ATTACHMENT A

Oakland University

Annual Energy Report

Fiscal Year 2008

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www.oakland.edu/energy

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EXECUTIVE SUMMARY

An increase in consumption of all three utilities produced a $344,000 increase in annual energy expense. The increase in consumption was approximately 5% each for all three of the main utilities, electric, natural gas, and water. A 2.7% drop in the electric rate was offset by a 3.9% and 3.7% increase in the natural gas and domestic water rates, respectively. The drop in electric rate was the result of switching to a partial D8, interruptible electric rate resulting from the installation of 3.3 MW of diesel electric backup power.

Projecting into Fiscal Year 2009, both the unit costs of electric and natural gas should fall slightly due to receiving the D8 rate for a full year and recent purchase of natural gas contracts. Presently 99% of Fiscal Year 2009 and 74% of Fiscal Year 2010 natural gas has been contracted. With the inclusion of a small growth in consumption, the overall net impact is estimated to be a small 1.9% increase in total utility expense.

The Energy Services Agreement (ESA) successfully installed over 40 mechanical and electrical project items at cost of $11,868,188. Two 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 the generators. The originally guaranteed ESA annual cost savings of $344,569 was increased to $471,146 as a result of adding a portion of the diesel generator scope to the project. The total ESA and diesel generator utility and maintenance savings will be $596,146 per year.

Feasibility studies were completed for a utility sized wind turbine project as well as a Bio-Energy Center which would utilize a wood chip boiler. Both potential projects would use conventional equipment and are economically attractive. Combined, they could provide a renewable and sustainable energy infrastructure for the University's future needs. Additional benefits from these systems would include energy independence, price security, local fuel procurement, carbon emissions reduction, and educational opportunities. These proposals are currently being presented to the University management for review.

INTRODUCTION

An increase in consumption for all three utilities accounted a $344,000 increase in the annual energy expense. The increase in consumption was approximately 5% each for all three utilities.

A 2.7% drop in the electric rate was offset by a 3.9% and 3.7% increase in the natural gas and domestic water rates, respectively. The drop in electric rate was the result of switching to a partial D8, interruptible electric rate as the result of installing 3.3 MW of diesel electric backup power.

Savings derived from the Energy Services Agreement (ESA) will be discussed in a following section. This project contracted for a $170,000 in annual utility savings, with an additional $106,000 in annual maintenance savings. The diesel generator project modified the scope of one portion of the ESA, with a supplemental $500,000 in funding, resulting in an additional ESA utility cost savings of $195,000 per year.

The unit cost of each utility with fiscal year comparisons are shown below in Table 1.

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

	FY07 Unit Cost	FY08 Unit Cost	Units	% Change from FY07
Electricity	$ 0.0770	$ 0.0749	per kW hour	-2.7%
Natural Gas	$ 9.0870	$ 9.4422	per million BTU	+3.9%
Water & Sewer	$ 46.300	$ 48.020	per million gallons	+3.7%

Table 2 shows the Fiscal Year 07 to Fiscal Year 08 comparison of consumption and cost. Electric consumption was up over 5% for the year. This figure would have been higher if the 3.5% savings from the ESA was not present. The entire ESA savings was not seen in Fiscal Year 08 due to the end dates and commissioning of multiple ESA projects items. In addition, the summer air conditioning season was 1.7% milder than Fiscal Year 07 as seen in Table 4 on the following page.

Natural gas consumption was up only 4.6%, even as the winter heating season was 9.9% colder than Fiscal Year 07. The ESA had a minimal impact on heating systems since Oakland was contracted to receive about 1/2% savings in the natural gas category.

Table 2 Utility consumption & cost with comparisons to previous year

	FY08 Usage	Units	% Change from FY07	FY08 Cost (Millions)	% Change from FY07
Electricity	37,751,000	kW hours	5.4%	$ 2.83	+2.7%
Natural Gas	291,497	million BTU	4.6%	$ 2.75	+8.7%
Water & Sewer	96,906	million gallons	5.5%	$ 0.465	+9.4%
TOTALS				$ 6.05	+5.9%

Note 1: MMBTU = one million British thermal units (approximately = 1 MCF = thousand cubic ft)
Note 2: This data is for the main campus only, the general funded east campus utilities are approximately 2% of total expenditures.

Domestic water consumption was up 5.5% for the year in spite of the measured 11% savings in from the ESA. Water has been very variable these past few years, and additional conservation projects are underway. Although the water/sewer charges are less than 10% of the overall budget, there are opportunities to save in the Central Heating Plant and on the Lower Playing Fields irrigation that will be implemented fully by next year's energy report.

