

**Oakland University**  
**Annual Energy Report**  
**Fiscal Year 2004**

Submitted, September 2004  
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## **EXECUTIVE SUMMARY**

The downward trend in utility costs experienced by Oakland University in the past few years ended in FY04 with a modest 5% increase. And, the projected increase for FY05 is anticipated to be over 17%. The increase stems from elevated natural gas prices, the end of our electricity Retail Open Access supply contract with Quest Energy, and a 7% increase in our current Detroit Edison (Edison) electric rate. The net result is projected to be an additional \$600,000 for FY05.

Utility expenditures for FY04 rose by 5.2% as compared to the previous fiscal year. This comes in spite of a 6% drop in natural gas usage and a 9% drop in water usage as well as rather mild weather.

The utility metering system has been providing valuable data to assist in identifying inefficiencies, areas requiring attention, and operational challenges. Several examples are presented along with a ranking of individual building costs per square foot.

Future energy management activities will include a request to the Board for continuation of the electric Retail Open Access program and a Board of Trustees request to approve a second energy cost-saving performance contract similar to the Viron project of 1998.

## UTILITY RATE INCREASES PUSH UP FISCAL YEAR 2004 COSTS

The downward trend in utility costs experienced by Oakland University in the past few years ended in FY04 with a modest 5% increase. And, the projected increase for FY05 is anticipated to be over 17%. The increase stems from elevated natural gas prices, the end of our electricity Retail Open Access supply contract with Quest Energy, and a 7% increase in our current Detroit Edison electric rate. A small projected increase in usage will be a much smaller influence than the coming utility rate increases. See Figure A2 in the Appendix which illustrates the natural gas consumption normalized for campus square footage and weather. This figure demonstrates a steady level of gas usage.

Utility expenditures for FY04 rose by 5.2% from the previous fiscal year. This comes in spite of a 6% drop in natural gas usage and a 9% drop in water usage, as well as rather mild weather. Table 2 below illustrates the mild winter and summer weather that we experienced in FY04. Heating and cooling degree days are a measure of the deviation from a mild 65 degree Fahrenheit outdoor air temperature which affects heating and air conditioning costs. Next, Table 3 tallies the unit cost increases for electric, gas, and water that were the driving force behind the overall 5% cost increase.

Lastly, Table 4 depicts the above mentioned FY05 projections.

**Table 1 Utility usage & cost with comparisons to previous year**

	<b>FY04 Usage</b>	<b>Units</b>	<b>% Change from FY03</b>	<b>FY04 Cost (Millions)</b>	<b>% Change from FY03</b>
<b>Electricity</b>	33,746,720	kW hours	-0.47%	\$ 1.802	+7.3%
<b>Natural Gas</b>	269,151	MMBTU	-6.29%	\$ 1.613	+3.9%
<b>Water &amp; Sewer</b>	9,403,000	Cubic Feet	-9.40%	\$ 0.315	+0.6%
<b>TOTALS</b>				<b>\$ 3.730</b>	<b>+5.2%</b>

*MMBTU = one million British thermal units (approximately = 1 MCF = thousand cubic feet)*

*Note: This data is for the main campus only, the general funded east campus utilities are less than 1% of the main campus totals.*

**Table 2 Heating and cooling degree days with comparisons to previous year**

	Average	FY03	FY04	% Change
Heating Degree Days	6,444	7,063	6,412	-9.2%
Cooling Degree Days	438	785	633	-19.4%

*Heating Degree Days are calculated from the average daily temperature and the difference from a 65 deg F reference point. This gives a measure of how much heating and cooling effort is required to maintain a typical building's indoor air comfort level.*

