ATTACHMENT A

Oakland University

Annual Energy Report

Fiscal Year 2003

Submitted, October 2003
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EXECUTIVE SUMMARY

Although usage in both natural gas and electricity climbed by 14% each, overall utility expenditures for FY03 fell by over 4% from the previous year. The largest contributing factor by far has been the favorable electrical rate that the University receives under its contract with the alternative electrical supplier, Quest Energy. Oakland University saved $523,000 in FY03 compared to the previous Detroit Edison D6 rate, and it is estimated that a further $515,000 will be saved in FY04.

The 14% increase in consumption coincides with a 13.7% increase in main campus square footage from FY02 to FY03.

Fiscal year 2004 costs are projected to increase slightly due to persistently elevated natural gas prices, expanding usage of existing facilities, and the new Oakland Center Expansion. The energy management goal for FY04 and beyond will be to continue to aggressively pursue lower cost natural gas and electricity, but also to shift toward reduced consumption and efficiency.

Natural gas prices continue to be volatile. An unusual 2003 spring-summer hike in gas prices pushed up prices equal to those seen in the winter of 2001. 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 has been fixed through FY05.

FISCAL YEAR 2003 USAGE & COSTS

Utility expenditures for FY03 fell by over 4% from the previous year. This continues a downward trend since FY01. The largest contributing factor by far has been the favorable electrical rate that the University receives under its contract with the alternative electrical supplier, Quest Energy. Although consumption of both natural gas and electricity climbed by 14% each, our overall expenditures were reduced. This increase in consumption coincides with a 13.7% increase in facility square footage from FY02 to FY03. Table 1 shows the FY03 utility consumption, cost, and comparison to last year. Table 2 displays the unit cost for each utility.

Table 1 **Fiscal year 2003 utility usage & cost with comparisons to previous year**

	Usage	Units	% Change from FY02	Cost (Millions)	% Change from FY02
Electricity	33,904,795	kW hours	14.3%	$ 1.68	-12.6%
Natural Gas	287,218	MMBTU	14.48%	$ 1.55	6.0%
Water & Sewer	10,379,000	Cubic Feet	-7.8%	$ 0.31	-2.3%
TOTALS				$ 3.54	-4.37%

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 **Fiscal year 2003 main campus square footage with comparisons to previous year**

	FY 2002	Units	FY 2003	Units	% Change from FY02
Main Campus	2,030,894	Sq Feet	2,309,092	Sq Feet	13.7%

Table 3 **Fiscal year 2003 average unit cost per utility with comparison to previous year**

	Unit Cost	Units	% Change from FY02
Electricity	$ 0.0494	per kW hour	-23.82%
Natural Gas	$ 5.4048	per MMBTU	-7.33%
Water & Sewer	$ 0.0309	per Cubic Feet	8.56%