Projecting into Fiscal Year 2009, both the unit costs of electric and natural gas should fall slightly due to receiving the D8 rate for a full year and recent purchase of natural gas contracts. Presently 99% of Fiscal Year 2009 and 74% of Fiscal Year 2010 natural gas has been contracted for. With the inclusion of a small growth in consumption, the overall net impact is estimated to be a small 1.9% increase in total utility expense.

Table 3 PROJECTED Fiscal Year 2009 utility consumption & cost

	FY09 Projected Usage	Units	% Change from FY08	FY09 Projected Cost (Millions)	% Change from FY08
Electricity	39,127,564	kW hours	3.7%	$ 2.92	+3.3%
Natural Gas	298,347	million BTU	2.4%	$ 2.77	+0.7%
Water & Sewer	96,379,800	million gallons	-0.5%	$ 0.466	+0.3%
TOTALS				$ 6.16	+1.9%

The weather remains warmer than the historical averages for both the winter heating season and the summer cooling season. However, Fiscal Year 2008 had both a cooler winter (by 9.9%) and a cooler summer (by 1.7%) as compared to 2007. We used a measure called "degree days" to gauge how far each day is from a reference 65 deg F.

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

	Average	FY06	FY07	FY08	% Change
Heating Degree Days	6,444	5,503	5,945	6,049	+9.9%
Cooling Degree Days	736	1,024	909	894	-1.7%

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])

Table 5 PROJECTED Fiscal Year 2009 average unit cost per utility

	FY08 Unit Cost	FY09 Unit Cost	Units	% Change from FY08
Electricity	$ 0.0749	$ 0.0747	per kW hour	-0.29%
Natural Gas	$ 9.4422	$ 9.2931	per million BTU	-1.58%
Water & Sewer	$ 48.020	$ 48.4400	per million gallons	+0.87%

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

Detroit Edison electric rates have continued to rise steadily in recent years at approximately 4% per year. The recent introduction of a partial D8 interruptible rate has taken the University off of this trend line, but further increases are expected.

As Detroit Edison is required to implement several billion dollars in NOx, SOx, and mercury emissions scrubbing equipment at existing coal plants, these costs will be passed through to customers. In addition, Detroit Edison has filed for a permit to install a third nuclear power plant. Historically, these plants have been some of the most costly installations in the entire electric power industry, costing many billions of dollars per plant. Lastly, the potential for some sort of carbon tax or "cap and trade" mechanism is growing. All of these costs will be incorporated into in our utility rates in the coming years. These cost risks make finding an alternative to our single Detroit Edison electric supply more prudent as these issues approach. Recently passed State of Michigan legislation has returned 90% monopoly power to Detroit Edison for our electrical supply. It also mandated a statewide 10% renewable energy portfolio by the year 2015.

