

SYRACUSE UNIVERSITY

ENERGY
CONSERVATION

1955-2009

PREVIOUS TO 1955

Previous to 1955, most of our campus buildings were steam-heated from our coal fired Steam Plant located to the west of Campus on Burt Street built in 1928, with a distribution system to campus. These buildings had few temperature controls and ventilation was accomplished by opening windows. Energy was inexpensive and there was no energy conservation.

1955-1972

In this 17-year period, over 30 major academic buildings, major residence halls, 700 apartments on South Campus, and Manley Field House were added to the campus. These buildings doubled the square footage of the campus.

Energy again during this period was very inexpensive, so these buildings were designed without any energy conservation in mind from the building envelope to mechanical-electrical systems. Most of the buildings had controls and modern ventilation systems per code, but were not centrally controlled.

There were no energy conservation programs or projects carried out previous to 1972 on any campus building.

1972-1980

The most notable aspect of the development of the Energy Conservation Program from 1972 to 1980 was the sustained commitment of the Syracuse University administration to the program. It formalized the commitment of capital funds to increase the efficiency of building operation and reduce future operating energy costs.

In 1972, the “Deferred Maintenance” program was developed and maintenance needs budget outlined through 1985. This provided an information source that was useful in selecting priorities and implementing energy conservation projects.

In 1973, in response to the OPEC oil embargo, immediate measures to reduce consumption were implemented. The traditional operation of buildings where occupancy temperatures are maintained 24 hours a day was modified by reducing temperatures during unoccupied periods. Domestic hot water temperatures and outdoor ventilation air supplies were reduced, and cooling thermostat settings were raised. Lighting levels were reduced, fixtures deactivated, and photo cell controls were installed on exterior lighting systems. Manual adjustments by Physical Plant and designated building coordinators were later replaced by automatic mechanical controls and time clocks to further reduce energy consumption and manpower costs.

In 1974, a series of goals and programs was formulated. Quick-fix conservation measures were easily identified and a data base was established. Long range goals were set as follows:

- Individual metering of building utilities
- Peak demand controls for building electrical consumption
- Campus-wide computer system for control of building systems' operation
- Building systems upgrading and modification
- Consolidation of academic programs
- Increased utilization of existing space
- Divestiture of non-efficient and peripheral facilities.

Between the years of 1974 and 1979, various programs were implemented as follows:

- Boilers and temperature reset controls were installed on all major and minor academic buildings and residence halls to provide temperature setbacks and reduce overheating. The payback period was under one year, achieving an average 15-20 percent reduction in consumption.
- Low-flow shower heads were installed in residence halls. The average payback period was two months, achieving an average 15-20 percent reduction in consumption
- Systematic lighting modification in major academic buildings reduced electrical consumption between 5 and 20 percent. All non-essential outdoor lighting was reduced.
- Heating and mechanical systems were modified and upgraded in major academic and residential buildings.
- Summer steam line shutdown capability was provided in the major dormitories by installing local electric water heaters for directors' suites and modifying main steam domestic hot water system plumbing.
- Steam Station efficiently was improved with replacement of the deteriorating heater at the Steam Station, upgrading of the Grant/Stadium steam line, and installation of the Waverly Avenue line to complete the distribution loop.
- The chilled water system steam and electrical consumption had been reduced by balancing the water flow with valves and additional controls in each building
- A Housing and Urban Development program provided a Phase One \$1.62 million loan enabling roof replacements, domestic hot water heat recovery and other mechanical revisions, lighting conversions, and window replacements to be carried out in ten major dormitories. A Phase Two loan of \$1.47 million enabled the remaining major dormitories, Slocum Heights and the Skytop Halls to be included.
- Supplemental heating was installed in nine major academic buildings to offset system deficiencies.
- Attic insulation was installed in the Administration Building, Blackwell and Comstock Cottages, and the Faculty Center.
- An energy management system was installed at the Bird Library substation. The payback period was approximately 18 months and resulted in a 25 percent reduction in consumption representing 3 million kilowatt-hours annually.

- Mandatory temperature restrictions were imposed by the Federal Government on all non-residential buildings from August 1979 to April 1980. This required readjustment of temperature controls in University buildings.

A Public Awareness Program was established in 1974 to emphasize the University conservation goals and inform the public. It included the following:

- Competitions involving widespread participation of the University Community produced posters, calendar, and bookbag designs and the “conservenergy” logo, all of which were subsequently adopted and utilized. Other competitions included the “Energy Game” and a “Candlelight Week”.
- An Energy Conservation Award was presented to Syracuse University by Niagara Mohawk Corporation.
- Several Syracuse University energy projects were published by NACUBO in their 1979 annual report. A cost incentive award of @2,500 was received in recognition of the creativity and cost effectiveness of the domestic hot water heat recovery projects.
- A MEMO pad, summarizing University programs, was designed and circulated nationally.

