

Oakland University
Annual Energy Report
Fiscal Year 2007

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EXECUTIVE SUMMARY

Increasing utility rates were the driving force behind a \$557,000 increase in annual energy costs in FY2007. Natural gas unit expense was up 21.5% from the previous year, and the Detroit Edison expense was up 9.2%.

Although FY2007 was colder than the previous year, weather patterns still remain warmer than the historical averages. In spite of the colder winter, natural gas consumption was held in check, for a less than one percent increase compared to FY2006. Both electric and domestic water consumption were both down as compared to the previous fiscal year, -4.0% and -11.5%, respectively.

Projections for FY2008 are for a 2.1% additional increase in overall expenditures. A small increase in natural gas rates, coupled with a decrease in electrical rates, suggests a more modest overall increase projected for next year.

Detroit Edison electric rates have continued to creep up over the past few years. The retail open market has not been advantageous, so the University remains with Detroit Edison. We are just beginning a partial, interruptible electric rate with Detroit Edison, taking advantage of the new 3.3 MW backup diesel generator installation. This new interruptible rate is projected to reduce the unit cost per kilowatt-hour by 5.2% for FY2008.

Presently, firm gas contracts have been obtained for 100% of FY2008, 60% of FY2009, and 31% of FY2010.

The energy services and diesel generator projects are both substantially complete. Final commissioning on a few items will continue into the fall, but all of the mechanical and electrical systems are fully installed.

Feasibility studies for on-campus wind power generation as well as conversion of our Central Heating Plant to biomass fuel are both underway and will be complete this winter.

INTRODUCTION

Increasing utility rates were the driving force behind a \$557,000 increase in annual energy costs. Forward purchasing in the natural gas market forestalled much of the recent price increases, but the University has is now being impacted by these sustained market costs. The FY2007 natural gas unit cost was up 21.5% from the previous year, and the Detroit Edison unit cost was up 9.2%.

Table 1 Average unit cost per utility with comparisons to previous year

	FY2006 Unit Cost	FY2007 Unit Cost	Units	% Change from FY2006
Electricity	\$ 0.0705	\$ 0.0770	per kW hour	+9.2%
Natural Gas	\$ 8.762	\$ 9.0870	per million BTU	+21.5%
Water & Sewer	\$ 46.30	\$ 46.30	per 1000 gallons	0%

Although FY2007 was colder than the previous year, weather patterns still remain warmer than the historical average. In spite of the colder weather, natural gas consumption was held in check, for less than a one percent increase as compared to FY2006. Both electric and domestic water consumption figures were both down as compared to the previous fiscal year, -4.0% and -11.5%, respectively.

Although the University saw -11.5% change in water & sewer consumption as compared to FY2006, usage still remains higher than previous years. Deferred plant renewal projects in the Central Heating Plant will further reduce consumption of water by December 2007. These projects will result in noticeable reductions in consumption.

Table 2 lists the usage and cost for each of the three main utilities, serving the west campus, and compares these with the previous fiscal year.

Table 2 Utility consumption & cost with comparisons to previous year

	FY2007 Usage	Units	% Change from FY2006	FY2007 Cost (Millions)	% Change from FY2006
Electricity	35,815,080	kW hours	-4.0%	\$ 2.75	+5.5%
Natural Gas	278,661	million BTU	0.9%	\$ 2.53	+22.6%
Water & Sewer	9,182	1,000 gallons	-11.5%	\$ 0.43	-11.4%
TOTALS				\$ 5.71	+10.8%

Note 1: MMBTU = one million British thermal units

Note 2: This data is for the main campus only, the general funded east campus utilities are under 2% of total expenditures.

The annual expenditure for propane was \$18,493. Propane heating is used for the Buildings & Grounds Maintenance building and a few other small out-buildings. Fuel oil for a temporary steam boiler during construction of the underground hot water system totaled \$39,374. This boiler was used to heat the science, engineering, and library buildings for several months last winter.

The golf course and Meadow Brook Hall utilities are not reported here, but are accounted for by their respective management reports.

Consumption escalations are projected in accordance with a typical 2 to 3% growth in the student body, measured in Full Year Equivalent Students (FYES), coupled with the proliferation of additional computers and new academic programs. Historical averages and trends in the weather are considered. Lastly, a look at the past year's consumption in relation to the year's weather is taken into account.