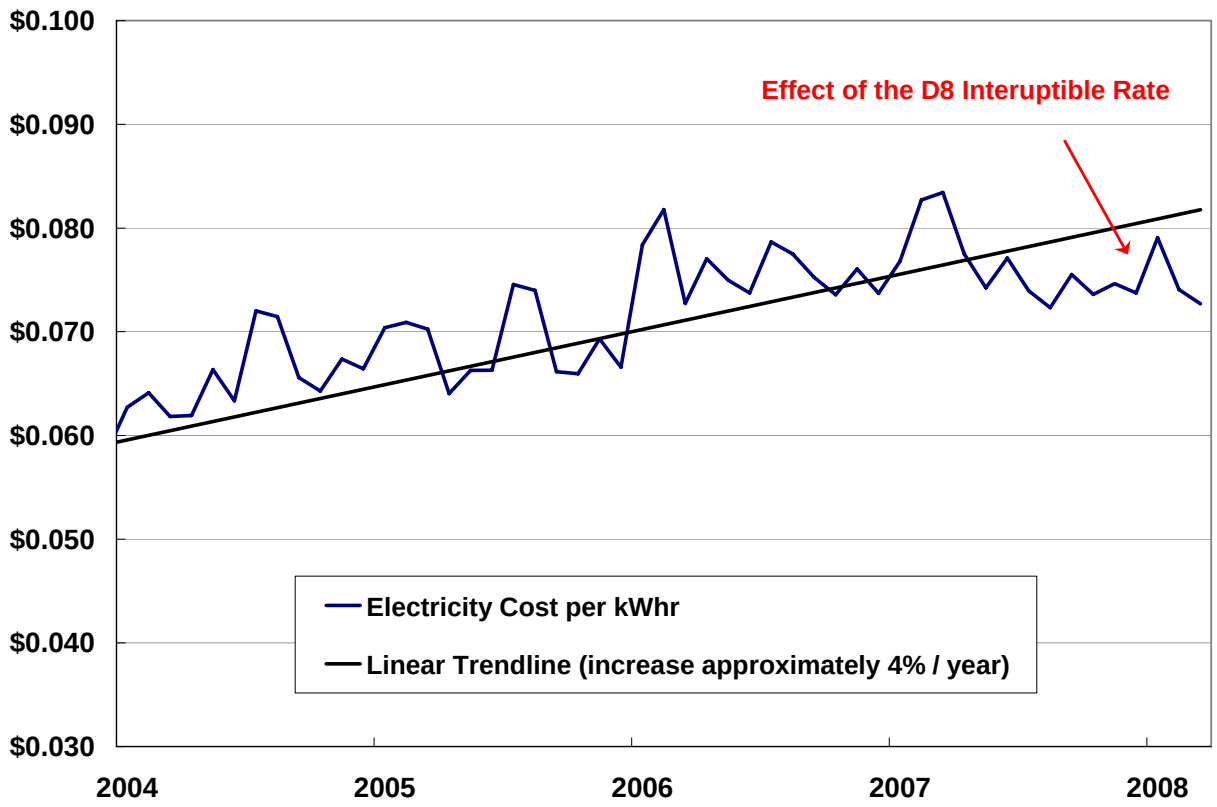

Figure 1 Recent increases in the Detroit Edison electric rate

Figure 2 illustrates the previous cost savings from the electrical Retail Open Access purchasing program in FY2003 & FY2004, followed by several years of increasing utility unit costs (mostly in natural gas). Recent years show a leveling off of these increases, but a more modest 3-5% per year is expected to continue on average. A 1.9% increase is estimated for Fiscal Year 2009.

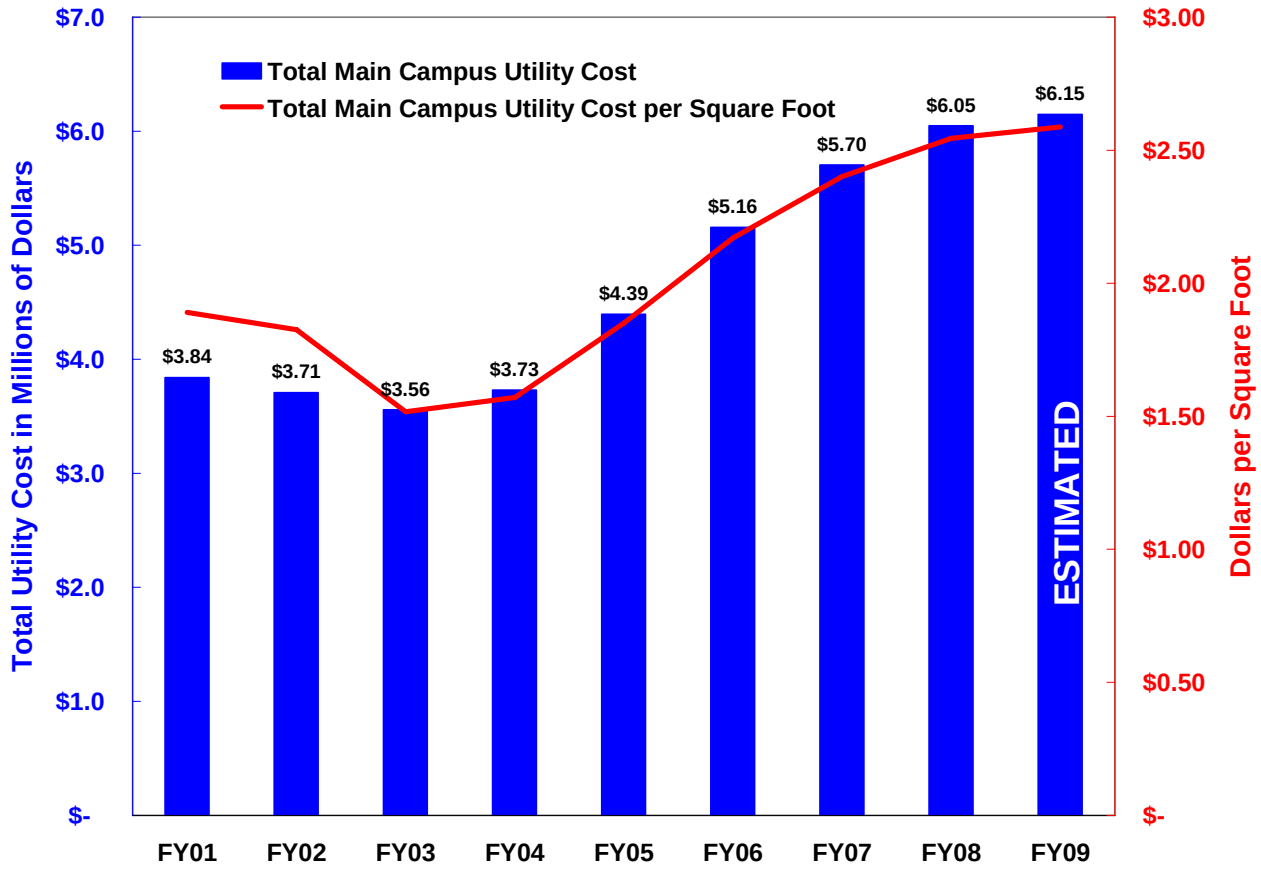

Figure 2 **Nine year combined west campus utility expenditures with cost per square foot of facility space**

UTILITY COST PER FYES AND SQUARE FOOTAGE

Figure 3, below, depicts this same information adjusted for building square footage and Full Year Equivalent Student (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.

