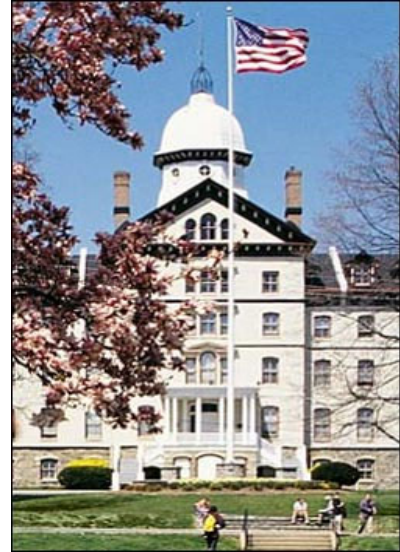


PROJECT SUMMARY

WIDENER UNIVERSITY ENERGY AUDIT

PROJECT SUMMARY

Bridgestone Associates performed an energy study and audit of approximately 50 buildings built from 1870 to very recently on this urban university campus of Widener University in Chester, Pennsylvania. Work was performed for Cinergy Solutions, an Energy Services Company interested in investing in a shared savings program with the University. Work included auditing of all the main buildings and facilities on the campus; modeling of existing utility bills; analysis of time-of-day and 15-minute interval electric data; review and evaluation of lighting systems; review and evaluation of HVAC and domestic hot water systems; review and evaluation of the Energy Management Systems; review and evaluation of water, sewer and other utilities; and review and evaluation of all building envelopes and structures. Because the University has taken over many local old houses, churches and other structures which will eventually be demolished as newer buildings are constructed, the energy audit focused primarily on the core campus buildings.



PROJECT STATISTICS

Client:	Widener University and Cinergy Solutions
Project Type:	Detailed Energy Audit
Size:	48 buildings totaling over 750,000 sq ft on main campus.
Facility Type:	University campus in urban setting
Facility Location:	Chester, Pennsylvania, USA
Plant Elevation:	< 50 feet above sea level
Electricity Utility:	PECO
Gas Utility:	PECO
Water & Sewer Utility:	DELCORA
Energy Use:	Main Buildings only: 13,430 MWh/yr; 2.8 MW Summer; 1.8 MW Winter; 34,000 MCF/yr
Energy Cost:	Main Buildings only: US\$1.9 million (approx)
Projected Savings:	US\$352,000 (main campus buildings only)
Projected Capital Investment:	US\$3.0 million

PROJECT DESCRIPTION

The energy audit was conducted for Cinergy Solutions, an energy services company considering investing in an energy savings project at Widener University.

The Widener Chester campus is located in an urban area on the edge of Chester, Pennsylvania. It consists of a main core of buildings in a contiguous campus setting with multiple smaller buildings in the surrounding streets. The University has grown from its early days as the Pennsylvania Military Academy (PMA), a small military college, to a thriving multi-disciplined university with over 6,000 students. The campus is a continually expanding facility, growing out of the core group of buildings which made up the PMA. The University has purchased many homes and other structures in the area, and converted them into offices and other support facilities with the intention to replace these with new construction during campus expansion at some future date.



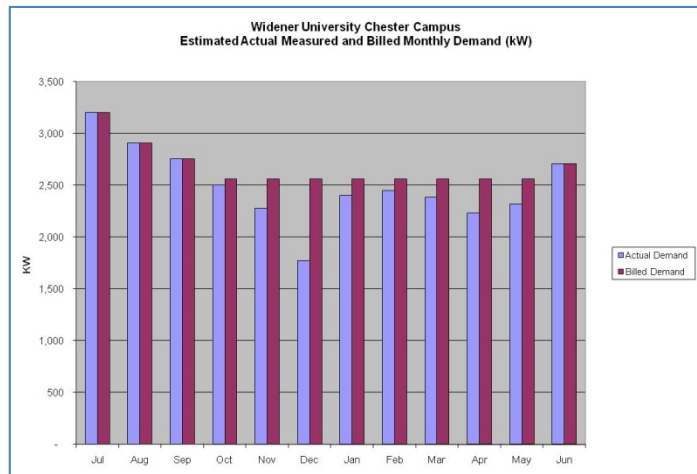
Because of the way the University campus has evolved and grown, there were two Energy Management Systems (EMS) installed and in use: (a) American Automatrix (AAM), and (b) Alerton. These EMS systems do not use optimal stop/start but control on fixed times. The setup/setback feature is used with a typical 10 °F +/- variation that usually avoids equipment coming back on at night, but does protect against deep pullup/pulldown draws. Some buildings, most notably the dormitories, are not controlled by either EMS. The maintenance personnel have had little training on operation of the EMS equipment.

There is no back-up fuel for any of the heating systems so all gas purchases must be made on a firm, non-interruptible basis. Because of this delivered natural gas costs are very high. If a back-up fuel were available, interruptible gas could be used, significantly lowering delivery and overall costs.



The electric service was purchased under PECO's HT tariff. This tariff provides low incremental cost for additional kilowatthours but high demand charges, with an 80% demand ratchet. As a result, any demand control measures offered significant potential savings.

The University had installed capacitor banks to improve overall power factor. Based on an analysis of the electric bills, the capacitor banks were working as the overall power factor was >97%.



The University had installed a number of Allen Bradley variable speed drives (VSD's). These were scattered throughout the campus and appeared to have been installed without any overall plan related to energy efficiency.

Members of the University maintenance crew had retrofitted motion sensors with switches on lighting in many areas including classrooms. All new buildings included lighting motion sensors.

Lighting in many areas of the University had been retrofitted with T-8 lamps. However, all mechanical rooms in every one of the older buildings still had T-12 lighting. As the lighting was left on 24/7 in most of these mechanical rooms, retrofitting with more efficient lamps would provide energy and demand savings.

All buildings had their boilers and auxiliaries operating 24/7 throughout the winter in case there was a need. Turn-down issues on many of the boilers resulted in considerable excess heating during periods when buildings were unoccupied.

There was no list of installed equipment on a building-by-building basis and no organized and documented preventative maintenance program. Buildings were divided up between maintenance personnel and they take care of the equipment in their allocated building, but with no overall preventative maintenance plan.



Bridgestone Associates developed a matrix of opportunities (see below) which included a list of over 168 recommended Energy Conservation Measures (ECM's) for immediate implementation on the main campus buildings and 66 ECM's that were recommended for future evaluation. In general the opportunities for energy efficiency improvement and utilities cost reduction included the following main areas:

- Upgrade and expansion of the EMS
- Upgrade and re-retrofit some lighting

