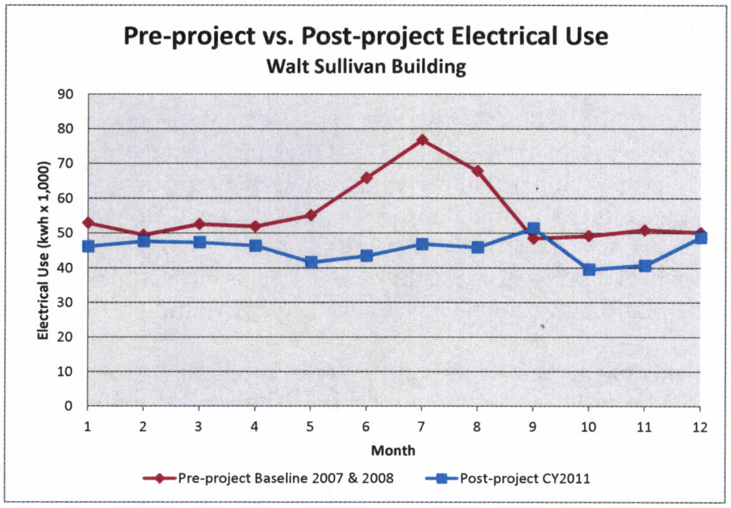
Also, the perimeter fan coil operation in both sections was converted from manual operation to automated control through the building automation system. The control starts, stops, and modulates fan speed based on space temperature and space-

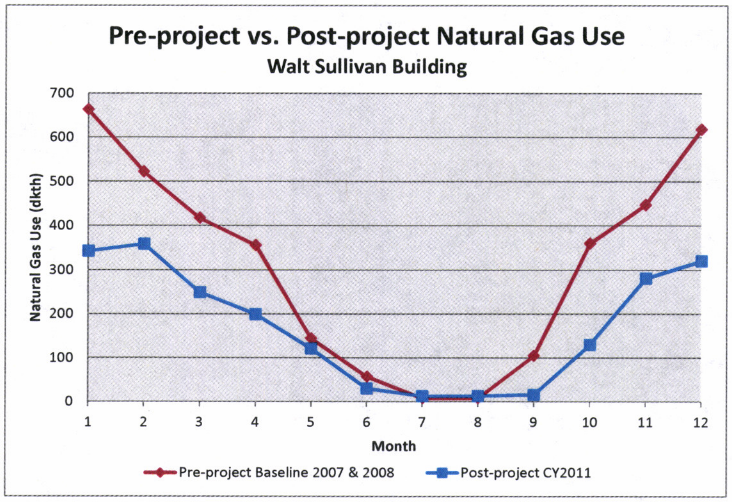
Walt Sullivan Building

temperature setpoint. In addition, all air handlers were updated with digital controls so that they operate in accordance with building usage from 7 a.m. to 5 p.m. Monday through Friday. At other times, the units run only when heat is necessary to satisfy unoccupied setpoints.

"The new controls even out the temperature throughout the various areas and allow the systems to be monitored," LaVigne said. "Overall, the upgrades have made a huge improvement in staff comfort and energy savings."

Funding for the State Buildings Energy Conservation Program for this project came through the U.S. Department of Energy State Energy Program. Additional state funding was provided by the Long Range Building Program administered by the Department of Administration. Utility funds were received as a rebate from NorthWestern Energy.





Definitions

air handler: An HVAC device containing a blower, heating/cooling equipment, and dampers that is used to condition and circulate air.

chiller: A refrigeration component in which heat exchangers remove heat from water that is circulated through an HVAC system. A variety of designs and configurations are seen, including centrifugal, reciprocal, scroll, and steam absorption chillers.

condensing boiler: A boiler that recovers heat from waste gases produced during the boiler's combustion process. As fuel is burned in conventional steam or hot-water boilers, waste gases are produced and expelled as exhaust. A condensing boiler cools and condenses these gases, extracting the heat as the condensate is drained off, thereby improving the boiler's efficiency.

heat exchanger: A device that transfers heat from the fluid or gas of one chamber into the fluid or gas of another chamber via the chamber walls.

hot water boiler: A heat transfer device that burns fuel to heat water that is then pumped throughout the building where heat is exchanged through any of a variety of heating elements.

multi-zone ventilation air handlers: An HVAC system with a hot deck and cold deck supplying a mixture of outside and return air. Dampers on the hot and cold deck controlled by zone thermostats provide a mixed air supply to the space being heated or cooled based on setpoints.