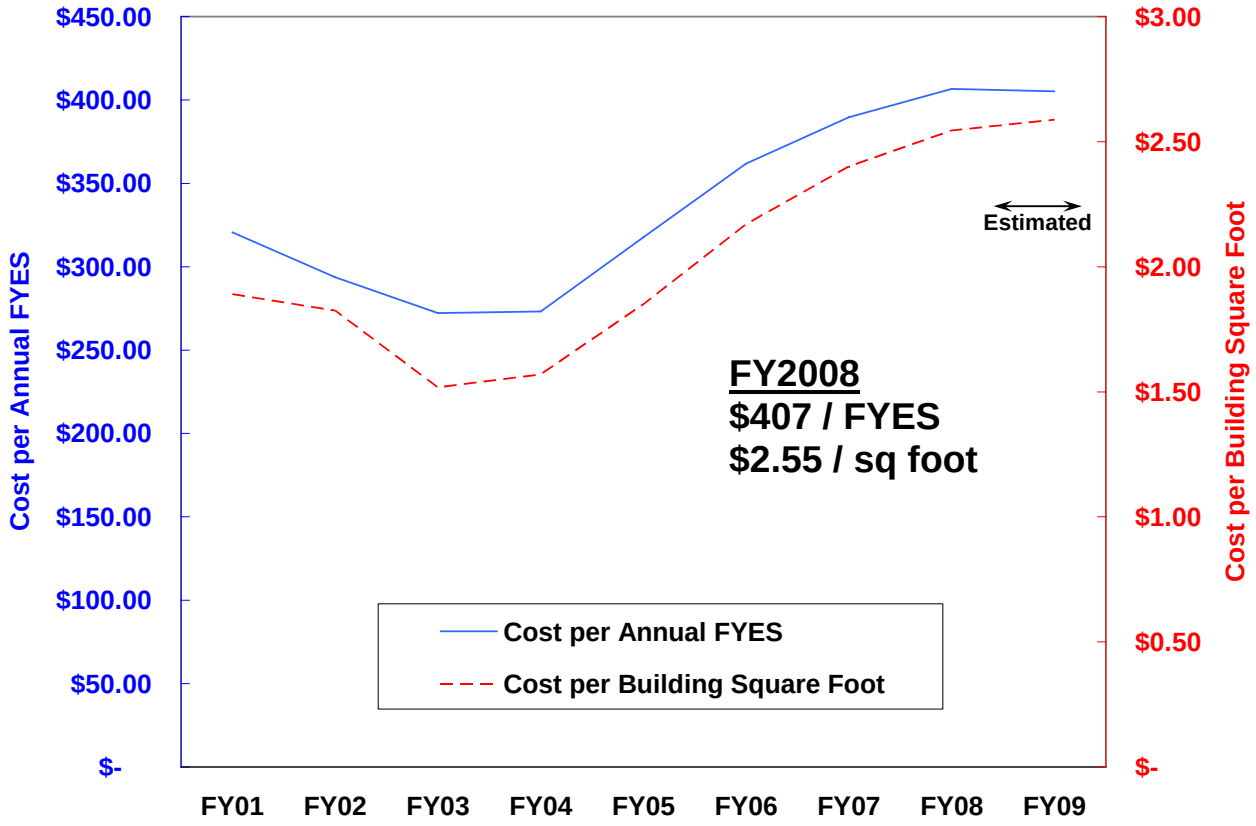

Figure 3 **Total utility cost for the main campus per Full Year Equivalent Student (FYES) and per building square foot.**