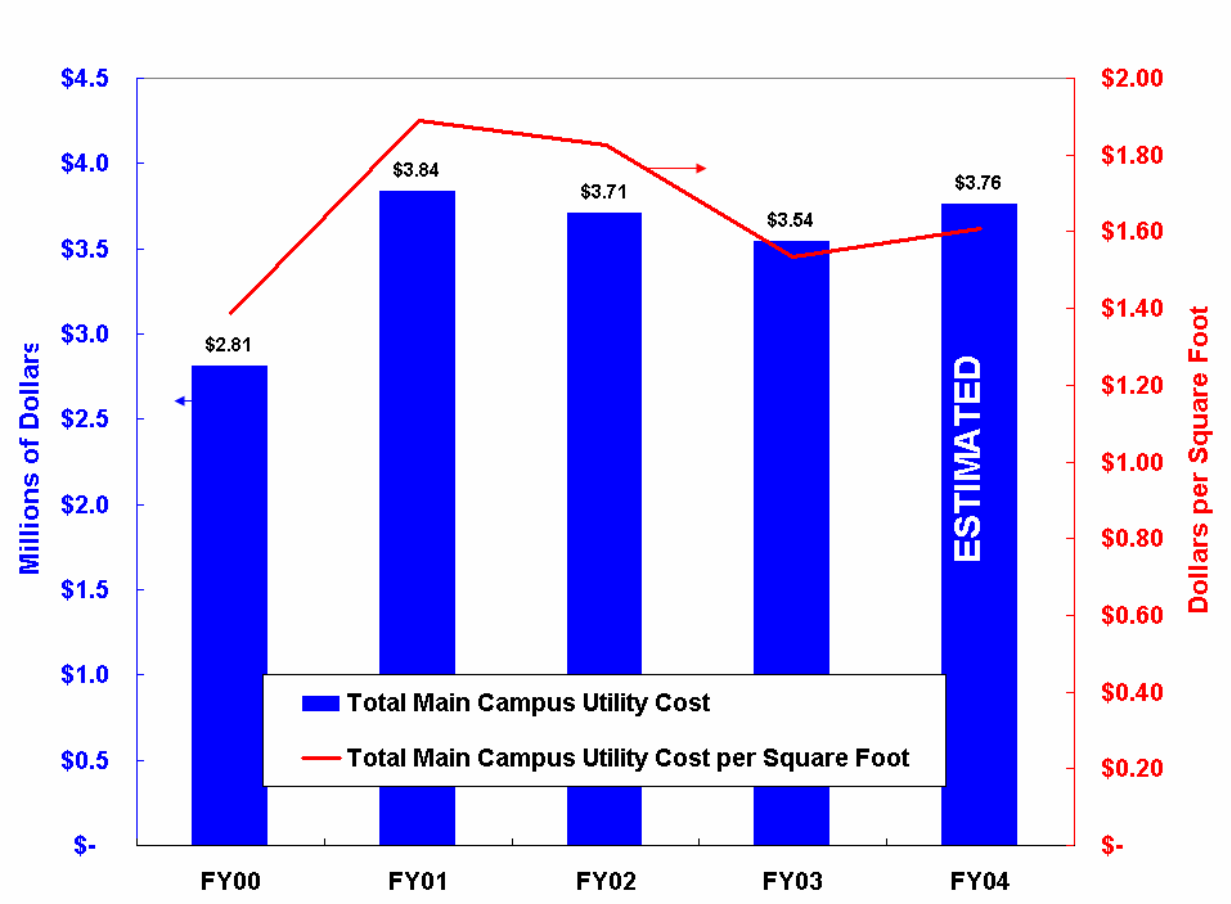


Figure 1 **Five year combined west campus utility expenditures with cost per square foot of facility space**

The above chart illustrates the recent fall in utility cost in spite of the recent construction on campus. The large increase in FY01 expenditures was mainly due to the jump in natural gas prices that winter and the University's month-by-month gas purchasing strategy.

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), Education & Human Services Building (2002), University Student Apartments (2002), the parking structure (2002), and the Oakland Center expansion (2003).

Fiscal year 2004 costs are projected to increase slightly due to persistently elevated natural gas prices, as well as increased usage. The energy management goal for FY04 and beyond will be to continue to aggressively pursue lower cost natural gas and electricity, and also to pursue initiatives for reduced consumption and better efficiency.

As Figure 2 below illustrates, the downward trend in cost per student and cost per square foot may end in FY04 unless energy efficiency measures can come into effect. The plan is to capitalize on the newly installed utility metering & monitoring system to identify target areas/facilities for energy conservation.

