Energy Savings Performance Contract

First established as a teacher’s college in 1864, Kutztown University enjoys a long and proud history. In recent years, the University has added and renovated facilities to better serve its students. In 2002, NORESCO initiated construction of a comprehensive energy efficiency and infrastructure project.

NORESCO presented a solution with an energy savings performance contract, which provided Kutztown University with the needed upgrades and improvements while simultaneously addressing needed capital improvements to generate both energy and operational savings.

After the success of the first project, Kutztown and NORESCO added two additional contract amendments. Amendment 1 involved several energy conservation measures, including window screens and the purchase of EnergyCAP® software.

Amendment 2 included a metering project which involved the installation of electric, steam, water, and gas utility meters. These meters were integrated with both the existing direct digital control system and with the EnergyCAP® utility monitoring system.

1 – Energy Efficient Lighting Upgrades

Annual Savings $82,608

NORESCO installed new energy efficient luminaries and modified existing fluorescent luminaries to increase efficiency.

NORESCO also installed occupancy sensors in areas such as offices, lab areas, restrooms, and other areas to further reduce electrical consumption when these areas are unoccupied. Specifically, at the Keystone Field House, NORESCO installed lighting fixtures that will reduce overall lighting by about 50% and will increase the space lighting levels. In addition, the new luminaries at Keystone will allow for instant on/off capabilities, which will eliminate the existing fixture warm-up times.

2 – Water Conservation

Annual Savings $236,173

NORESCO substantially reduced water consumption of plumbing fixtures by installing and retrofitting them with new low-flow plumbing fixtures. Replacement and retrofit of these fixtures dramatically improved the water efficiency of the selected buildings and enhanced the working and quiet area for residents, staff and students. NORESCO provided new water meters, array flush valves and irrigation flow controls. All of the new fixtures and valves are low-flush devices which reduced unnecessary water use, minimized maintenance requirements and provided the facilities with new, more attractive plumbing fixtures.

3 – EMS Additions and Modifications

Annual Savings $144,873

NORESCO enhanced and modified the existing Andover Energy Management System to provide a higher level of savings and energy optimization. This measure included a comprehensive survey of control systems that documented existing conditions and allowed for accurate pricing of system upgrades.

4 – Window Replacements

Annual Savings $46,396

NORESCO conducted an investigation of the Tri-County dormitories (Laghe Hall, Bikes Hall, and Schobald Hall) and found significant opportunities for improvements in the energy efficiency of the building envelope. Specifically, NORESCO installed thermo-pane windows to increase the energy efficiency of the buildings’ windows. The new windows have improved thermal performance, which will result in increased occupant comfort and reduced energy consumption.

5 – Kitchen Hood VFD Controls

Annual Savings $29,922

NORESCO equipped the majority of the kitchen hoods at South Dining Hall and McFarland Student Union with dedicated on/off controls designed to vary the quantity of hood exhaust and related make-up air volumes. These systems continuously monitor both heat and particulates under the associated exhaust hoods. Based on those conditions (heat and smoke), fans speeds for exhaust and supply are adjusted to minimum required values while simultaneously maintaining proper air balance. An additional benefit to this system is reduced air noise during off-peak hours.

6 – Variable Frequency Drive on Tower Fan

Annual Savings $333

NORESCO installed a new variable frequency drive (VFD) and inverter rated motor for use on the evaporative cooling tower fan that moves the heat pump system at the Graduate Center. The cooling tower observer varies load throughout the cooling season. Based on the cooling load, the variable frequency drive on the fan motor regulates the fan speed, which reduces the power drawn by the fan during periods of partial load. It also reduces stress on the system.

7 – Chiller Isolation Valves & VFDs for Chilled Water Pumps

Annual Savings $3,080

NORESCO installed isolation valves on the chillers at the McFarland Student Union to prevent flow through the non-operating chillers. Variable Frequency Drives were installed for the secondary chilled water pumps to avoid isolated chilled water flow effectively throughout the systems.

8 – VFDs for Chilled Water and Condenser Water Pumps

Annual Savings $9,270

NORESCO installed variable frequency drives (VFDs) on the existing 15 HP chilled water pumps and the 10 HP condenser water pumps at the South Dining Hall. Additional points were added to the existing energy management system to control operation of the new VFDs. Differential pressure controls were installed on the chilled and condenser water distribution piping to ensure adequate flow and chiller safety. During periods of low demand for chilled water when only one or two chillers are operating, the two way isolation valves on the fraction chillers will be closed. The VFDs reduce the motor power drawn by slowing the speed of the operating chilled water and condenser water pumps to match the load.

9 – Weatherization

Annual Savings $2,133

NORESCO improved the building envelopes of HickmanHall, Vegetarian, and Learning Center. The building envelope improvements were focused on reducing air infiltration and improving overall building energy performance. This resulted in lower utility bills and improved occupant comfort and health.

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11 – Leading Dock Infiltration Control

Annual Savings $3,125

NORESCO installed a new feature above the seawall door at the leading dock in the South Dining Hall. This powerful blower system whenever the door is opened to create a high velocity curtain of air across the door opening. This air current prevents large volumes of conditioned mixed air from escaping when the door is open and also discourages insects from entering the building.

12 – Steam Trap Maintenance and Repair

Annual Savings $43,652

NORESCO surveyed all campus steam traps and installed a formal steam trap maintenance program. Steam traps found to be leaking were replaced or repaired with new properly functioning traps. Those conditions in these buildings improved thermal energy savings were achieved. In order to sustain the benefits over the life of the project, approximately one-third of the traps were reinstalled annually. Those found to be leaking were repaired or replaced with the internal traps that manufactured parts purchased by ASU.

13 – Insulate Steam Piping

Annual Savings $10,213

NORESCO insulated steam piping of various locations throughout the campus. This insulation will reduce heat loss to the atmosphere and thereby reduce overall heating energy costs. High temperature steam piping and accessories also pose a safety issue for personnel working in the area. In particular, this work included installing replacement steam piping with fiberglass insulation protected with a canvas or PVC jacket. It also covered the valves and accessories with renewable pre-fabricated insulation jackets.

14 – New Roofing

Annual Savings $12,627

NORESCO installed a new roof on the Kempsey Field House, which is a large athletic building. The new roof eliminates previous roof problems such as roof leaks, heat loss, and snow and ice damage due to failed snow and ice guards.

17 – Submeter Project

Annual Savings $12,627

NORESCO provides all of the design, programming, electrical, piping, graphics, leasing, labor, material, et cetera and requirements to completely install fuel, electric, water, steam, hot water and various uses only reading of the electrical requirements of notable lighting in various buildings throughout the campus. Furthermore, any additional applicable points added on the filter system where required and coordinated at the trending format requirements to ensure proper interface with the existing EnergyCAP® software.

18 – Energy Conservation Through Behavior Change*

Annual Savings $16,000

A pilot study was conducted in 2007 to test the effects of the Energy Conservation Through Behavior Change® (EC2) process. Similar four residence halls were identified, baseline water and electrical meter data were collected, and a third party reported the minimal consumption during the study. Kutztown University’s water and sewage costs were astronomically high, reducing the time of a hot shower only decreased water and sewage costs but the natural gas costs associated with heating the water. The pilot study resulted in a 24% reduction in minimal water consumption and a 5% reduction in minimal electricity consumption.