Table 3 PROJECTED FY2008 utility consumption & cost

	FY2008 Projected Usage	Units	% Change from FY2007	FY2008 Projected Cost (Millions)	% Change from FY2007
Electricity	36,714,199	kW hours	2.51%	\$ 2.69	-2.5%
Natural Gas	290,005	million BTU	4.07%	\$ 2.71	+6.9%
Water & Sewer	9,457	1,000 gallons	3.00%	\$ 0.438	+3.0%
TOTALS				\$ 5.83	+2.1%

The weather remains warmer than the historical averages for both the winter heating season and the summer cooling season. The FY2007 heating degree days were 8% above the FY2006, meaning it was an 8% colder winter. This is still almost 8% warmer than the historical average.

The FY2007 summer weather was 11.2% cooler than FY2006, but still about 24% warmer than the historical average.

Table 4 Heating and cooling degree days with comparisons to previous year

	Historical average	FY2006	FY2007	% Change
Heating Degree Days	6,444	5,503	5,945	+8.0%
Cooling Degree Days	736	1,024	909	-11.2%

Degree Days are calculated from the difference between the average daily temperature and reference temperature (65 deg F). This gives a measure of how much heating and cooling effort is required to maintain a typical building's indoor air comfort level. (data source ¹)

Future utility projections take into account the expected utility rates along with an assumption of a small increase in consumption. For natural gas, 100% of the FY2008 gas supply has already been contracted and the cost is locked in for an expected rate increase of less than 3%. Water rates have remained very stable and are not anticipated to change.

¹ National Oceanic and Atmospheric Administration, National Center for Environmental Prediction, http://ftp.ncep.noaa.gov/pub/cpc/htdocs/products/analysis_monitoring/cdus/degree_days/archives/

Table 5 PROJECTED FY2008 average unit cost per utility

	FY2007 Unit Cost	FY2008 Unit Cost	Units	% Change from FY2007
Electricity	\$ 0.0770	\$ 0.0730	per kW hour	-5.2%
Natural Gas	\$ 9.0870	\$ 9.3373	per million BTU	2.8%
Water & Sewer	\$ 46.30	\$ 46.30	per 1000 gallons	0%

Detroit Edison electric rates have continued to creep up over the past few years, as seen below in Figure 1. The retail open market has not been advantageous for the past 4-5 years, so the University remains with Detroit Edison. We are just beginning a partial, interruptible gas rate with Detroit Edison, taking advantage of the new 3.3 MW diesel generator installation. The interruptible rate is projected to reduce the cost per kilowatt-hour by 5.2% for FY2008.

