University of Virginia's Award-winning Energy-efficiency Program

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Editor's Note: Last year, University of Virginia's Energy Program won high honors, as a *magna cum laude* Honor Society member, awarded by the US Environmental Protection Agency (EPA). This was the fourth major award the UVA Energy Program has earned for achieving energy efficient goals. In March 1998, UVA was the only university awarded 1998 Energy Star Buildings and Green Lights Partner/ Ally of the Year. In late 1997, EPA selected UVA for the Green Lights Honor Society, and in 1996, EPA awarded UVA a bronze medal for achievement in energy efficiency.

Besides the EPA honors, UVA's work was also cited when the Association of Energy Engineers named Cheryl Gomez, utilities director for UVA's Facilities Management, 1997 Energy Manager of the Year.

UVA's award-winning energy program has included lighting retrofits and upgrades... chilled water connections... occupancy sensors... LED exit signs... insulated heating pipes.

An **annual** savings of more than $415,000 was made from the work accomplished in 1997-98 alone. Lighting retrofits and upgrades in 10 buildings accounted for $110,000 of the savings. Since becoming a Green Lights partner, UVA has upgraded lighting in 58 buildings—that's 38 percent of space or more than three million square feet. A new chilled water line connection between the Chemistry Building and UVA's chiller plant in 1998 saved $263,500. The installation of occupancy sensors saved $7200 and LED exit signs saved $12,200.

And underground in the steam tunnels, deteriorated insulation on heating pipes was replaced—besides the $22,000 energy savings, the temperatures are safer and more comfortable for utilities workers who do maintenance there.

This "by-building" chart summarizes the locations and the savings from lighting upgrades for 1997.

LOCATION	ESTIMATED ANNUAL SAVINGS
Campbell Hall	$12,511
Monroe Hall	$11,166
New Cabell Hall	$15,549
Fayerweather Hall	$ 5,436
Thornton Hall	$27,659
Brooks Hall	$ 1,056
University Hospital Corridors	$23,223
Physics Building	$12,717
Levering Hall	$ 752
1939 Ivy	$80
TOTAL	**$110,149**

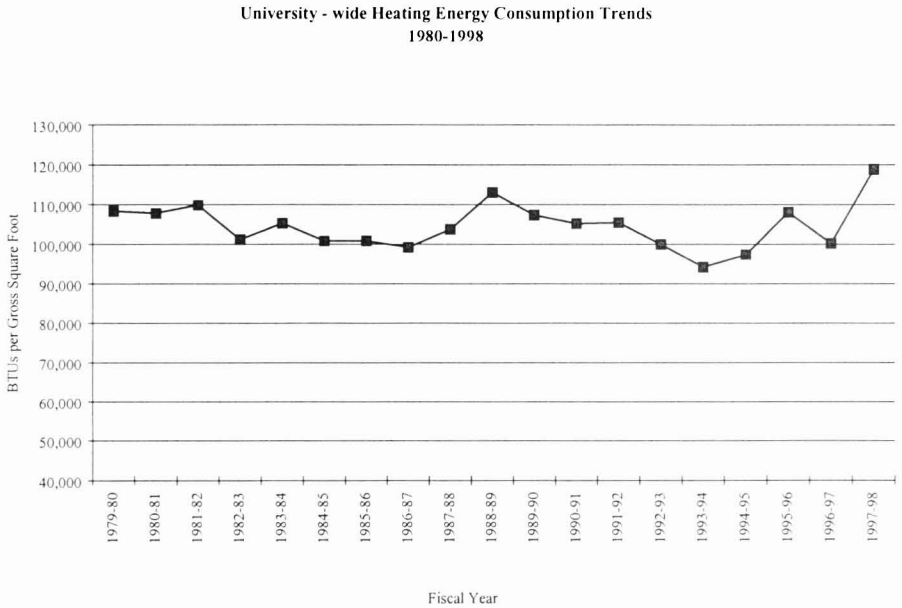
Calculated annual energy savings expected from the accomplishment of all energy conservation work in 1997-98 are summarized as follows:

PROJECT	ESTIMATED ANNUAL SAVINGS
Lighting Upgrades	$110,149
Chemistry Connection to Chiller Plant	$263,500
Occupancy Sensors	$7,200
LED Exit Signs	$12,200
Heating Pipe Insulation	$22,000
TOTAL	**$415,049**

UVA's work also has environmental benefits: In 1996, lighting upgrades at UVA prevented the emission of 3,625,408 lbs. CO^2; 18,580.250 g SO_2 and 5,891,294 g. NO_x, according to Angela Coyle, Green Lights Manager for EPA, as well as stashing away annual savings of 2,481,417 kWh.

The work plans were chosen to expedite the Energy Program's concise goals, two of which are illustrated here:

Table 1. Reduce or achieve a zero growth rate in the annual Heating Energy Use on a per unit area basis.