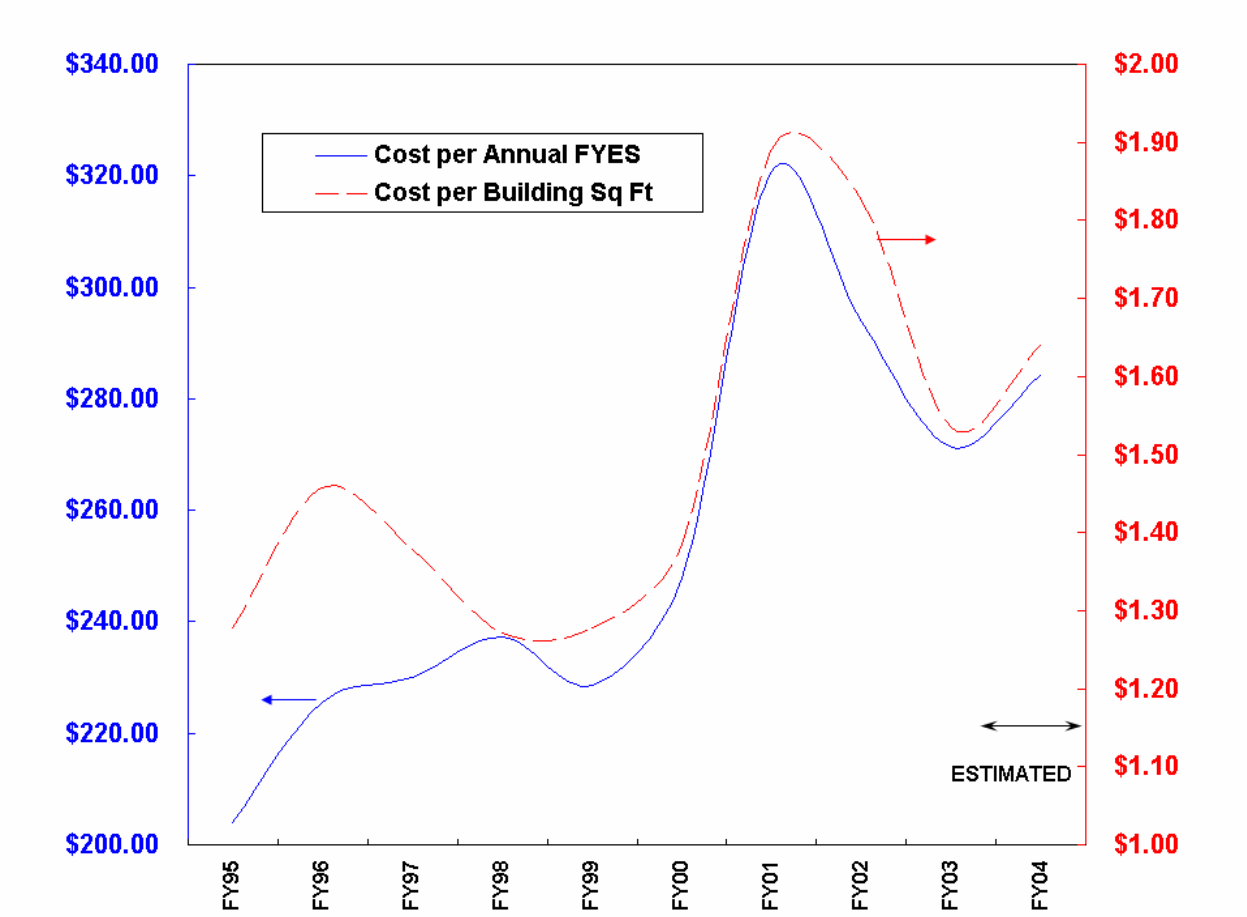


Figure 2 **Total utility cost for the main campus per Full Year Equivalent Student (FYES) and per building square foot.**

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 relation to a winter weather index called heating degree days. Heating degree days measure the severity of the winter cold. 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 gas consumption in relation to campus growth.

Then, Figure A3 normalizes this gas consumption against the weather and campus growth. This shows that the weather corrected heating BTU's required per square foot has remained very constant over the past decade.

Figures A4 through-A6 illustrate the monthly utility usage and resulting trends over the past decade.

VIRON ENERGY SERVICES – ENERGY SERVICES AGREEMENT (ESA)

Figure 3 below illustrates the original contract estimates for cost savings. These savings were verified and documented from FY98 through FY01 and are continuing. The 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, a list of 20-30 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 capitol renewal needs could be addressed within such a contract using long term financing.