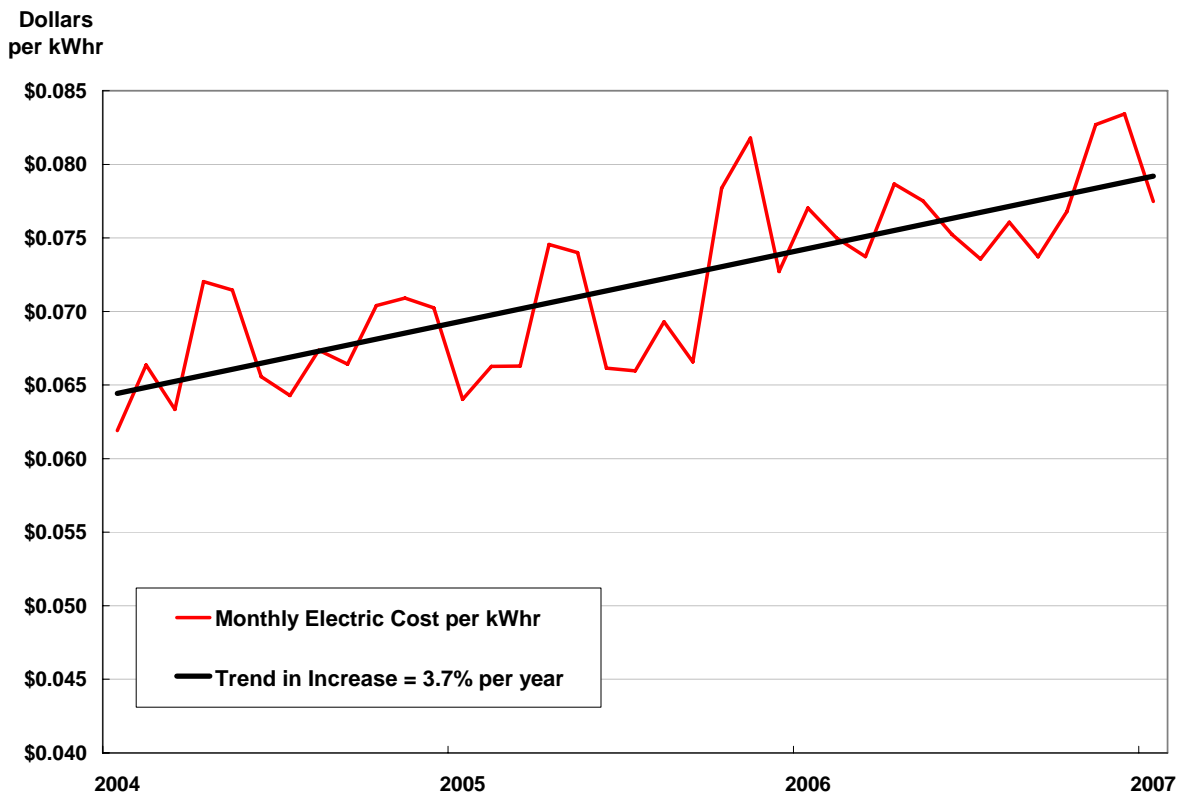


Figure 1 Recent increases in the Detroit Edison electric rate

Figure 2 illustrates the previous cost savings from the electrical Retail Open Access purchasing program in FY2003 & FY2004, followed by several years of rapidly increasing utility unit costs (mostly in natural gas). Fiscal Year 2008 should see a leveling off of these recent increases in gas, but electricity will continue to creep upward.