HISTORICAL CONSUMPTION AND COST

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

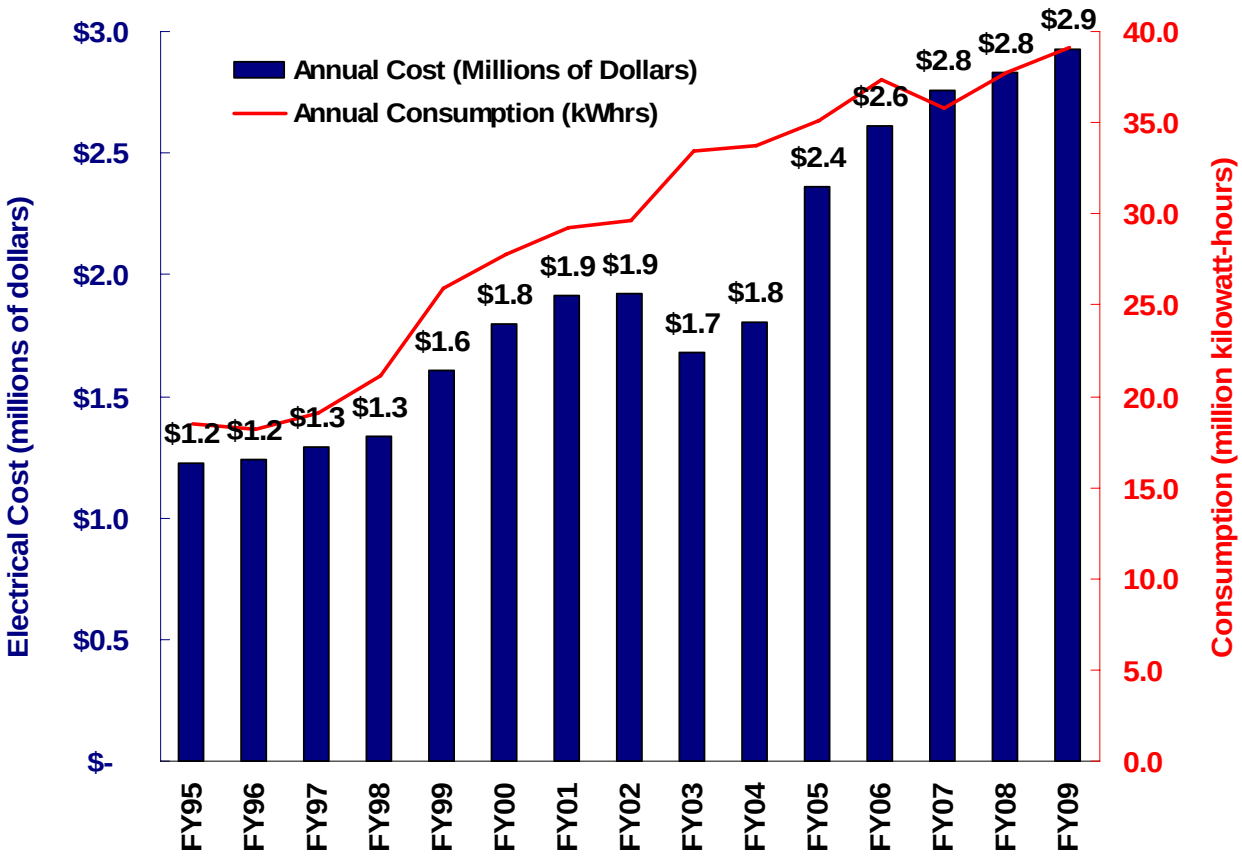

Figure 4 Historical main campus annual <u>electrical</u> cost and consumption

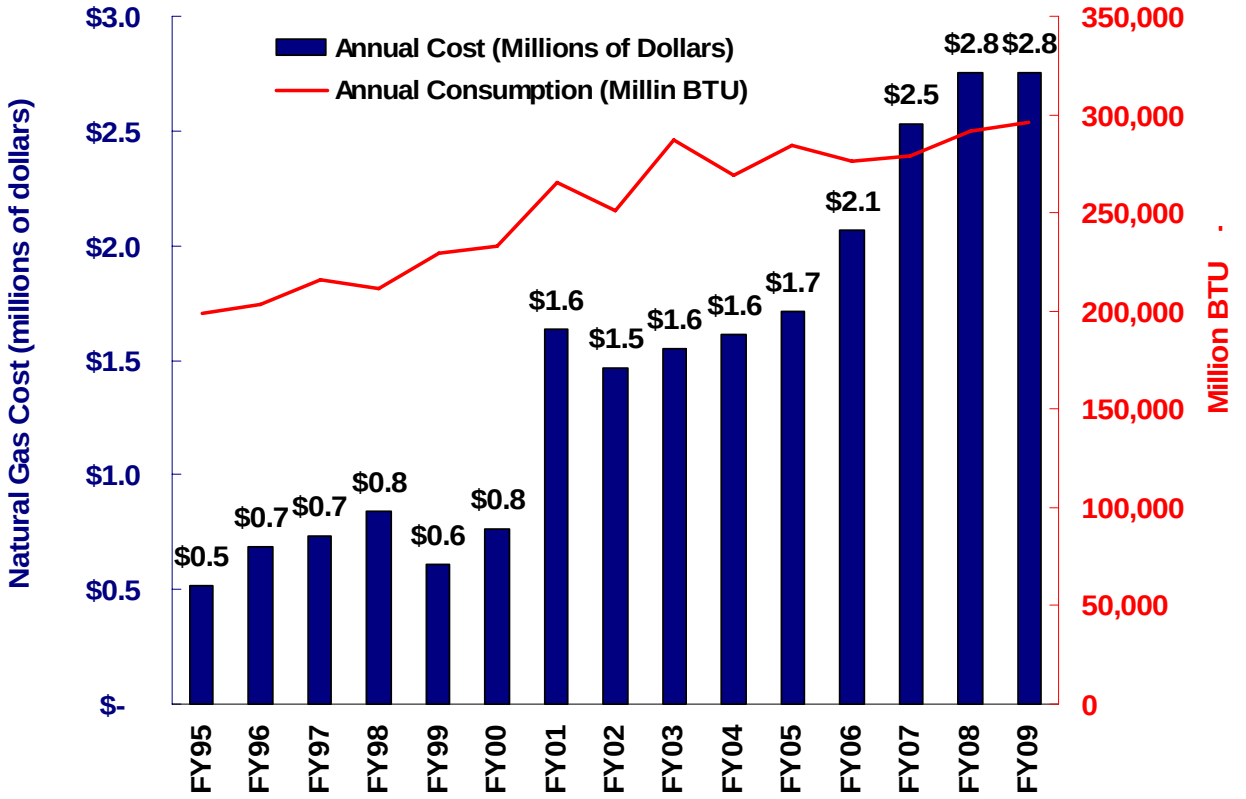

Figure 5 Historical main campus annual natural gas cost and consumption