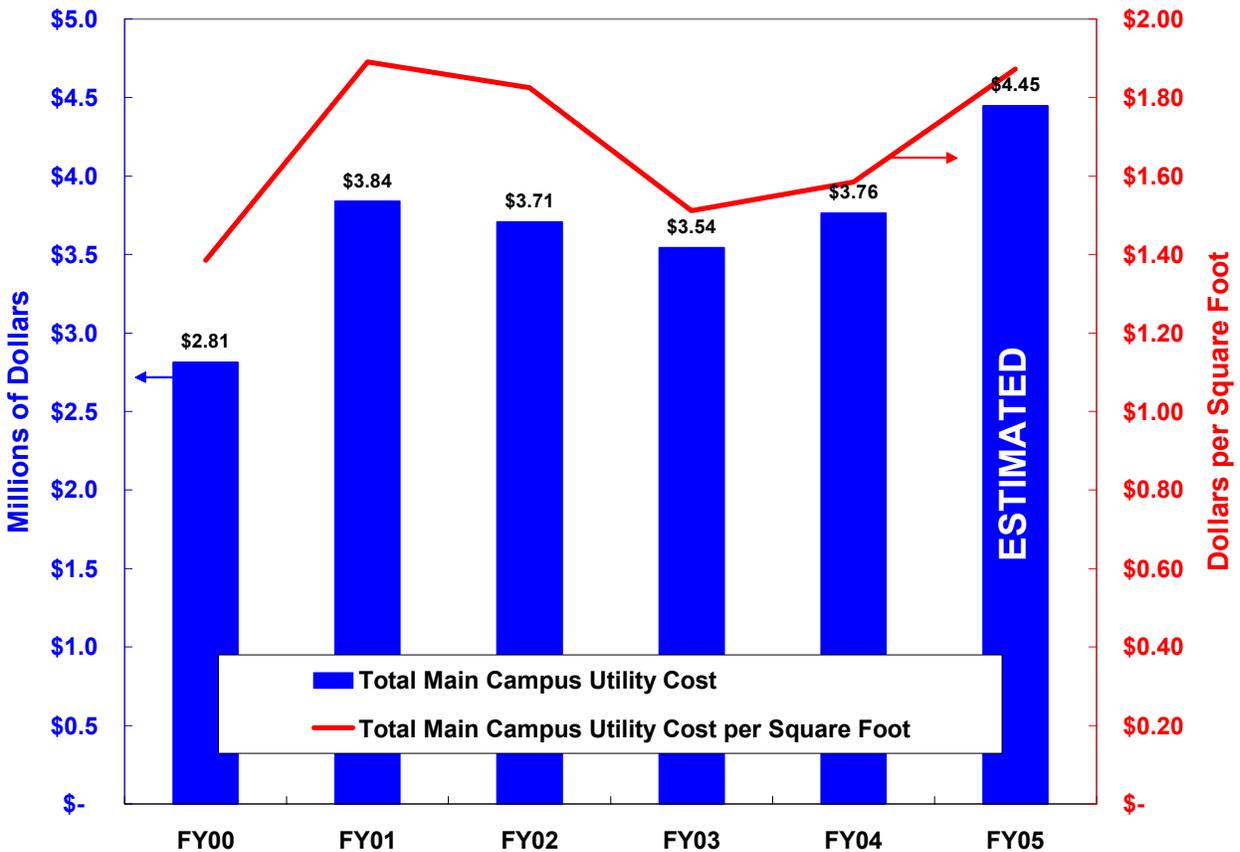
**Table 3 Average unit cost per utility comparisons to previous year**

	FY04 Unit Cost	Units	% Change from FY03
Electricity	\$ 0.0535	per kW hour	+8.3%
Natural Gas	\$ 5.9913	per MMBTU	+10.9%
Water & Sewer	\$ 0.0335	per Cubic Feet	+8.4%

**Table 4 PROJECTED FY05 utility usage & cost with comparisons to FY04**

	FY05 Projected Usage	Units	% Change from FY04	FY05 Projected Cost (Millions)	% Change from FY04
Electricity	35,022,252	kW hours	+3.78%	\$ 2.33	+29.3%
Natural Gas	288,266	MMBTU	+7.10%	\$ 1.71	+6.3%
Water & Sewer	10,166,752	Cubic Feet	+8.12%	\$ 0.34	+8.0%
<b>TOTALS</b>				<b>\$ 4.38</b>	<b>+17.5%</b>

*Note: This data is for the main campus only, the general funded east campus utilities are less than 1% of the main campus totals.*