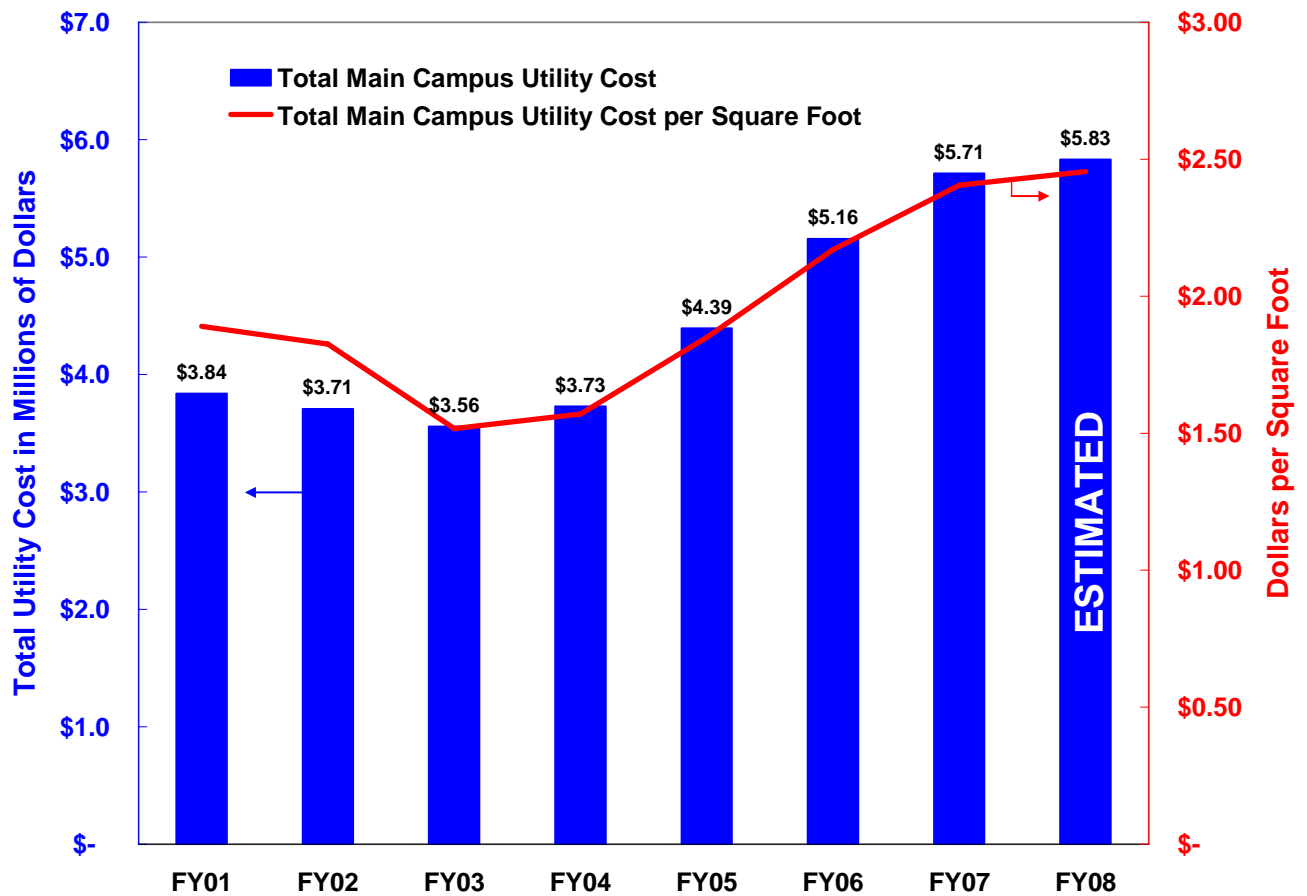


Figure 2 Eight year combined west campus utility expenditures with cost per square foot of facility space

UTILITY COST PER FYES AND SQUARE FOOTAGE

Figure 6, below, depicts this same information adjusted for building square footage and FYES.

This figure is based on our present main campus size of 2,375,000 million square feet, and 14,635 full year equivalent students. For a full time, resident undergraduate student with 15 or more credit hours per semester (\$7,575 for both fall and winter semesters), this equates to 5% of their annual tuition.