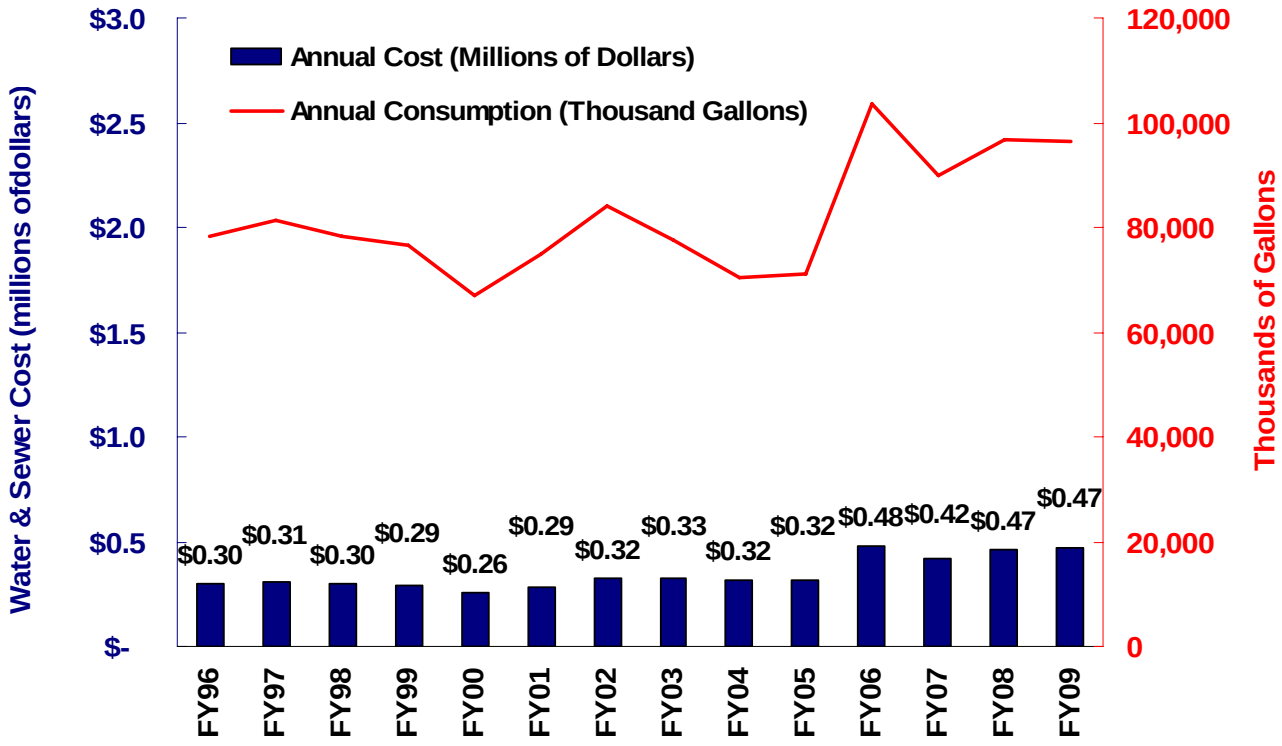

Figure 6 Historical main campus annual <u>water & sewer</u> cost and consumption

NATURAL GAS PURCHASING UPDATE

Natural gas prices continue to be volatile. This past spring and summer witnessed a rise in prices to $14 per million BTU with a rapid decline back to the $7-$8 per million BTU range.