setpoint: The desired temperature set by the operator and maintained by an HVAC system.

single-zone ventilation air handler: An HVAC device that provides a percentage of conditioned outside air to a single zone, usually controlled to a supply air temperature of 68°F to 70°F, for the purpose of providing indoor air quality.

steam boiler: A system that creates pressurized steam that circulates throughout a building and delivers heat via radiators (as opposed to a hot-water boiler, which circulates hot water).

variable frequency or variable speed drive (VFD): An adjustable drive that controls the speed of an electric motor by dictating how often it is supplied with electricity. When used in variable-air-volume air handlers, VFDs conserve energy by adjusting volume of air flow to system demand.

CASE STUDY

State Energy Program
State Buildings Energy Conservation Program

Montana State Hospital

XANTHOPOLUS BUILDING

Project Budget: $2,431,935
Federal: $820,257
State: $1,611,678

Annual Estimated Savings
$76,345
Electricity: 217,000 kWh
Gas: 5,270 dKt

INTERRUPTIBLE GAS LINE

Project Budget: $1,597,000
Federal: $734,000
State: $863,000

Annual Estimated Savings
$60,144
Gas: 6,000 dKt

CAMPUS LIGHTING

Project Budget: $101,821
Federal: $94,162
Utility Incentive: $7,659

Annual Estimated Savings
$9,295
Electricity: 98,498 kWh

Major energy upgrades at Montana State Hospital (MST) remedied a potentially serious safety issue as well as cut energy usage and costs.

Located in Warm Springs, about 25 miles northwest of Butte, MSH provides inpatient evaluation, treatment, and rehabilitation services for adults with severe mental illness. It is the only public psychiatric hospital in the state and has, on average, 187 residents. Among the buildings on the campus are the hospital, housing for residents, and program facilities, as well as several buildings no longer in use.

In 2009, an energy audit lead to the discovery of numerous leaks in the gas lines serving MSH. Emergency repairs were made immediately, followed by installation of an interruptible gas line and other energy upgrades that were funded in part with federal funds administered by the Montana Department of Environmental Quality (DEQ).

"Being able to make these upgrades fixed a safety issue and benefited us economically," said Tracey Thun, MSH CFO. "Our energy usage has been going down the last two years."

IN NEED OF IMMEDIATE REPAIR

The hospital campus was served by a state-owned gas distribution system fed from a NorthWestern Energy station located on a corner of the property. The system was originally coated-steel buried pipe. Over time, as the lines corroded and started to leak, sections of the pipeline were replaced with polyethylene PE yard gas piping.

When the audit revealed a discrepancy between the gas meter loads and the reported maximum daily delivery quantities (MDDQ), a leak detection survey found 11 significant leaks. One located at the service to the old Receiving Hospital resulted in gas levels in the basement high enough to warrant abandoning the building.

Emergency repairs consisted of cutting and capping the main that served the abandoned building, as well as fixing leaks on the gas risers serving various buildings used by the maintenance staff, on the risers in the housing area, and in joints leading from the housing. Because the remaining steel pipe was badly corroded, it too needed replacement to prevent future leakage and hazards.

PRESENT AND FUTURE SAVINGS

Given the extent of the repair work required, it made economic sense to take that opportunity to put the entire campus on full interruptible gas, which could be partially curtailed during peak-use periods to reduce MSH's natural gas costs. These "critical" days, as determined by the utility, usually occur on the coldest winter days of the year.

MST already had interruptible gas service for a portion of the campus, with a propane air-mixing system linked to one of the two main boiler plants on campus that served as the back up fuel. In addition, an amount of firm gas was maintained to provide fuel during a curtailment period for the buildings not on the hot-water boiler plant system.

Montana State Hospital

To accommodate a full-campus interruptible gas line, the propane air-mixing station was upgraded to a model capable of handling the bigger demand, and the old 200,000-gallon propane tank was relocated to serve as fuel storage for the new facility.

By installing the propane air-mixing station, MSH dropped its monthly MDDQ fee from $3,000 to $1,512. Substantial natural gas savings were also made by eliminating the need to maintain firm gas.

"Because the air-mixing system turns the propane into natural gas, we didn't have to change out any of our natural gas appliances, which was an additional benefit for us," Thun said.