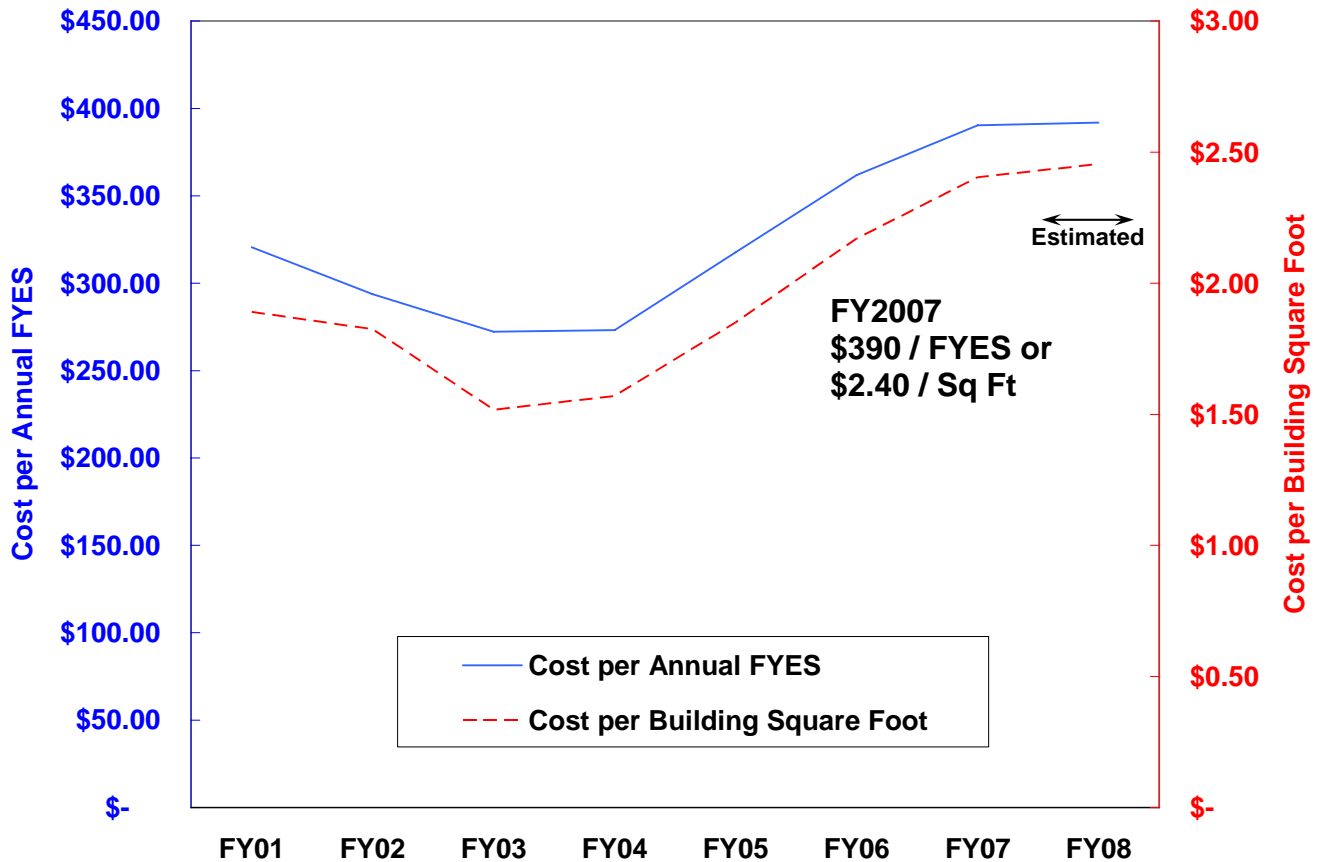


Figure 3 Total utility cost for the main campus per FYES and per building square foot.

HISTORICAL CONSUMPTION AND COST

Figures 4, 5, and 6 illustrate the monthly utility usage and resulting trends over the past decade.