**Figure 1 Five year combined west campus utility expenditures with cost per square foot of facility space**

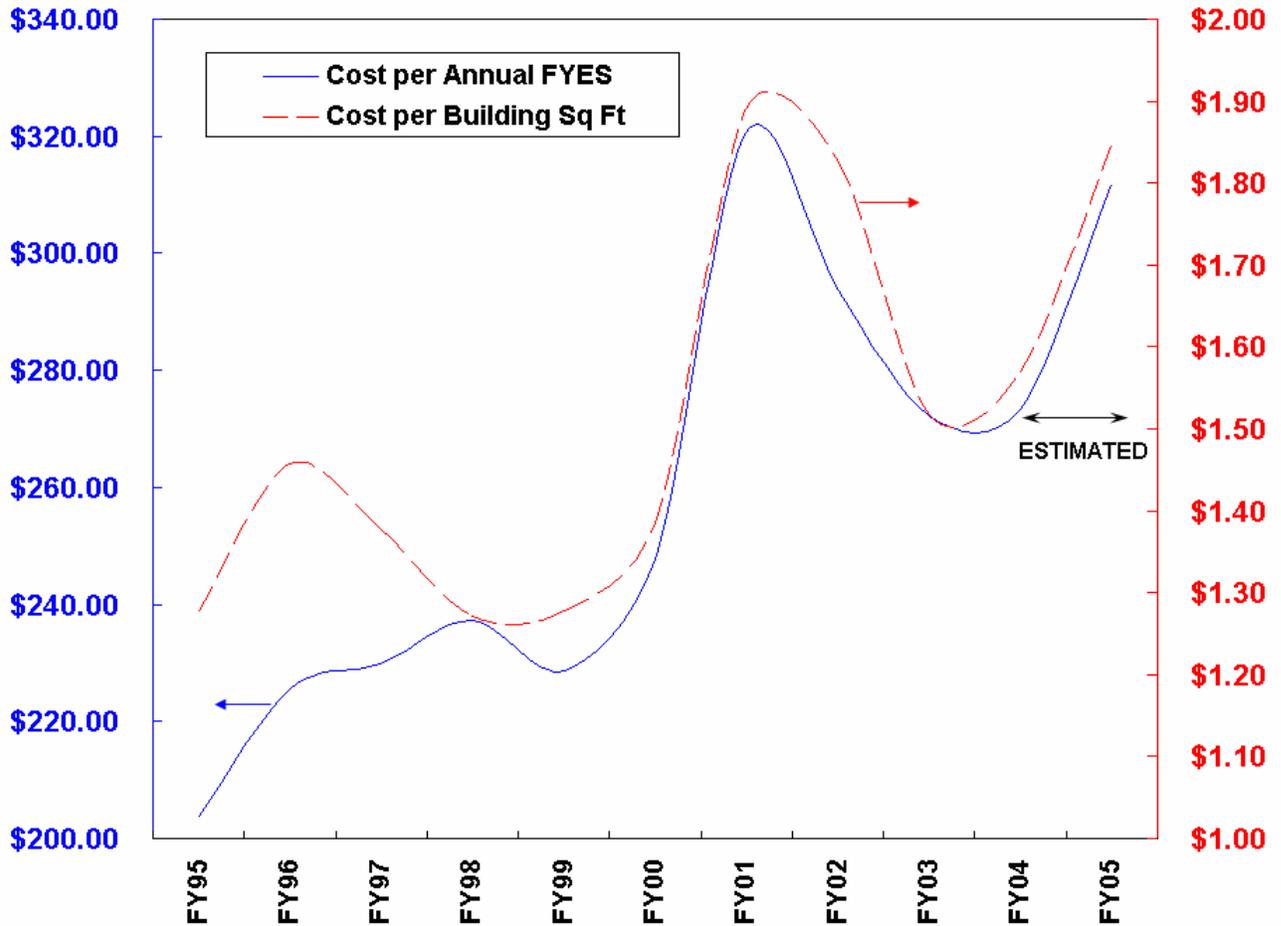
The above chart illustrates the small increase in utility cost from FY03 to FY04 as well as the projected increase for FY05. This reverses the modest decreasing trend over the previous years. Once again, utility RATE increases, particularly the end of the electric “Retail Open Access” contract and return to the regulated Detroit Edison tariff, are driving the FY05 costs upward.

Due to the Electric Choice program and favorable gas prices, OU managed to reduce costs from FY01 through FY02 and FY03 in the face of a growing campus. Recall that five facilities have been constructed since FY2000, expanding the campus by over a half a million square feet, or over 25%. These five facilities were Elliot Hall (2000), Pawley Hall (2002), University Student Apartments (2002), the parking structure (2002), and the Oakland Center expansion (2003).

FY05 costs are projected to increase by over \$600,000 due to the loss of Electric Choice and continued pressure from the natural gas market. The energy management goal for FY05 and beyond will be to aggressively pursue lower cost natural gas and electricity, and also to pursue initiatives for reduced consumption and better efficiency. The potential to return to the open market Electric Choice program will be monitored

closely. However, even upon a return to the program, the University will not see the same magnitude of savings as realized in FY03 and FY04.

Figure 2 depicts the reversal of the downward trend from the FY01 peak in cost per student and square footage. Pressure from increased utility rates has been forcing the trend back upwards.



**Figure 2 Total utility cost for the main campus per Full Year Equivalent Student (FYES) and per building square foot.**

