

STATE UNIVERSITY SYSTEM
CONSERVATION MEASURES
UTILITY COSTS

FAMU

FAMU engaged Honeywell as a Performance Contracting and Energy Management Company. Honeywell changed lighting in several buildings, which reduced energy consumption and electric demand. They also installed steam traps, and initiated water conservation and changes to the HVAC system and controls. This work was completed in two phases. This resulted in annual savings of \$254,570 for phase I and \$82,683.52 for phase II.

UF

JCI Performance Contract: Starting in 1998, the University of Florida initiated a performance contract with Johnson Controls Incorporated. Energy savings measures included retrofit of lighting systems, installation of building controls, operational scheduling, and air handling unit improvements. Total savings are estimated to be valued at \$2,131,319. Cost of implementation has already been subtracted from realized savings, leaving the above value quoted as the net savings.

Progress Energy Utility Contract: Initiated in 1992 when Progress Energy was known as Florida Power Corporation (FPC). The contract entitles the University of Florida to lower electricity and steam rates in return for enabling FPC as the sole provider of these utilities to the main campus. Since 1993, estimated savings in electricity consumption resulted in a value of \$25,000,000, where as savings in steam consumption have amounted to \$11,000,000. These values are based on rate differentials between current Progress Energy's electricity rates and other available rates.

Chilled Water Plant Optimization: This includes modifications that affect the operation of campus chilled water plants. Not only does this include operational methods employed, but also upgrading worn equipment with new and more efficient models. Estimated savings are currently valued at \$293,000. The additional cost associated with the purchase of high-efficiency chilled water equipment is minimal when compared to the cost of the chilled water project itself.

LEED Certification of New Buildings: The University of Florida has made a commitment to the environment by adhering to construction standards set by the USGBC. As a result, LEED buildings are more conservation oriented than their non-LEED counterparts. Based on limited studies, current LEED buildings have shown a 38% reduction in utility consumption when compared to their non-LEED counterparts. For a basic LEEDS certified building, capital costs are similar to a non-LEEDS building, though the price does increase as the level of LEED achieved is increased (i.e. a gold-level LEEDS building costs 7% more during construction).

Reclaimed Water: Since its construction in 1994, the Waste Water Treatment Plant has allowed the University of Florida to irrigate with reclaimed water. Reclaimed water is derived from raw sewage through various filtering methods. Benefits to the local community are realized through less drain on the potable water supply, as well as reduced strain on municipal sewage treatment facilities. A rough estimate places total savings of approximately \$2,500,000 since 1994. Considering that a waste water treatment plant was needed regardless of reclaimed water use, construction costs for the facility should not play a role in savings calculations.

Progress Energy Audit: Progress Energy is sponsoring an investment grade energy audit for the University of Florida. The project is focusing on a group of high-use campus buildings. Though currently in progress, the goal is to achieve from \$250,000 to \$750,000+ in savings. Progress Energy is providing the audit to the University of Florida free of charge.

Armstrong Steam Study: Armstrong Services has recently conducted an analysis of steam and condensate return systems on campus. Based on their recommendations, the University of Florida will conduct a steam trap survey and a piping insulation project. Savings are projected to be \$94,000 over three years. At an initial cost of \$46,100, the payback period is estimated at approximately a year-and-a-half.

AES Lighting Retrofit: In 2001, the University of Florida contracted Advanced Energy Solutions, LLC to retrofit lighting systems in a number of campus facilities. Generally, remaining T-12 fluorescent fixtures were replaced with T-8 fluorescent fixtures. The retrofit was completed in late 2001 and estimated savings amount to \$43,000. Implementation of the project resulted in a cost of \$37,000, thus reducing our net savings to \$6,000.

JCI Assistance Contract: After the termination of the JCI Performance Contract, the University of Florida continued on with a yearly assistance contract. The general scope of this contract was to assist University personnel in maximizing savings potentials through the use of building automation systems. To date, the efforts of this contract have saved about \$150,000. The contract with JCI costs \$30,000 per year.

Amendments to Construction Standards: Revisions have been made to the University of Florida's Design and Construction Standards, requiring the use of energy efficient equipment. For example, the standards require the use of high efficiency electric motors, cooling coils with no less than an 18 degree delta T, and restrict the use of hot water in most lavatories. The standards expand in a number of other areas as well, yet it is difficult to gauge the overall monetary impact to savings.

FAU

Implemented a lighting energy service performance Contract (ESCO). Phase 1 is completed and scheduled savings are \$186,000 per year. Phase II will be implemented soon within this fiscal year with scheduled savings of an additional \$135,000 per year. Negotiated a gas contract that will generate a 10-13% savings over the going rate at the time of the agreement.

Included in the FAU Cost Containment Guidelines requirements that all public area lighting in new construction will be designed to allow scheduling so as to save energy.