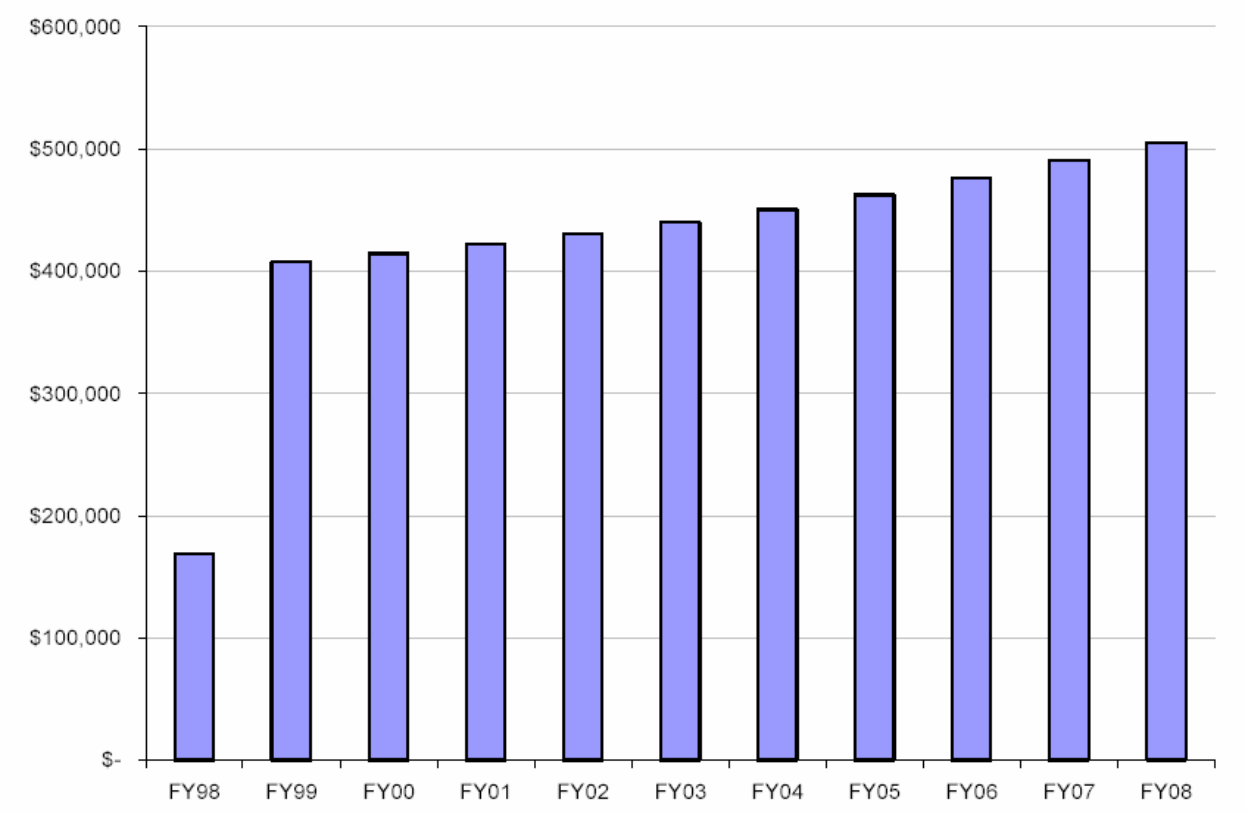


Figure 3 **Originally estimated avoided costs from Viron ESA throughout the ten year term of the agreement**
(source: Viron ESA, Schedule F, March 10, 1997, verified by Viron annual reports through FY01)

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 of 2003 and will expire in July of 2005.

Oakland University saved $523,000 in FY03 as compared to the previous Detroit Edison D6 rate, and it is estimated that a further $515,000 will be saved in FY04. A new

purchase contract beginning August 2005 will be placed out for bid sometime in the coming months. Future savings for the next contract are expected to be slightly less than the existing contract savings based on the current market.

New Main Campus Electrical Service

The new Spencer Substation service was energized on May 15th, 2003. Although the vastly improved reliability of this new service was in service, it could not guard against the multi-state blackout of August 14 & 15th.

The only method to fully guard against such an area wide power outage would be to install dedicated onsite power generation for Oakland University. This option is discussed in more detail below.

NATURAL GAS PURCHASING UPDATE

Natural gas prices continue to be volatile. An unusual 2003 spring-summer hike in gas prices pushed up prices equal to those seen in the winter of 2001.

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

WATER & SEWER RATE INCREASE

The City of Detroit water rate increase resulted in an 18% hike to Oakland University's combined water & sewer cost of approximately $50,000 annually. Further water rate increases are anticipated.

Overall water consumption decreased slightly from FY02 to FY03.

POTENTIAL FOR COMBINED HEAT AND POWER AT OAKLAND UNIVERSITY (COGENERATION)

Over the past year, we have been investigating the opportunity for the University to install its own power generation equipment. Our central campus heating and electrical systems are ideally suited for the addition of 3-6 megawatts of on-site cogeneration. Cogeneration involves an environmentally benign means of electrical power generation in conjunction with the capture of thermal energy byproduct (waste heat). This type of system has the ability to save the University on its utility operating costs.

Several benefits of an Oakland University cogeneration system are:

- ✓ Lowers our overall operating costs.
- ✓ The project would be designed to provide a positive cash flow allowing the University to address several million dollars in urgent capitol renewal projects.

- ✓ Diversifies our utility portfolio to buffer future price shocks in any single utility market. We are currently purchasing electricity below market costs, and I fully expect this to increase in coming years.
- ✓ Backup power capacity to allow a substantial portion of the campus to operate during a Detroit Edison power outage.
- ✓ Proven technology. Many other Michigan universities, hospitals, and industrial facilities presently enjoy the benefits of cogeneration.
- ✓ More efficient means to heat and power the campus, thereby reducing our contribution to carbon dioxide emissions and associated global warming.
- ✓ Lower pollutants as compared to our existing systems.