Fuel used for heating energy on a per unit basis appeared to increase by 18.57 percent compared with fiscal year 1996-97. However, this year for the first time ever, billing responsibility for all heating energy consumption at the University was delegated to the Utilities Department. If the data for 1997-98 is normalized for the increase associated only with the improved data capture, an analysis of the heating energy use over a nineteen year period indicates that the average heating energy use has generally declined or remained near zero since 1979. As such, it is important to note that central plants continue to be the most energy efficient means for delivering heating energy to facilities.

The last point is significant. Normalizing data for the last fiscal year and comparing heating energy consumption on a unit basis for the first five-year period of 1979-1984 to the most recent five years,

the data indicate that the University has reduced its heating energy consumption by an average of over 6,500 Btu/GSF. If the University had not accomplished energy conservation work or aggressively replaced building boilers with connections to central plants, its heating energy consumption would have increased rather than decreased over the last 15 years due to the higher quantities of outside air currently required by the BOCA Mechanical Code and the energy intensive research facilities and Hospital that have been constructed. Calculating savings from the 6,500 Btu/GSF heating energy reduction alone results in savings of over $440,000 for last year. These calculated savings understate the actual savings by a third to a half in that they don't take into account that new code requirements and the construction of energy intensive facilities would actually have increased the overall heating energy consumption if the University hadn't implemented any of its energy conservation initiatives.

Electricity usage increased by 4.08 percent on a square foot basis compared with fiscal year 1996-97 despite the number of cooling degree-days being 28% higher. Factors which contributed to keeping the electrical consumption stable despite the significant increase in cooling degree days included the milder winter and ongoing energy conservation work such as lighting upgrades, building- automation/energy management systems improvements, and replacement of building chillers with connections to central plants.

Trending of electricity consumption on a per unit basis in the last eight years indicates that electricity consumption has remained fairly flat with the exception of the peak of 1995-96. If the University had continued to increase its electrical consumption during the 1990's at the same average rate of increase as the 1980's (which was almost 5% per year), the University's electrical bill this past year would have been $4.2 million dollars more than it actually was. The success in achieving a zero increase in electricity usage on a unit basis is due to the energy conservation work that has been accomplished.

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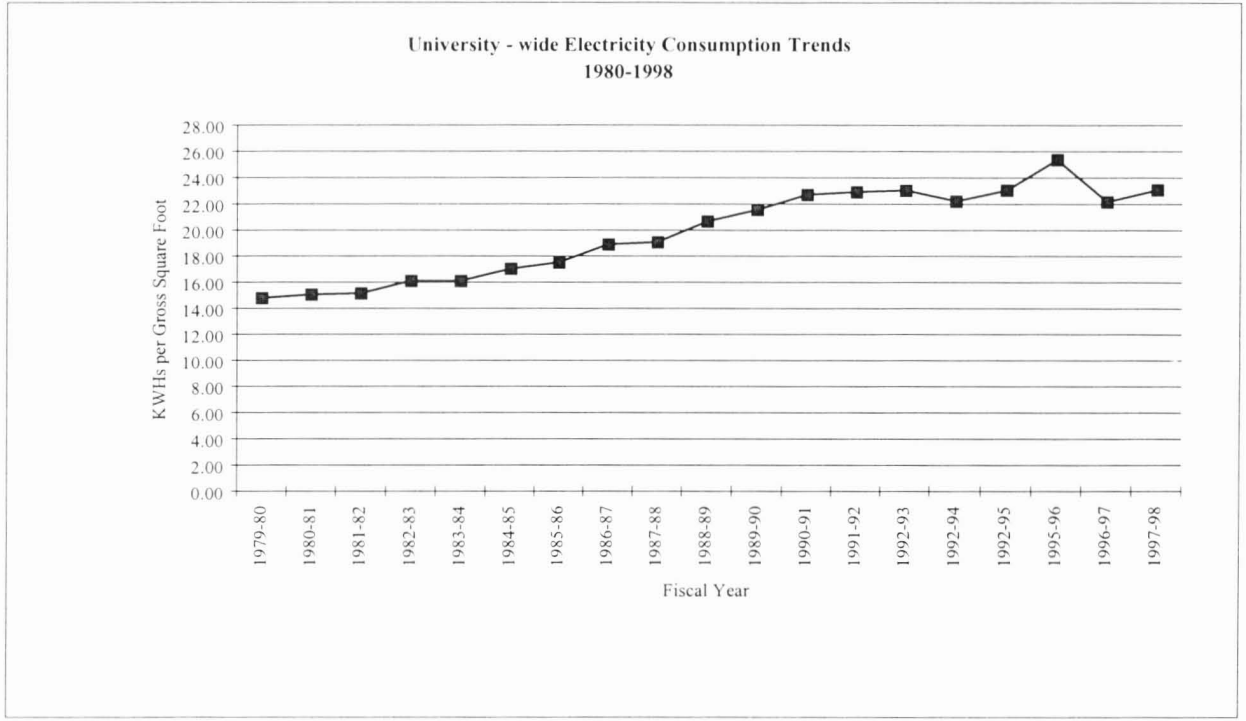

Table 2. Achieve a zero growth rate in Electric Energy Use on a per unit area basis.