### INDIVIDUAL BUILDING ENERGY COST FROM UTILITY SUBMETERING

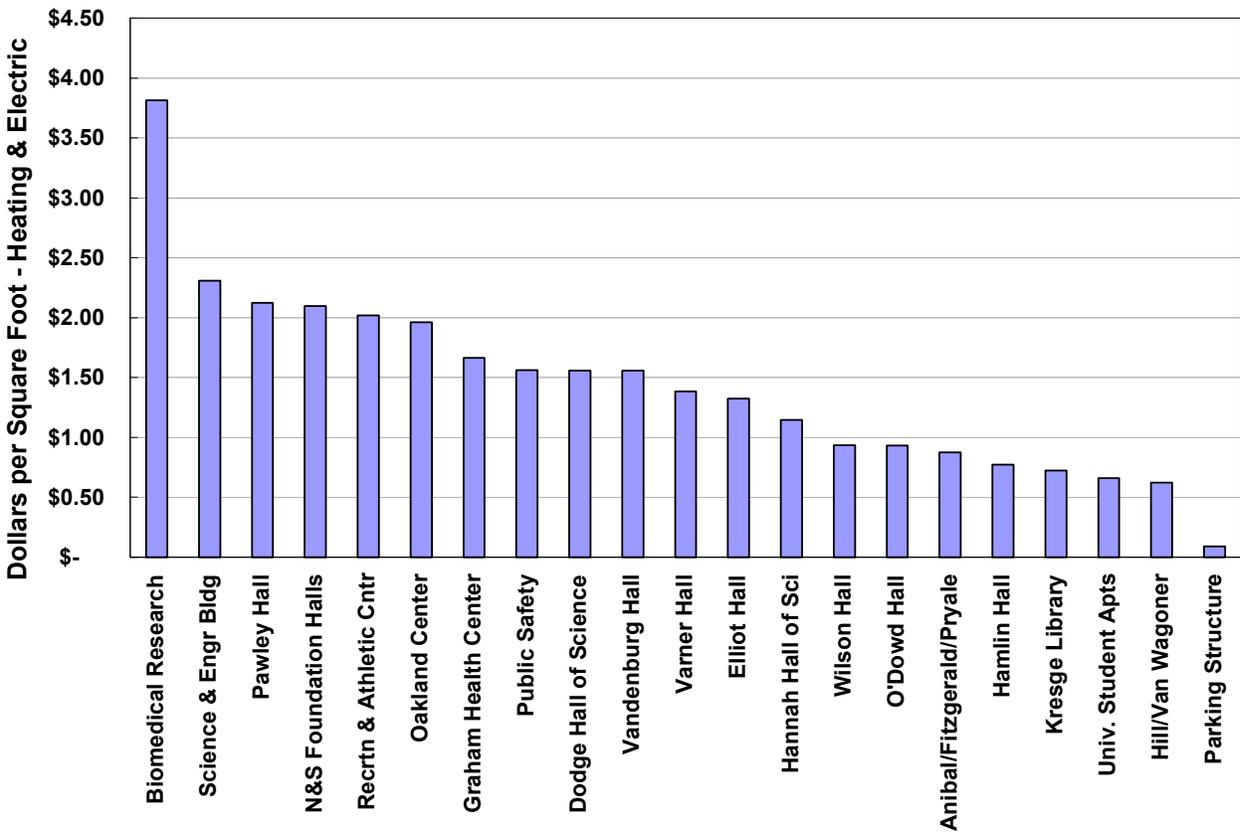
The new utility metering and monitoring system allows us to view each building’s heating and electrical usage individually. The auxiliary department’s facilities are also metered for natural gas and domestic water. Although we are still learning how to use the system to its full extent, we are confident that the system is facilitating energy cost savings via a number of different areas. Below are a few examples.

Figure 4 illustrates the cost per building of the combined electric and heating costs per square foot. At a glance you can immediately notice the energy intensive nature of the laboratory buildings that operate around the clock. The Biomedical Research & Support

Facility is ventilated by 100% outdoor air with a resulting energy penalty. The Science and Engineering Building also operates continuously and also has a large number of fume hoods and laboratory equipment.

The metering system identified the newly constructed Pawley Hall as an unusually high utility consumer. Due to the large amount of ventilation air designed into the building, some new building “de-bugging”, and some operational issues, this building seems to be using an unwarranted amount of energy. We are looking at several issues to remedy the situation. As in many other examples, here is a moderate potential for savings. The FY04 annual heating and electric cost for Pawley Hall was \$2.12 per square foot compared to a main campus average of \$1.50 per square foot. If and when we are able to reduce the Pawley Hall usage to the campus average, this 130,000 square foot building could be operated for about \$80,000 per year less than we are presently expending.

Not shown is the “real time”, and detailed, minute by minute energy monitoring capability which has allowed Facilities Management to view daily patterns for aberrations caused by faulty equipment or improper operation. An example of the use of this tool was found in the Recreation and Athletic Center. The RAC has been documented to have an unusually high electrical peak. We are looking at the building’s chiller plant equipment and its operation to address this issue. In addition, this building is being used for a test audit for the bid process in the new energy services project.



**Figure 4** Energy cost per square foot for each main campus building. Includes electrical and heating costs individually metered per building ranked from highest to lowest.

Note: Anibal, Pryale, & Fitzgerald Houses' heating usage are not metered. The average cost per square foot of the other dormitory buildings was used.

## HISTORICAL USAGE & COSTS

For further illustration of the campus growth and weather correlations in comparison to utility consumption refer to Appendix 1.