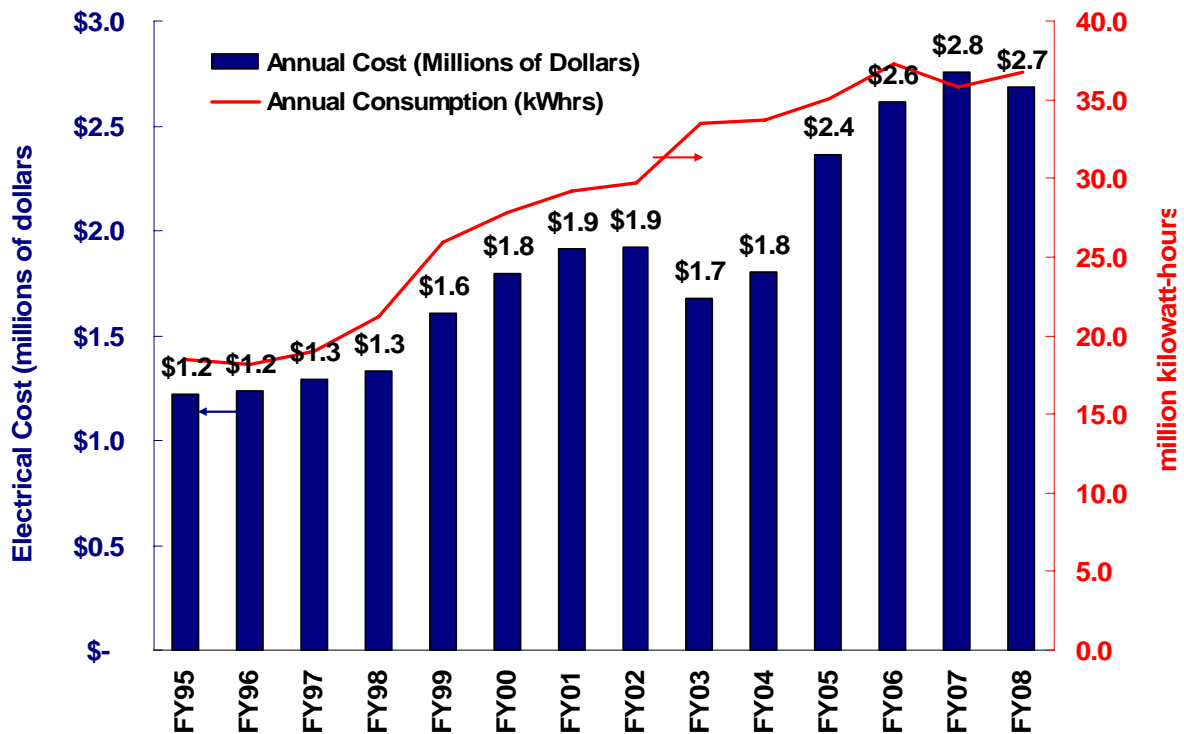


Figure 4 Historical main campus annual electrical cost and consumption

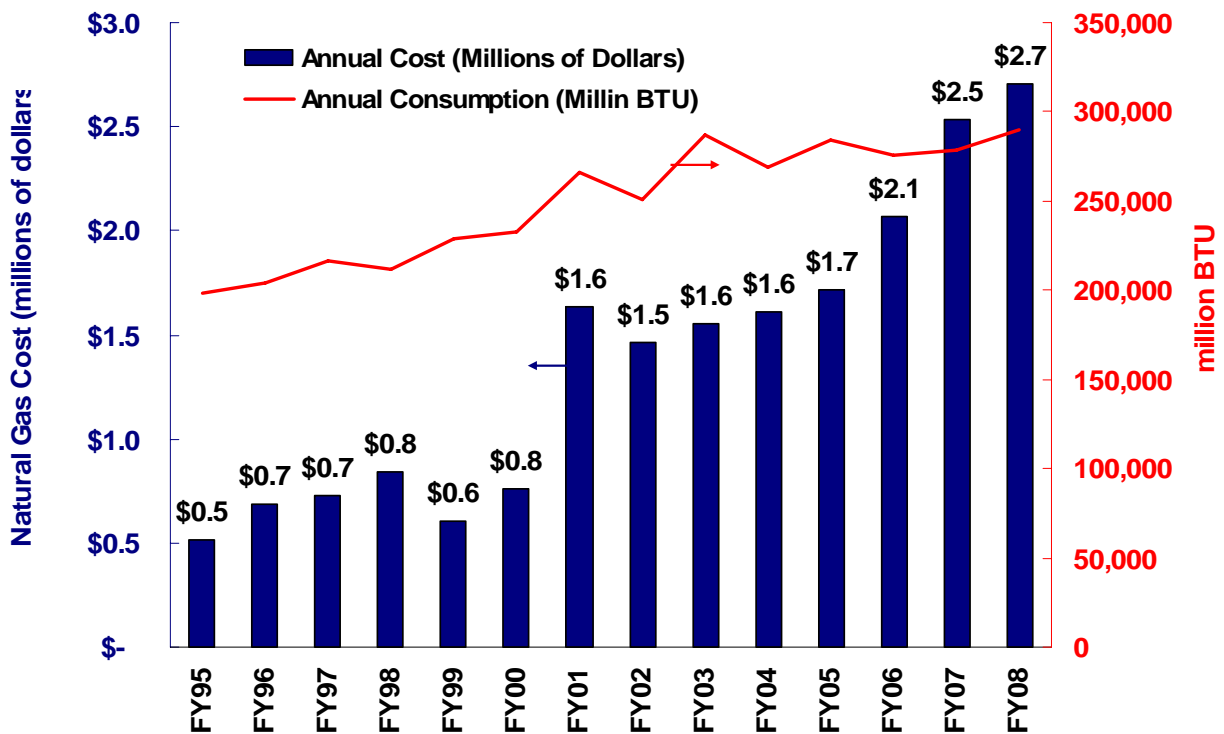


Figure 5 Historical main campus annual natural gas cost and consumption

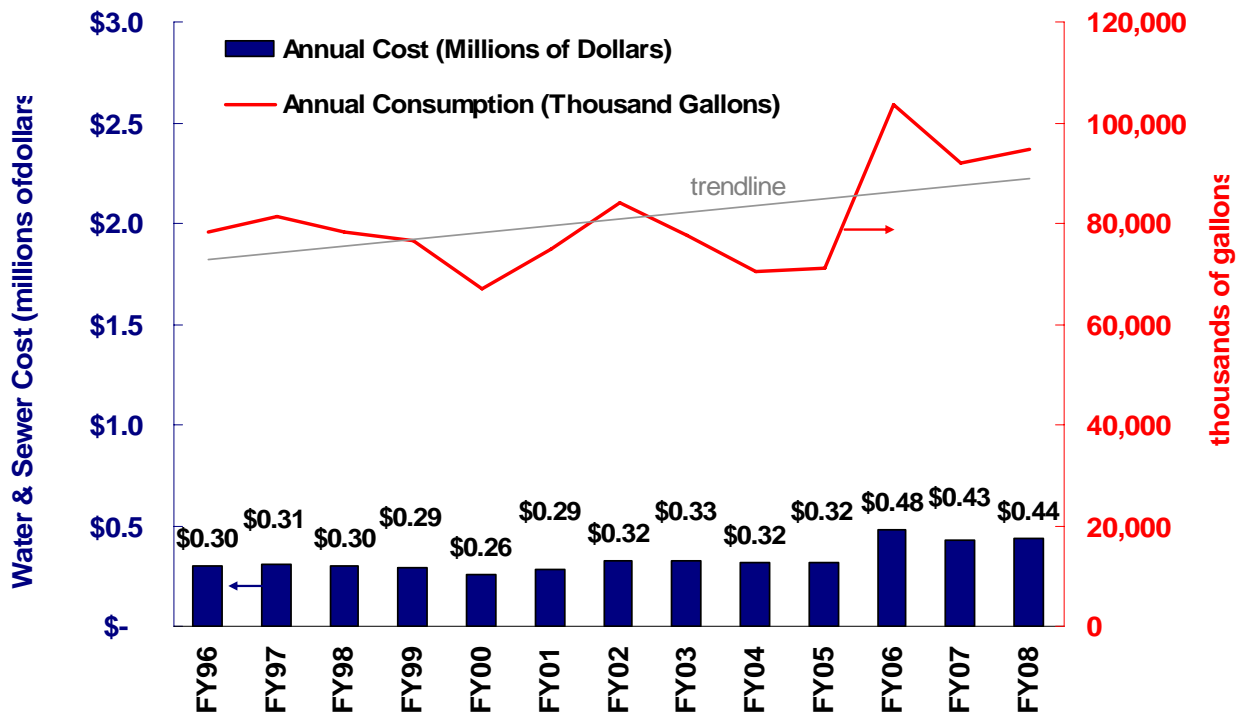


Figure 6 Historical main campus annual water & sewer cost and consumption

NATURAL GAS PURCHASING UPDATE

Natural gas prices continue to be volatile and continue to increase. Summertime natural gas NYMEX future prices remain in the range of \$7-\$8 per million BTU and wintertime future prices have been fluctuating between \$9 and \$10 per million BTU. Prices are not expected to fall substantially.

Multiple, forward purchases have been very helpful to hold down costs, minimize risk, and provide fiscal year budget stability. Figure 7, below, is an illustration of the University's gas purchases, their cost, and duration. The different colored blocks represent individual purchase contracts. Multiple blocks are layered in at different times to supply the total gas needs represented by the black line. Facilities Management continually monitors the energy futures markets and corresponds with several industry consultants to make prudent gas purchases.