Scheduled \$1.4 million dollars of improvements to existing cooling towers at Bldg. 5 over the next 3-4 years. This will reduce the temperatures of the condenser water flowing to the chillers and provide more efficient operation in the heat of the summer when the air conditioning load is the greatest.

Negotiated a long term rental agreement for distribution substation facilities with FP&L that will net FAU an annual savings of approximately \$150,000 by moving FAU into a more favorable rate structure.

Installed one new higher efficiency chiller at Bldg. 5 (CEP). Chiller 5 is approximately 0.5KW per ton. FAU has begun to base load the campus with this chiller to provide for overall savings.

Installed waterless urinals at the College of Nursing.

Reduced hot water temperatures at main boilers in CEP.

Cost Containment Guidelines include requirements for variable flow air and water systems in new construction for HVAC systems.

Implemented plan to provide separate pumping in areas such as field houses to reduce operating costs of large motor horsepower pumps in central plant.

Systematic upgrade of existing temperature controls throughout campus as budget allows to provide better energy management.

After the 2004 hurricanes, FAU replaced all defective motors with high efficiency motors which are an efficiency improvement of several percent and all of the motors operate 24/7.

Thermostats are set at temps 76+/-2 degrees F; the 2 degrees being the accuracy of the thermostat.

It should be noted that in some of FAU buildings the chilled water temperature is constant to control humidity and temperature is adjusted by additional heat traveling back into the air. So raising the space temperature could use more fuel at the boilers.

Updated the FAU Cost Containment Guidelines and Professional Services Guide to include sustainable requirements which will result in a LEED "type" Certified Building Program and save energy.

Issued campus wide posting of Energy Conservation Best Practices recommended by FP&L.

Completed the design of an Alternative Fuel Tank Facility and are participating in the Federal Program for purchase of alternatively fueled vehicles.

Continue to meet or exceed the state requirements set forth in the Florida Energy Code in the design and construction of all our new facilities requirements which will result in a LEED "type" Certified Building Program and save energy.

Commissioned on energy audit and implemented HVAC and lighting recommendations for the Sea-Tech campus.

New College

All florescent lighting in campus buildings has been retrofitted to provide electronic ballasts and T8 or T5 lamps, significantly reducing consumption of electricity for interior lighting. Exterior lighting has also been upgraded to provide higher efficiency light fixtures.

A new campus chiller plant was constructed in 1999 and is equipped with high efficiency chillers. Approximately 50% of the College's total E&G gross square feet (gsf) are currently cooled with chilled water. Funding is in hand and design is currently in progress to extend the chilled water system to an additional 15% of E&G gsf. There are significant energy savings in cooling with chilled water vs. cooling with stand alone HVAC systems.

NCF recently collaborated with FSU Ringling to permit FSU to co locate its new chiller plant (supporting the entire Ringling/Asolo complex) immediately adjacent to NCF's existing chiller plant. Interconnections were made so that NCF's chillers can support FSU and vice versa in the event any one of the chillers malfunctions or needs to be taken down for service. Also, when the Ringling's new education building is complete, NCF will be able to connect to the chill water supply lines servicing the new building and provide metered chilled water to NCF's campus buildings, cooling an additional 15% of NCF's total E&G gsf. When complete, this will bring NCF's total E&G gsf cooled this way to approximately 80%. This will produce significant energy savings for NCF and we will not have to invest in the high cost of installing chill water lines from our chiller plant to the Campus because FSU will have already installed the lines to support their new facility.

Where the need arises to replace stand alone a/c systems, units with high emergency efficient SEER ratings are installed.

The boiler providing hot water and steam to east campus was replaced in 2004 with a high efficiency boiler. This reduced boiler operating costs by approximately 25%.

NCF has begun installing an electronic energy management system in buildings served by the central chilled water system. This system will be expanded as we add more buildings to our chilled water system. It allows us to provide demand based (and night set back) control of cooling and interior lighting consumption by individual room or zone within a given building.

In addition to focusing on reducing energy consumption (or at least minimizing the rate of consumption growth), NCF is reviewing the utility charge structures assessed by local utility providers to ensure we are getting the most economical rates available that meet our consumption priorities. We are negotiating a service contract with Commercial Utility Econometrics (CUE). CUE is a Florida firm covered under the State's SNAPS procurement process. CUE will review all our various utility rates and make recommendations on actions and modifications which may result in reduced utility expenses. CUE's review will address rate analyses and accuracy of suppliers' billings. CUE's compensation will be based on any recommendations implemented by NCF that yield actual, measured cost reductions. If no cost reductions are identified, CUE receives no compensation for their efforts.

Although the College has not constructed any new buildings or performed major renovation on existing facilities in the last 5 years or so, design standards are being updated to employ the most current energy conserving design practices such as airside heat recovery (by enthalpy wheels, air-to-air exchangers, etc.), variable air volume HVAC systems, secondary reuse of exhaust air, premium efficiency fan and pump motors, automatic/metering faucets, high efficiency lighting systems, passive building design features (overhangs, shading devices, insulated fenestration, etc.).