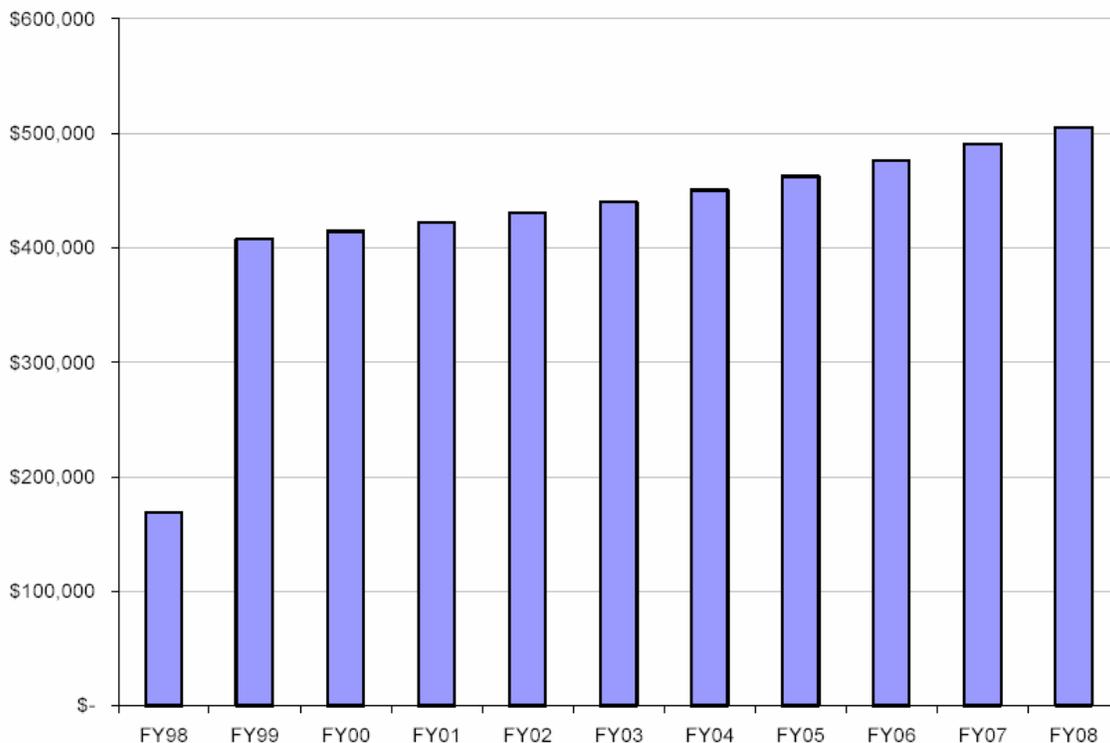
Figure A1 shows natural gas consumption in conjunction with a winter weather index called heating degree days. Heating degree days describe how many days that the outdoor temperature diverges from a 65 degree Fahrenheit reference point. The higher the number, the colder the heating season. The number used for this winter, FY04, was taken as the historical average of just under 6,500 heating degree days for Metro Detroit.

Figure A2 shows the same natural gas consumption on a per square foot and per heating degree day basis. The campus improved efficiency from FY02 to FY03 and maintained rather stable for FY04. FY05 is projected to remain at present levels. Figures A3, A4, and A5 illustrate the monthly utility usage and resulting trends over the past decade.

## PREVIOUS AND FUTURE ENERGY SERVICES AGREEMENTS (ESA)

Figure 3 below illustrates the original contract estimates for cost savings. These savings were verified and documented from FY98 through FY01 and are even more valuable than depicted here due to today's significantly higher utility rates. This figure is merely included as a reminder of the avoided energy costs that the University would otherwise have incurred if the ESA had not been undertaken.

There is the potential at Oakland University to produce a second performance-based energy contract with similar cost savings. Although many of the simple items have already been undertaken, technology continues to improve. With the aid of the new campus utility metering system, a list of 30-40 economically viable projects has been compiled for further study. This may be an attractive option to address the increasing utility costs beyond FY04. Like the original ESA, several million dollars in capital renewal needs could be addressed within such a contract using long-term financing. Approval was given to begin the process of selecting a new energy service company and conducting a campus-wide energy audit for a potential second-phase ESA.



**Figure 3** Originally estimated avoided costs from Viron ESA throughout the ten year term of the agreement  
(source: Viron ESA, Schedule F, March 10, 1997, verified by Viron annual reports through FY01)

## **ELECTRICAL PURCHASING UPDATE – RETAIL OPEN ACCESS**

The University's twenty-four month contract with the alternative electric supplier, Quest Energy LLC, took effect in August 2002 and ended July 2004.

Oakland University saved approximately \$500,000 in FY03 and \$380,000 in FY04 as compared to the previous Detroit Edison D6 rate. Uncertainties in the regulatory environment and an unfavorable electrical market forced Oakland University to return to full service from Detroit Edison as of July 2004. Two rounds of bidding took place this spring to attempt a continuation of Retail Open Access, but pricing was above the Detroit Edison D6 rate cost. The Detroit Edison D6 rate was also increased by over 7.9% this past year as well.

Facilities Management will continue to monitor the regulatory environment as well as the power supply markets and determine if a new bidding cycle is warranted. After 12 months of Detroit Edison full service, Oakland University will be able to move back onto Retail Open Access without penalty. However, future savings for the next contract are expected to be less than the previous savings based on the current market conditions and a 7.9% increase in the Detroit Edison D6 rate.

A Board of Trustees action item will be proposed in the coming months to seek approval for a continuing program to purchase electricity on the retail open market. This type of program would mirror the Oakland University natural gas purchasing program in effect since mid-1980.

Lastly, six new bills were introduced into the Michigan Senate which would have some impact on the Retail Open Access program. These and other issues at the Michigan Public Service Commission are being monitored closely.