IMPROVED VENTILATION, MORE COMFORT

The second boiler plant on campus provided steam heat and domestic hot water to two buildings — the Xanthopolus, or "Dr. X," building, and another building slated to be abandoned following the remodel of Xanthopolus. Among the upgrades to Xanthopolus was replacement of the HVAC system and removal of the steam boiler.

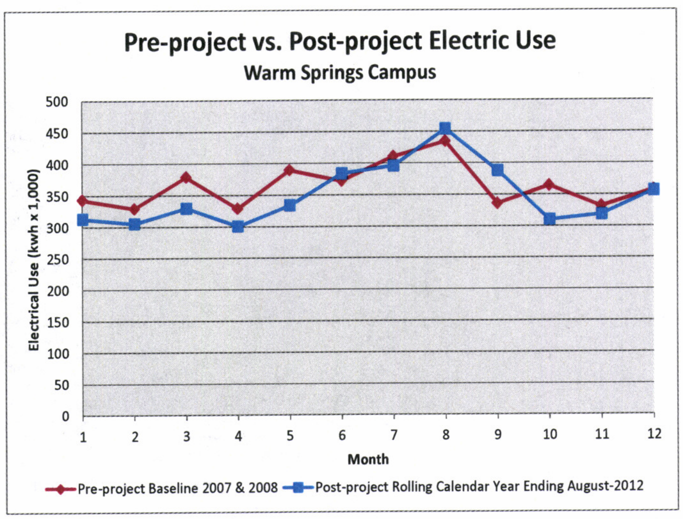
"The air ventilation in that building was inadequate, with no air conditioning and no air movement," said Thun. "The comfort level now is probably 100 percent better."

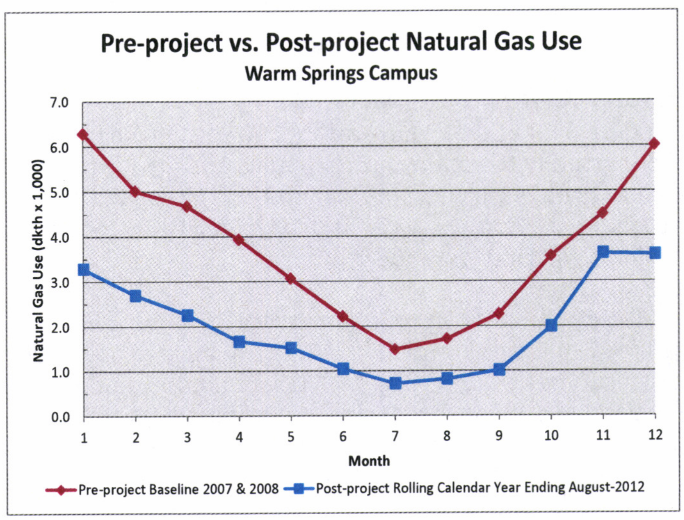
With shutdown of the steam boiler plant, MSH was able to consolidate many of its maintenance functions in the hot-water boiler facility, for additional convenience and savings.

"The high-pressure steam boilers required 24/7 coverage," said Thun. "The low-pressure hot water boilers don't need that, so there will eventually be some personnel savings as well."

The final energy-efficiency project at MSH was upgrading the lighting throughout the campus. In addition to replacing inefficient fixtures and magnetic ballasts, new fixtures were added outside to light a very dark sidewalk by the hospital building.

The State Buildings Energy Conservation Program (SBECP) funds energy improvements to state-owned facilities and captures the energy savings from the project annually through repayments from the agency that owns the facility. Repayments that are collected from the energy cost savings will be used for additional projects in the future. Funding for SBECP for this project came through the U.S. Department of Energy State Energy Program. Additional state funding was provided by the Long Range Building Program, administered by the Department of Administration. Utility funds were received as a rebate from NorthWestern Energy.





Montana Department of Environmental Quality

CASE STUDY

State Energy Program
State Buildings Energy Conservation Program

Montana State Crime Lab

Location
Missoula

Project Completion
May 2011

Project Budget
$1,812,859

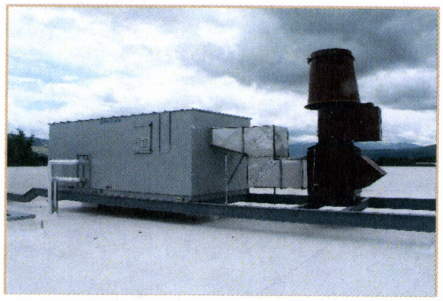
Project Budget
Federal: $680,000
State: $987,859
Utility Rebate: $154,920

Annual Estimated Savings
$45,707
Gas: 5630 dKt

Energy upgrades completed in May 2011 at the Montana State Crime Lab are already paying off in decreased natural gas usage, greater control over the heating, ventilation, and air conditioning (HVAC) system, and a dramatic improvement in staff comfort. But the biggest return may be in the building's extended longevity.