A 24 month contract was purchased this September at $9.85 per million BTU followed by a smaller 4 month contact for this winter for $8.545 per million BTU. Future gas purchases are budgeted at $10 per million BTU for estimating purposes.

The figure below illustrates how these multiple purchases are made to supply the total campus natural gas needs. 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.

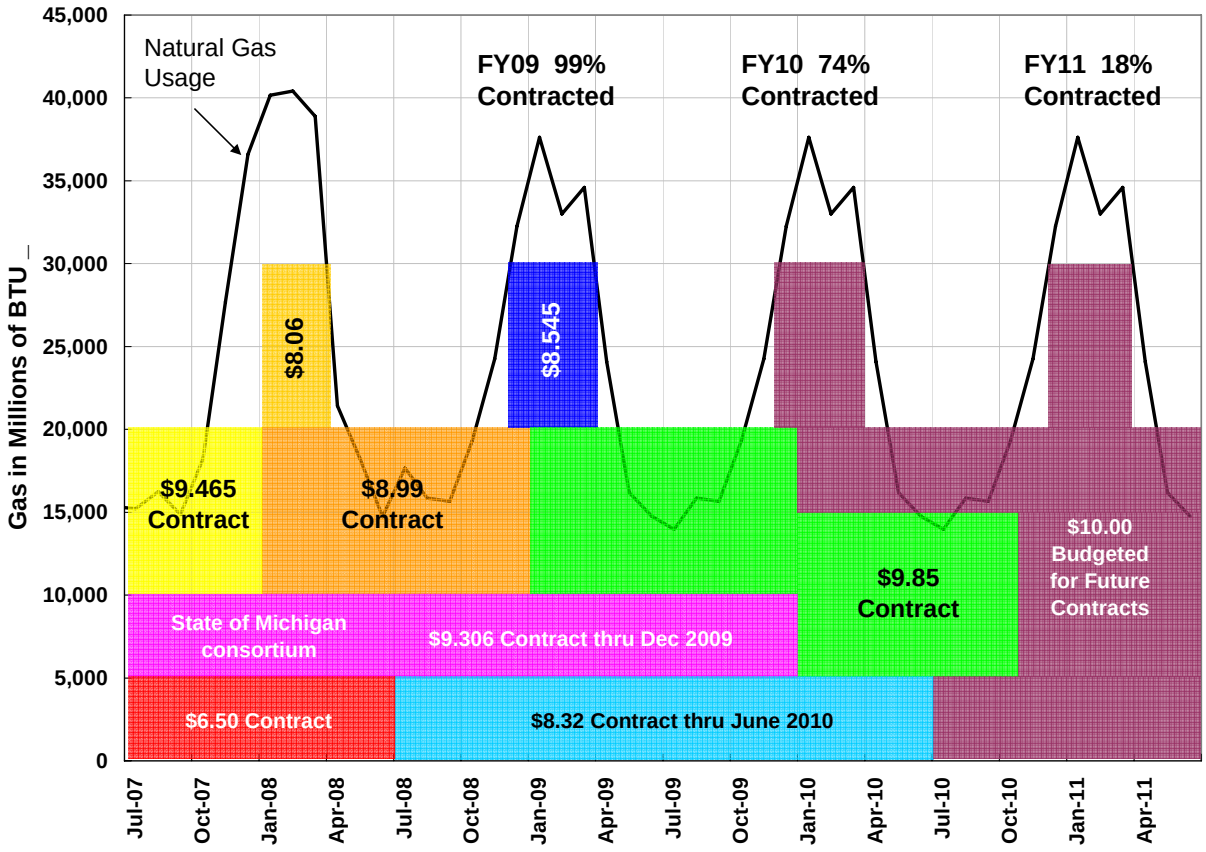

Figure 7 Natural gas purchase contacts (prices are in dollars per million BTU)

ENERGY SERVICES AGREEMENT AND DIESEL GENERATOR REVIEW

The Energy Services Agreement (ESA) successfully installed over 40 mechanical and electrical project items at cost of $11,868,188. Two 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 the generators.

The originally guaranteed ESA annual cost savings of $344,569 was increased to $471,146 as a result of adding a portion of the diesel generator scope to the ESA. And the remaining portion of the savings is estimated as an additional $120,000 for the change in rate from D-6 to D-8 and for peak shaving. The combined total savings will be $596,146 per year.