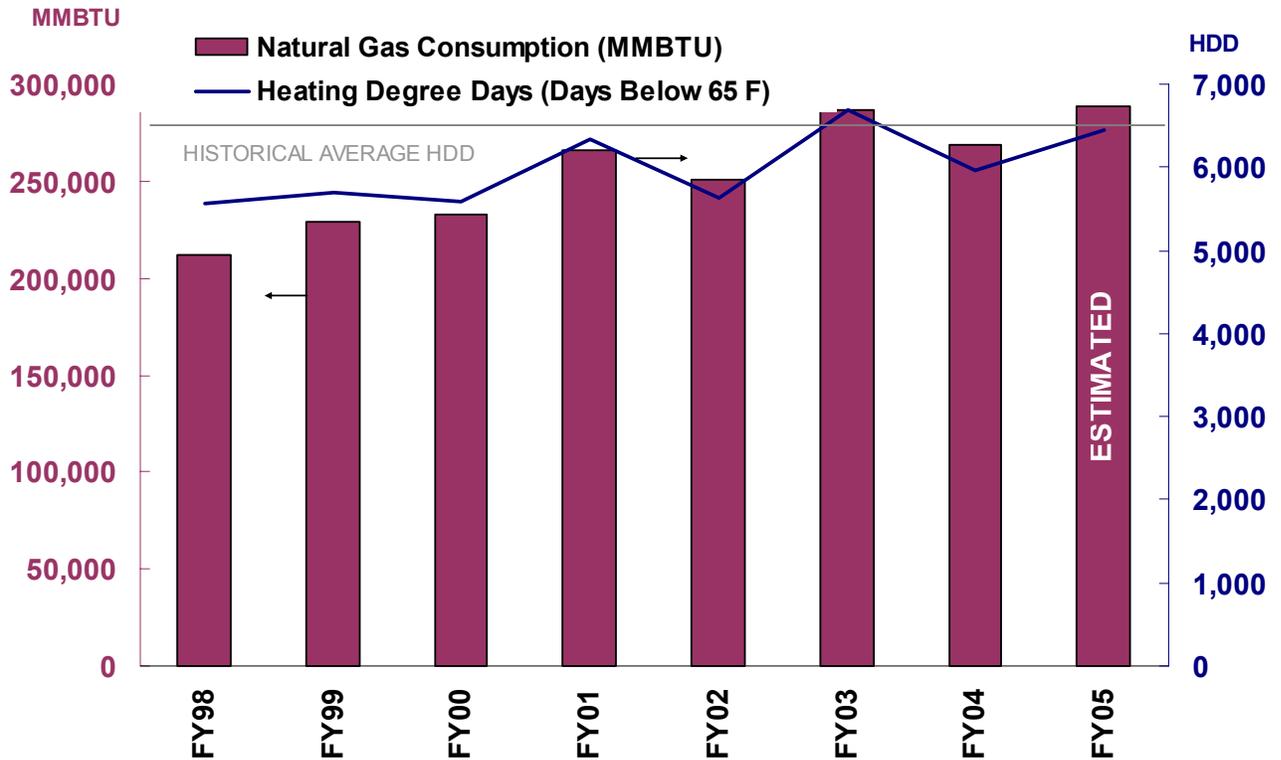
## **NATURAL GAS PURCHASING UPDATE**

Natural gas prices continue to be volatile. Petroleum price increases and over-active, speculative trading has managed to keep natural gas prices at high levels. There are no signs of an easing of the natural gas markets in the near future.

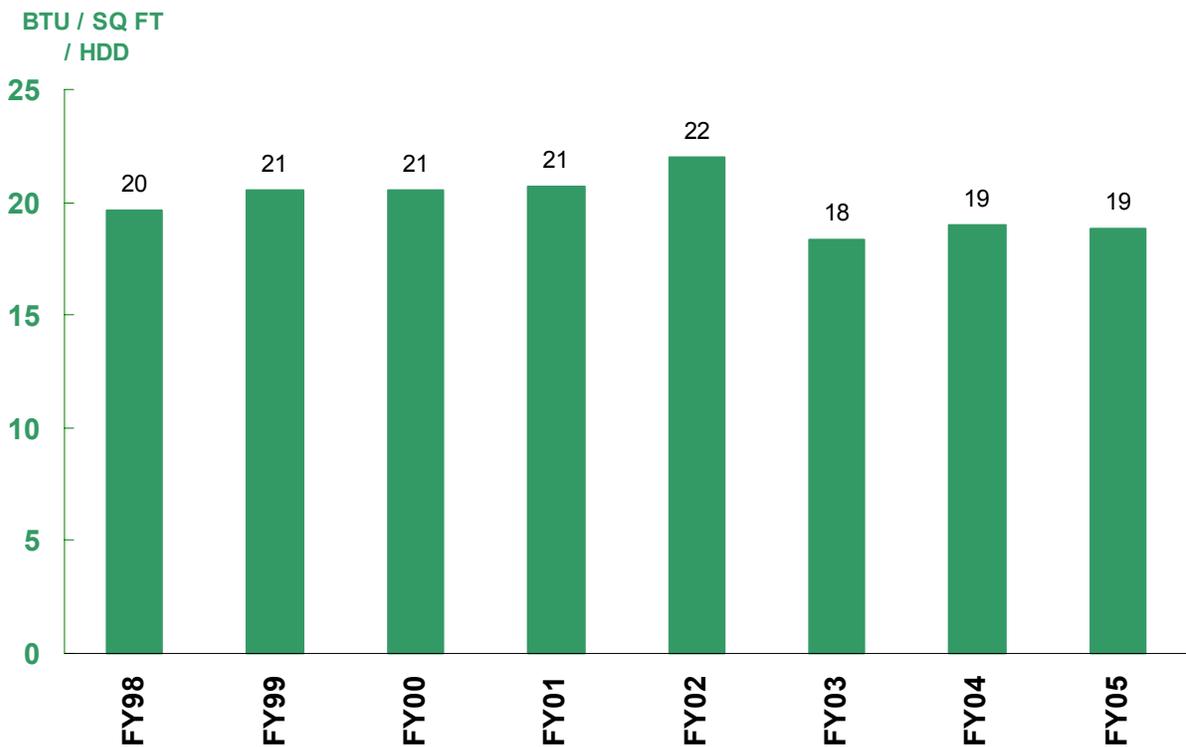
Currently, the University maintains long-term gas purchase contracts to dampen market volatility. Firm contracts for 100% of our required heating gas are in place through FY05, and approximately 50% is contracted through FY06. Therefore, barring extraordinary weather, our heating budget is fixed through FY05.