"We believe the project will add 20 years to the lifetime of the taxpayers' investment," said David McAlpin, administrator of the Missoula-based facility

The State Crime Lab is an internationally accredited organization that provides forensic science services in support of the state criminal justice system. Housed in a 31,145 square-foot building constructed in 1999, the Crime Lab includes administrative office space, a shooting range, and specialty laboratories for analyzing drug chemistry, firearms, latent prints, DNA, and numerous other aspects of forensic investigation. An energy audit in 2010 identified several areas in need of improvement.


NEW ROOFTOP AIR HANDLER

TOO COLD TO FUNCTION

The Crime Lab's HVAC system was highly inefficient. For ventilation, the facility was served by 11 makeup air units, which were undersized for the specialty labs, met neither mechanical code nor filtration requirements, and often operated at 100 percent airflow thus using a significant amount of energy. Because the building's exhaust fans also ran at constant volume when in operation, the combination resulted in continuous airflow at an average rate of 12 air changes per hour, a level required only in the event of a toxic chemical spill. Most makeup air equipment operated about 12 hours a day with the exception of that in the morgue and evidence storage areas, which ran continuously. Meanwhile, most of the lab exhaust systems ran continuously.

Heating and cooling efficiency was also an issue. The toxicology, breath analysis, and DNA/serology labs were heated by gas-fired duct furnaces and duct-mounted electric reheat coils. Occupants complained that the rooms were sometimes so cold that the equipment would not function properly. The building's cooling was provided by air-cooled condensing units that fed into direct expansion (DX) cooling coils in the makeup air units.

The State Crime Lab building was largely lit by 32-watt T8 light fixtures with electronic ballasts that were relatively efficient. However, the lighting was manually controlled so energy was lost when lights were left on in unoccupied areas. In addition, large windows on the south and west sides of the building resulted in significant solar gains and glare issues.

AN EXEMPLARY PROJECT

To lower the Crime Lab's energy use, most of the makeup air units were converted to variable air volume (VAV) air handlers, including four rooftop units. The new AHUs are equipped with variable frequency drives (VFDs) and a plate-type heat recovery core that is capable of direct evaporative cooling. All laboratory general exhaust and hood exhaust systems are now routed through this core to increase efficiency. The new VAV rooftop units are equipped with VFDs on the supply and exhaust fans, an economizer cooling system, and hot water coils. In addition, they adjust to space ventilation requirements as dictated by CO_2 sensors installed throughout the facility.

Three of the existing makeup air units were replaced with new high-efficiency constant volume units with hot water coils. Upgrades were also made to two makeup air units that were not replaced. The gas-fired sections on the makeup air units were replaced with hot water coils, while economizer cooling and CO_2 sensors were added to the rooftop units. To further reduce exhaust requirements, an operating schedule was added to the morgue and evidence storage areas, and occupancy sensors were installed in the Autopsy area so the air handling unit only operates when necessary. The Crime Lab's ventilation and exhaust systems are now more appropriately aligned with space requirements, decreasing the average rate of air changes per hour by half.

Montana State Crime Lab

Heating and lighting upgrades also save significant energy. The heating system was replaced with two natural gas condensing boilers equipped with hot water pumps with VFDs and a direct digital control (DDC) system that provides a general temperature setback of 60°F during the heating season and 80°F during the cooling season. As a result, in addition to reducing energy consumption, the new heating system is much easier to operate. Additional energy savings resulted from putting solar-reflective film on windows, reducing heat gain and glare.

The wattage in nearly 1,200 T8 lamps was reduced from 32 to 28, resulting in the same amount of light output for less energy, and occupancy sensors were installed throughout the facility. "I had underestimated how important that part of the upgrade was until I saw the results," McAlpin said.

"We consider the upgrade a real success," he added, "In fact, I think it is a poster child for energy conservation projects."