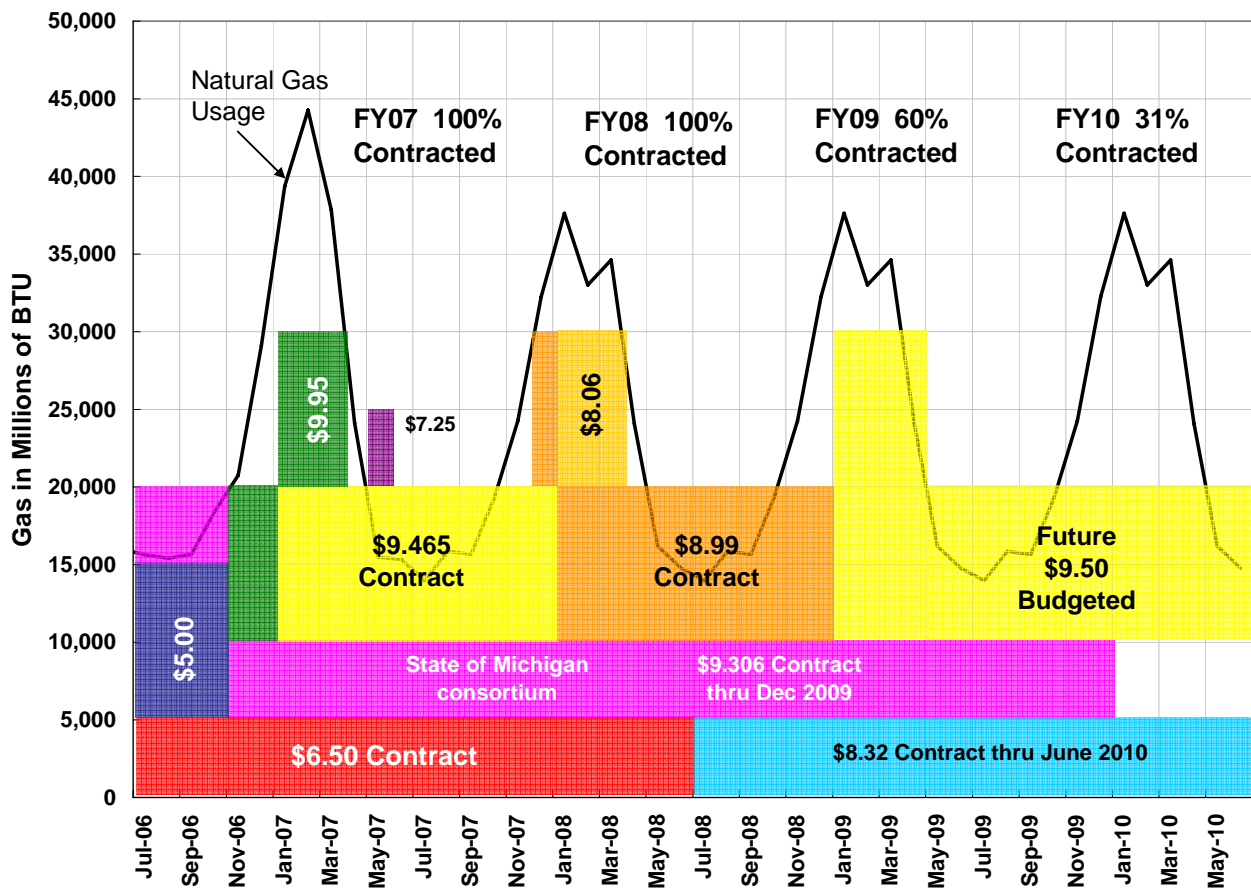


Figure 7 Natural gas purchase contracts (prices are in dollars per million BTU)

PHASE TWO ENERGY SERVICES PROJECT UPDATE

The energy services project is substantially complete. Final commissioning on a few project items will continue into the fall, but all of the mechanical and electrical systems are fully installed and operational.

The project installations have contributed a portion of this year's 4.0% drop in electrical consumption, an 11.5% drop in domestic water consumption, and minimized our natural gas consumption by several percent, all in comparison to the previous fiscal year.

The energy and maintenance cost savings are on target to achieve \$470,000 per year, which includes a portion of the diesel generator project savings (discussed below).

DIESEL GENERATOR PROJECT

Two packaged diesel generators were installed in a joint effort between the Energy Services project and the Facilities Management Department. An additional \$500,000 was approved by the Board of Trustees to supplement the Energy Services Agreement to install these units at our central campus substation. These units will provide emergency backup power for approximately one half of the campus while simultaneously allowing for a cost savings from a Detroit Edison interruptible electric rate.



Plans for additional generators will be presented to the Board of Trustees in coming years as the savings from these two machines are accumulated. The expectation is that 100% of the campus will have emergency backup power in the next 3 to 6 years.

WIND POWER FEASIBILITY STUDY

A 50 meter tall wind sensor tower was installed in February 2006, and has been collecting wind data for use in a wind power assessment for our campus. The Facilities Management Department initiated the collection of wind data, and the President's Resource Development Fund provided assistance to undertake a full feasibility study as well as a second year of wind data collection.

The study will include a full pro forma for a number of utility sized wind turbines in the range of 1 to 1.5 megawatts each. Several sites on the golf course and south side of the main campus are under consideration for siting the turbines. The approach of the study is to ascertain if a project can be developed with a positive cash flow over a 10 to 15 year financing period. The results of the study and recommendations will be presented to the University management this winter.

BIOMASS (WASTE WOOD) BOILER FEASIBILITY STUDY

Facilities Management has obtained a \$25,000 grant from the Southeast Michigan Resource Development Council to study the addition of an urban wood waste fueled boiler for our campus. Wood is a relatively inexpensive source of fuel, and the relative abundance of locally derived urban waste wood has the potential to make this project financially attractive.

Central Michigan University presently operates a wood fueled heating plant to provide most of their campus heating, and Northern Michigan University is presently designing a wood boiler addition, capable of providing both heating and power production to their campus.

When combusted in a properly designed, industrial boiler, wood burns cleanly, resulting in nothing but water vapor and carbon dioxide out of the chimney. The combustion of biomass fuels are considered carbon neutral due to the fact that the growth of the wood fuel pulls carbon from the atmosphere which is then released back during combustion. There is no sulfur, mercury, or other contaminants in the emissions that are produced in coal fired power plants. The only issues will be with properly managing the ash and managing the logistics of fuel delivery and storage. This type of operation involves additional maintenance and staff. However, a multimillion dollar reduction in fuel cost could potentially pay for the additional staff and new equipment needed. This study will review the technical, fuel procurement, and business cases for a possible project. If a positive cash flow project looks feasible, the results and recommendations will be presented to University management this winter.



Wood storage silo and smokestack steam plume from the wood boiler at the Central Michigan University Heating plant