Market conditions are continually monitored, and prudent purchases will be made to contract for our natural gas needs for FY06 and beyond.

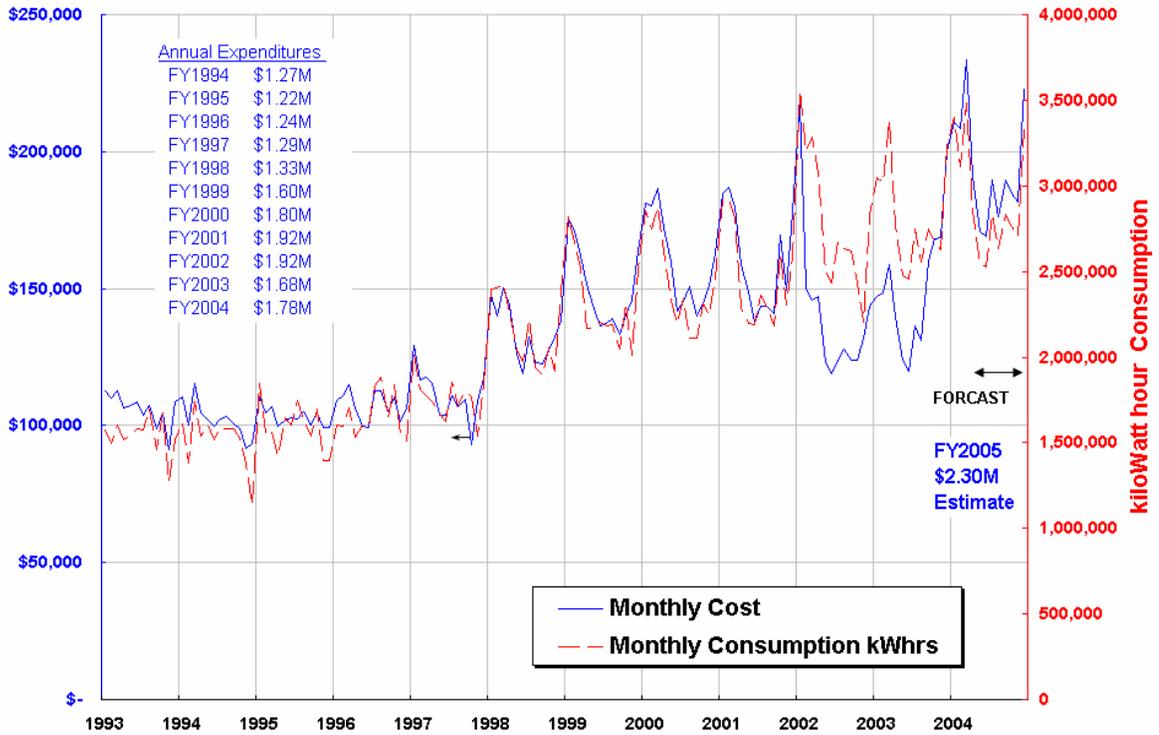
## APPENDIX 1 – HISTORICAL TRENDS



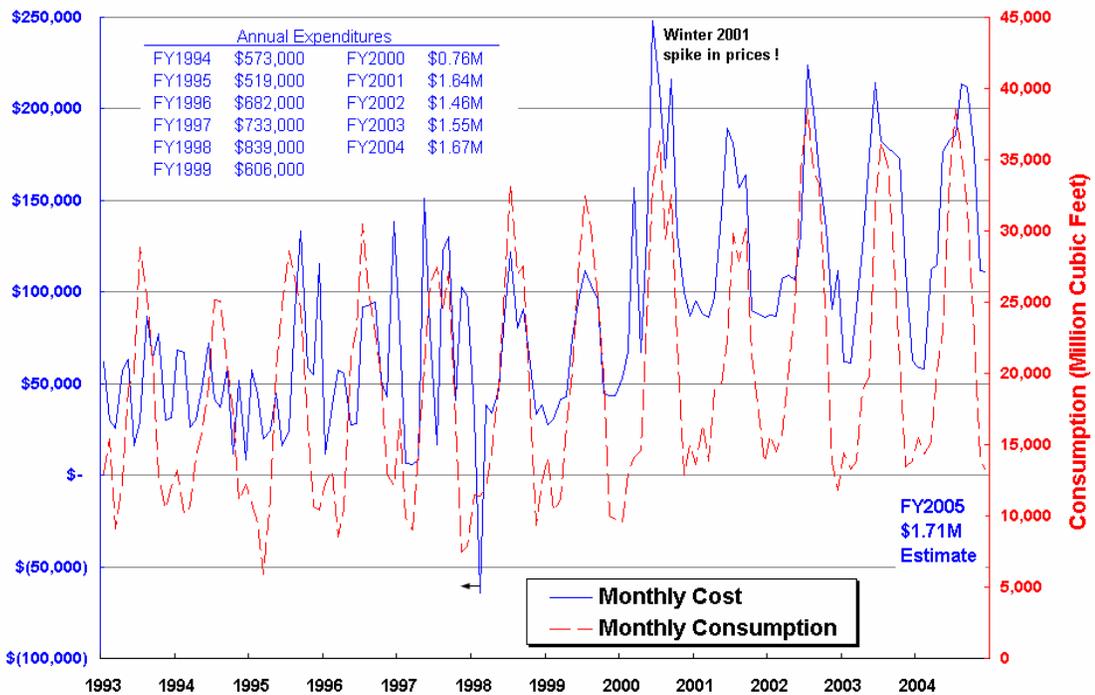
**Figure A1** Main campus natural gas consumption as compared to winter weather conditions in heating degree days (HDD)  
*HDD = (65 – Daily Average Temperature) for each day measured at Detroit Metro Airport*