Table 6 ESA and Diesel Generator Annual Cost Savings

	Projected Savings	**Actual Savings June 2007 to July 2008**
Utility Savings *	$170,023	$170,023
Maintenance **	$106,123	$106,123
D-6 to D-8 ***	$165,000	$171,500
Peak Shaving ****	$0	$0
Total	**$441,146**	**$447,646**

* The utility savings were comprised of both stipulated and measured savings. All lighting and water upgrades were measured and verified.

** The maintenance savings were itemized and verified per the actual agreement.

*** Change in rate from D-6 to D-8 was implemented October 2007 for 9 months

**** Peak shaving was not implemented until August 2008 and did not impact the saving yet, projected saving are $100,000 annually

The ESA utility savings mentioned above was comprised of the following:

1,316,048	kW hours of electricity	(4% of Fiscal 2007 consumption)
1,158	MMBTU of natural gas	(0.5% of Fiscal 2007 consumption)
10,222,000	gallons of water	(11% of Fiscal 2007 consumption)

WIND POWER PROPOSAL

An Oakland University Wind Energy Feasibility Study has determined that the wind resource at the University will support a wind turbine installation for purpose of offsetting grid supplied electrical energy. The study focused on selecting wind turbine generators of capacity between 0.9 and 3.0 megawatts. Wind turbines with rotor hub heights of 75m, 80m and 100m were evaluated.

A 50 meter tall wind sensor tower was installed in February 2006, and collected wind data for two years. 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 scope of the study was to evaluate the installation of one, two, or three wind turbines. Four proposed locations were identified with installation costs for three different wind turbine models at each site. Of the four locations, we found that locations 1 and 2 have the most economic promise for development based on construction costs, the least disruption to campus grounds, and wind data. Proformas for the most economically attractive units show that we can implement wind turbines of 1.5 megawatt capacities each at either of locations 1 or 2 for approximately $3,700,000 per turbine.

We recommend that consideration be given to install two 1.5 megawatt wind turbines. If funded, the actual manufacturer would be selected through an open bid process. Total installed capital cost for the project is estimated at $7,400,000 with a projected average annual electrical generation of six million kilowatt hours of electricity. Since all of the potential wind turbines are non-US, the rising cost of the Euro and Canadian dollar will be a significant variable in this project.

The unit cost of energy (UCE) from two turbines is estimated at $0.088 per kW-hour with **project payback conservatively estimated at 12 years**, using a 3% escalation factor for the inflation of Detroit Edison electricity. The UCE is the 25 year average cost of electrical production that would be incurred per kW-hour. **The resulting cumulative, positive cash flow of the project at the end of the 25 year life is $3 million in today's dollars, per**

wind turbine. Each turbine of this size would produce approximately 10% of the University's electrical needs.

The cost of electrical energy is expected to increase due to items mentioned in the section above, as well as from increasing coal and natural gas prices, and inflation in the underlying materials and labor used to construct new generating baseload facilities.

Additional cost risk from mandated emission controls on existing coal plants, renewable energy portfolio standards, and carbon taxes are complex variables that may further enhance projected cash flows, but these have not been factored into our estimates.

(image courtesy of Khales Dahr & Jim Leidel)

A $1.5M "Clean Renewable Energy Bond" was awarded to Oakland University by the Federal Internal Revenue Service to help support the project. This would be a zero percent bond to cover a portion of the project costs.

BIOMASS BOILER FEASIBILITY PROPOSAL

Facilities Management was awarded a grant from the Southeast Michigan Resource Development Council to study the technical and economic merits of an urban wood waste fueled boiler for our campus. The study was completed with very favorable results.

It was determined that locating a biomass fueled boiler at the existing Central Heating Plant would not be recommended due to space limitations and wood chip truck traffic. Therefore, two alternate locations were investigated, one on the north side of campus, and one on the south by the electrical substation. A computer generated rendering of one possible plant design at the south substation site is shown here.

Due to the significant capital costs involved with such a project and the forthcoming needs of several potential academic constructing projects, Facilities Management is investigating a third party ownership option. In this arrangement, a project developer would be selected to design, build, own and operate the “Bio-Energy Center”. This facility would then sell electrical and heating utilities to Oakland University and other customers such as Detroit Edison.

The Bio-Energy Center would plant would be a modern, clean burning facility using recycled waste wood from the surrounding communities. The project would receive substantial financial support from the sale of renewable energy credits and federal energy production tax credits. Substantial savings are possible while creating additional jobs, utilizing a Michigan based fuel supply, removing the University from the volatile natural gas market, eliminating a significant portion of Oakland University’s carbon footprint, and creating a sustainable energy infrastructure to allow the University to grow and expand.

A request for proposals for project developers is expected to be released this fall. If a favorable project can be negotiated, this could potentially be brought before the Board of Trustees early in 2009.