USF

Implemented 'Green Lights' program in all facilities of USF in 1999. The program included T8 fluorescent lamps, electronic ballasts, compact fluorescents, motion sensors, light reflectors, redesign and rewiring of lighting with more efficient lamps, and new light fixtures. The electrical savings exceed \$750,000 a year as electrical rates increase. The total savings since implementation are expected to be in excess of \$4 million.

Implemented 'Direct Natural Gas Purchase' program since 1996. In this program, the natural gas is purchased on market index pricing and is transported to USF via interstate gas pipelines. Total savings from the program since implementation have exceeded \$5.5 million.

Replaced single stage steam absorption chillers with high efficiency electric centrifugal chillers in the main central plant.

Test installed 'Vending Miser' on vending machines to reduce electric consumption.

Installed direct digital building automation systems in all buildings for better efficient control of space conditions, and thereby reducing energy consumption.

Installed 'Variable Frequency Drives' on air handling units which reduce energy consumption by using only the minimum needed electricity for air flow to the space.

FSU

PERFORMANCE CONTRACTING

FSU has recently signed a contract that will implement the third phase of energy performance contracting.

The energy and cost reduction measures include the latest technology in lighting systems, motion detectors to control classroom lighting, low flow plumbing fixtures, conversion of irrigation systems from City water to wells and remote sensing of campus computers to turn them off when not in use for extended periods of time.

The latest phase of performance contracting also includes an extensive energy awareness program. This program will provide energy education information to the entire campus community and will provide significant training on the subject of energy saving.

EQUIPMENT REPLACEMENTS AND UPGRADES

All of the older, large centrifugal chillers have been replaced in the Central Utility Plant. The new chillers utilize only about 65% of the energy of the chillers that were replaced.

Continued and enhanced the use of ground water for chiller condenser water. This greatly increases the efficiency of the central plant chillers. It also reduces the cost of maintenance and eliminates the need for chemical treatment.

ENERGY CONSERVING DESIGN GUIDELINES

The campus design and construction guidelines have been rewritten to include significant requirements concerning energy conserving construction. One item of particular concern is the increasing number of science buildings on campus that have large numbers of fume hoods that require significant amounts of outdoor air to be conditioned and provided as make-up air. The new design guidelines require the latest technology in low flow, energy efficient hoods.

ENERGY MANAGEMENT AND CONTROL SYSTEMS

Numerous improvements and enhancements have been made to the campus energy management system to reduce energy consumption and to improve the ability of the system to track energy consumption. This enables the staff to discover system problems and to correct them in a timely manner. Energy consumption data from the energy management system has proven to be extremely useful to the University in predicting usage in real time. This has resulted in significant energy savings in the areas of steam, chill water and electrical consumption.

NEGOTIATION OF DISCOUNT WITH THE CITY ELECTRIC DEPARTMENT

Intense negotiations were held with the City of Tallahassee Electric Department concerning the cost of electricity. As a result of these negotiations, FSU was able to receive a 7% discount off the main electric rate for the campus.

UNF

Sliding scale on hot water delivery to campus based on outside air temperature. The scale is based on supplying 120 degree water at 90 degrees outside temperature and 180 degree water at 30 degrees outside temperature

Night setbacks from 76 degrees to 78 degrees starting at 11 p.m. nightly

All room and zone building automation system controls calibrated to maintain plus or minus one (1) degree temperature

Campus secondary pumps are now variable volume, pressure controlled pumps

Eighty-five (85) percent of the campus air handler units are now variable volume units

All centrifugal chillers in the campus central plant have an efficiency that exceeds .55KW/ton

The central plant boilers have a 4 to 1 turn down ratio and are staged by the building automation system to provide adequate BTU up to 16 million BTU

All electric motors that are 20hp or greater installed during the last four years have an efficiency rating greater than 90%

Waterless urinals installed in several facilities and will be the standard in new facilities

Auto flush valves installed in numerous facilities

Energy efficient florescent lights and electronic ballast installed in several facilities. A campus wide project is in the design phase to upgrade all major buildings

FIU

Load Shedding, Off-hours and weekends
Energy Management Controls with set back settings

UCF

Purchased (3) new high efficiency 2000 TON chillers.

Hired full-time commissioning agent to re-commission building HVAC systems.

Installed additional Building Automation Systems in some E&G facilities.

Installed occupancy sensors in some office spaces to control lighting.

Expanding building equipment systems scheduling to limit space conditioning during after hour periods.

Retrofitting classrooms and office spaces to new high efficiency lighting systems.

Formulating the UCF Energy and Sustainability Plan which will be implemented campus wide.