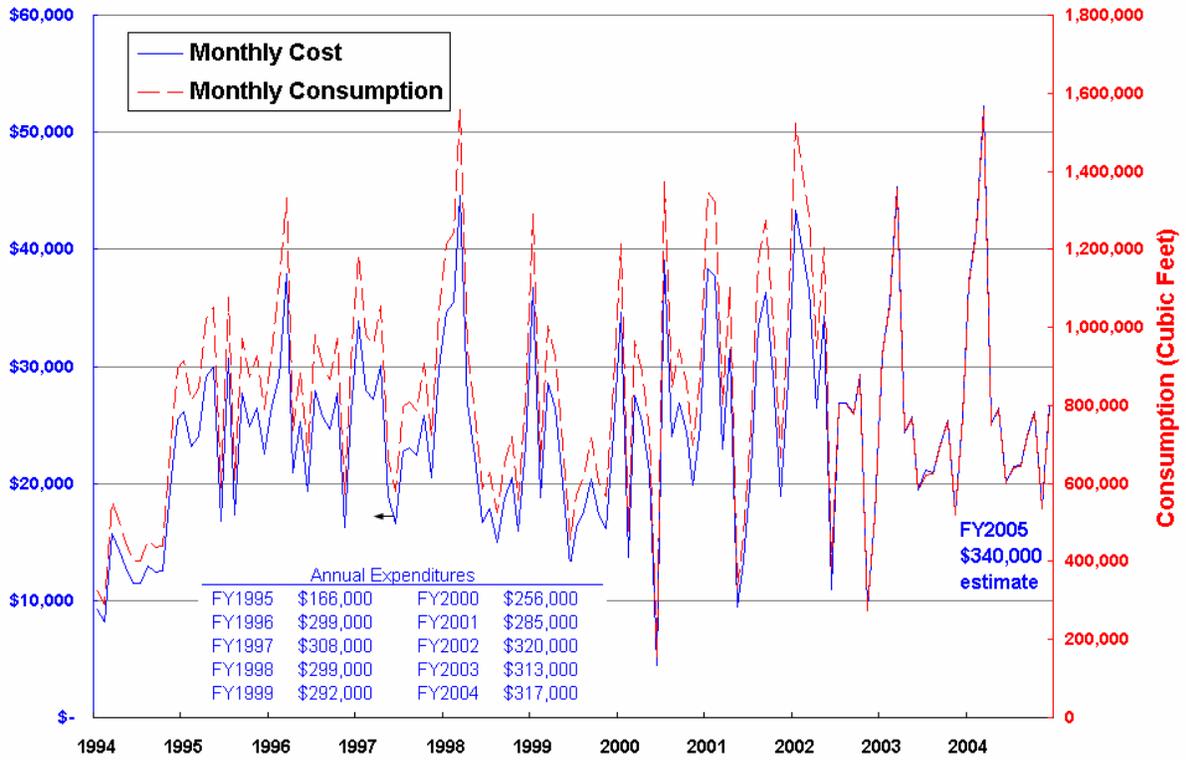
**Figure A2** Main campus natural gas consumption normalized for winter weather in HDD and campus growth in square feet



**Figure A3 Main campus electrical cost and consumption for a decade**



**Figure A4 Main campus natural gas cost and consumption for a decade**



**Figure A5 Main campus water & sewer cost and consumption for a decade**