Many large hospitals, industrial facilities, and campuses utilize this type of system including UM, MSU, WMU, EMU, and CMU.

This opportunity could provide OU with the above environmental and cost reduction benefits. Longer term financing could allow a means for funding urgent capitol renewal projects for utility system infrastructure.

ENERGY PROJECTS

A number of projects have been undertaken in this past year and all are substantially complete and functional.

Utility Metering

All of the new metering has been installed and is functional. Over 100 metered data points are collected by control panel in each building and networked back to a central computer server for real time display, archiving, and report generation.

Just a few representative figures taken from the system are located in Appendix 2. Although the system was not on-line as soon as anticipated, the operational and energy savings benefits will be multiple. Some of the more noteworthy uses will be:

- ✓ Departmental awareness of energy usage
- ✓ Accurate auxiliary department billing
- ✓ Tool for utility purchasing –better information for the suppliers
- ✓ Efficiency auditing per building
- ✓ Targeting of energy conservation measures
- ✓ Campus electrical peak shedding and load shaping

Solar Demonstration Project

The new 10,000 Watt solar roof located at the University Student Apartments was switched onto the grid in June of 2003. Weather instrumentation and a data acquisition system were installed as part of the project to facilitate further study by the OU engineering department. An open house was held for the public on October 3, and over 50 visitors stopped by to learn about our system. Five newspaper articles have been published highlighting the system as well.

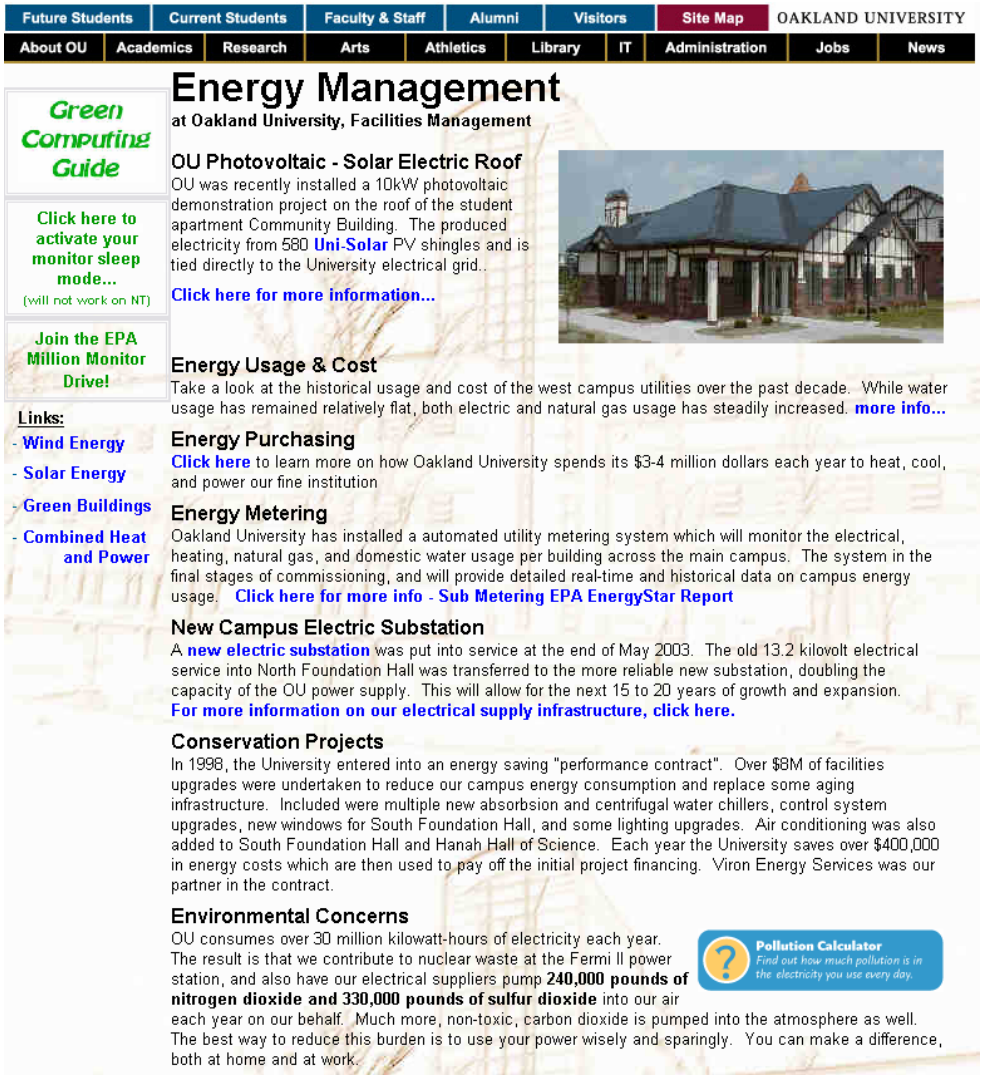
Solar power production matches our campus electrical demand very closely. If the State of Michigan provides additional incentives, or if the price of solar electric installations fall, additional solar installations would be a great asset for the University.