The energy data base was expanded in incorporates all major buildings through the installation of electrical submeters. Computer programs to automate the data base were initiated in 1978.

Feasibility studies and investigations were begun in 1974 to assist in developing information for areas of potential conservation and include the following:

- A trash-fueled Steam Station study was conducted by Syracuse University, Onondaga County and Carrier Corporation.
- An aerial infra-red photography survey was made to determine the heat loss from the underground steam distribution system and buildings on Main Campus.
- A reduced voltage investigation determined it was not feasible under present conditions to reduce the voltage at substations and/or buildings in order to reduce consumption.
- A campus wide computer building control system feasibility study resulted in the installation of the energy management system in Bird Library, Newhouse II and the Health Center.
- In-house evaluations were carried out on all previously implemented projects confirming the effectiveness of the programs.

In 1979, the Hall of Languages was renovated and incorporated many energy conservation features and techniques.

The following projects were completed in the early 1980s:

- Smith Hall exterior maintenance for improved energy efficiency.
- Completion of the temperature control project in major academic buildings.

- Carnegie supplemental radiation installation in under-heated areas to balance building systems.
- Skytop Office Building heat recovery project using the rejected heat from the Computer Room air conditioning system to heat domestic hot water.
- Peck Hall architectural modifications to reduce heat loss and infiltration programs.

In November 1979, Syracuse University applied to the Department of Energy for Energy Conservation Matching Grants for six buildings. A grant of \$300,000 was awarded for a Steam Station project to install more efficient burners and a computerized combustion control system, and a grant of \$92,000 was awarded for conversion of the Bird Library air handling system.

1980-1990

The Energy Conservation Program's accomplishments during the past decade have been possible through sustained support by the Administration. A dramatic illustration is where the capital investment of \$370,000 for the major dormitories was projected to result in a \$27.5 million cumulative cost avoidance over the next 20 years, based on a 10 percent increased energy cost. A significant portion of that cost avoidance has been due to the initial quick-fix projects which reduced consumption by 20-25 percent. Projects such as HUD I and II requiring a capital investment of \$3.09 million were projected to result in a \$14.4 million cumulative cost avoidance over the next 20 years.

The direction for the eighties continued to focus on energy conservation programs. This included the upgrading and modification of buildings, systems and utilities, the expansion of computerized management systems, development of public awareness, programs and exploration of new opportunities for conservation, particularly as they are affected by changes in economic, political and regulatory conditions.

During the eighties, Syracuse University applied for and received many grant awards from the state energy office for sixteen cycles of funding. These awards enabled us to carry out millions of dollars in energy projects during this decade. These fund cycles and the state energy office began to decline in the early 1990s.

In 1982, a central computer system was installed to control the 764 South Campus apartments, which are electric-heated and high energy cost. This energy system was expanded to the Main Campus buildings and residence halls during the eighties and early nineties.

1990-2009

From 1972 to 1992, most of the energy incentives, applying and carrying out projects were done by the staff of ODC project managers and Engineering. At some point in this period, there was a person designated for energy, but not full time.

In 1992, with the arrival of Chancellor Shaw, the University went through restructuring. An audit of campus indicated that there was a need to have a full time person and department for enacting an Energy Conservation Program.

Tim Sweet was hired in 1992 as Energy Manager with ODC. Tim was instrumental in the following:

- Continuing energy programs already in place.
- Established a benchmark data base for all energy consumption on campus.
- Monitor all energy use on campus.
- Evaluate new energy systems and technology.
- Apply for new energy grants whenever possible- state, federal or local.
- Increased community awareness programs for energy.
- Expand energy management systems to include all campus buildings.
- Establish energy policies which are sensitive to the functional needs of the University.

During the last 17 years, many energy projects were funded and completed to reduce campus energy uses.

- Utility company rebates funded many lighting projects to eliminate inefficient lighting systems.
- Utility rebates were also used in almost all new building construction to assist with offsetting the costs.
- Expansion of the campus energy management system that now controls most of our campus buildings and any new systems and buildings.
- Grants funded most of expansion of the University's Chilled Water Plant that cools two million square feet of campus buildings.
- Bird Library, our largest academic building on Campus was converted from costly electric heat to steam sourced heat.
- In the Fall of 2008 the campus-wide temperature policy was modified to reduce our carbon footprint and in turn helped conserve energy. The new settings are 68 deg F for heating and 76 deg F for cooling.
- All new buildings being constructed and renovation projects over ten million dollars must all be USGBC LEED certified. This ensures that conservation measures are built in.

Long term concerns for the University energy is the unstable fuel cost and availability. This is being monitored daily by the SU energy office.

The Co-Gen plant that supplies SU, four hospitals and the Forestry College with steam has been in operation for the past 17 years has saved millions of dollars. Since the deregulation of fixed kw/price with the utility companies, the stability of this Co-Gen is questionable. This issue is being reviewed closely.