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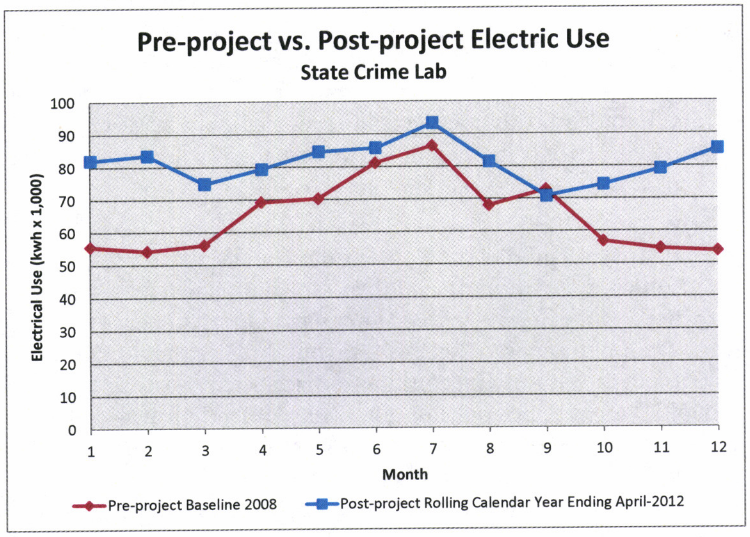

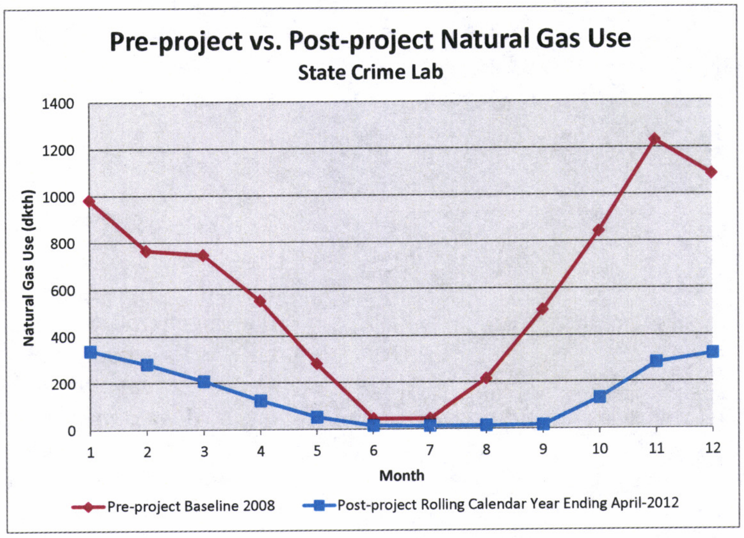

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direct digital controls (DDC): Controls for automation of system operations. When used with an HVAC system, the controls are mounted on mechanical systems and connected to sensors located throughout the area to be heated or cooled. Because the controls direct the system's equipment based on up-to-date information, energy use reflects actual need.

direct expansion (DX) cooling: A system in which air is chilled directly by the refrigerant in the cooling coil (as opposed to water cooling, in which water is chilled and in turn chills the air).

economizer cooling: A device that, in a mixed air system that delivers heating and cooling, allows use of cool outdoor air to cool indoor air.

electronic ballast: The device that controls the amount of current in an electric circuit. An electronic lamp ballast uses solid state electronic circuitry to provide the proper starting and operating electrical condition to power one or more fluorescent lamps.

makeup air: The outside air brought indoors via a ventilation system. A makeup air unit is an AHU that conditions 100 percent outside air for interior use as an alternative to recirculating stale air, which could carry odors and bacteria.

T5, T8, and T12 lamps: Various sizes of tubular fluorescent lamps. T5s are the smallest of the three sizes at five-eighths of an inch in diameter and product better quality of light for longer periods of time than the other two sizes. T8s are one inch and T12s one-and-a-half inches in diameter. T 12s are the least efficient, tending to use magnetic ballasts and producing lower-quality light for a relatively short period of time.

variable-air-volume (VAV) air handler: An air handler that adjusts the volume of air flow supplying only enough air flow to satisfy heating and cooling requirements for each space.

variable frequency or variable speed drive (VFD): An adjustable drive that controls the speed of an electric motor by dictating how often it is supplied with electricity. When used in variable-air-volume air handlers, VFDs conserve energy because the volume of air flow can be adjusted to match system demand.