SEB Chilled Water / Ice Storage Plant Control Upgrade

The control system for the Science and Engineering Building chilled water plant was upgraded and reprogrammed. The revised control program enhances the operation of an electrical peak shaving system, using night-time ice production and storage for day-time cooling loads. The initiative resulted in a three-year payback from electrical cost savings.

OU Energy Web Site

The OU energy management web site has been up and running since FY02. It will be a dynamic forum to provide the campus and public with energy information and related issues. Below is the homepage view of www.oakland.edu/energy .



APPENDIX 1– HISTORICAL TRENDS

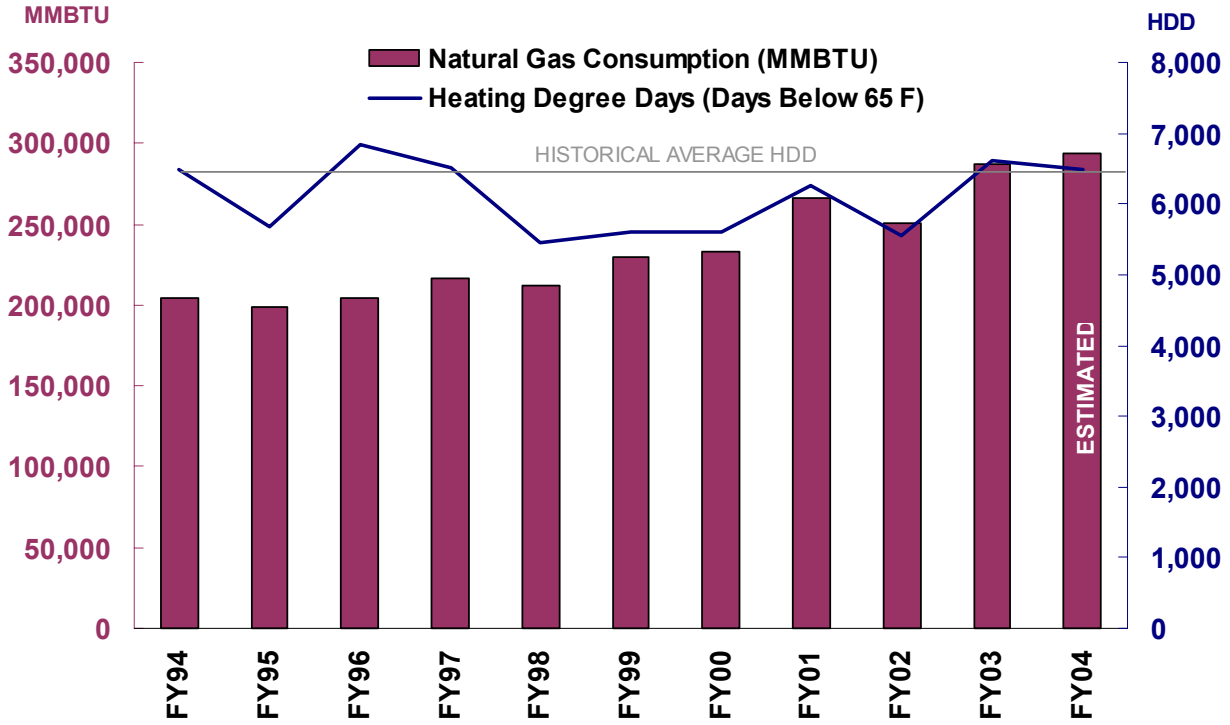


Figure A1 **Main campus natural gas consumption as compared to winter weather conditions in heating degree days (HDD)**

HDD = (65 – Daily Average Temperature) for each day measured at Detroit Metro Airport

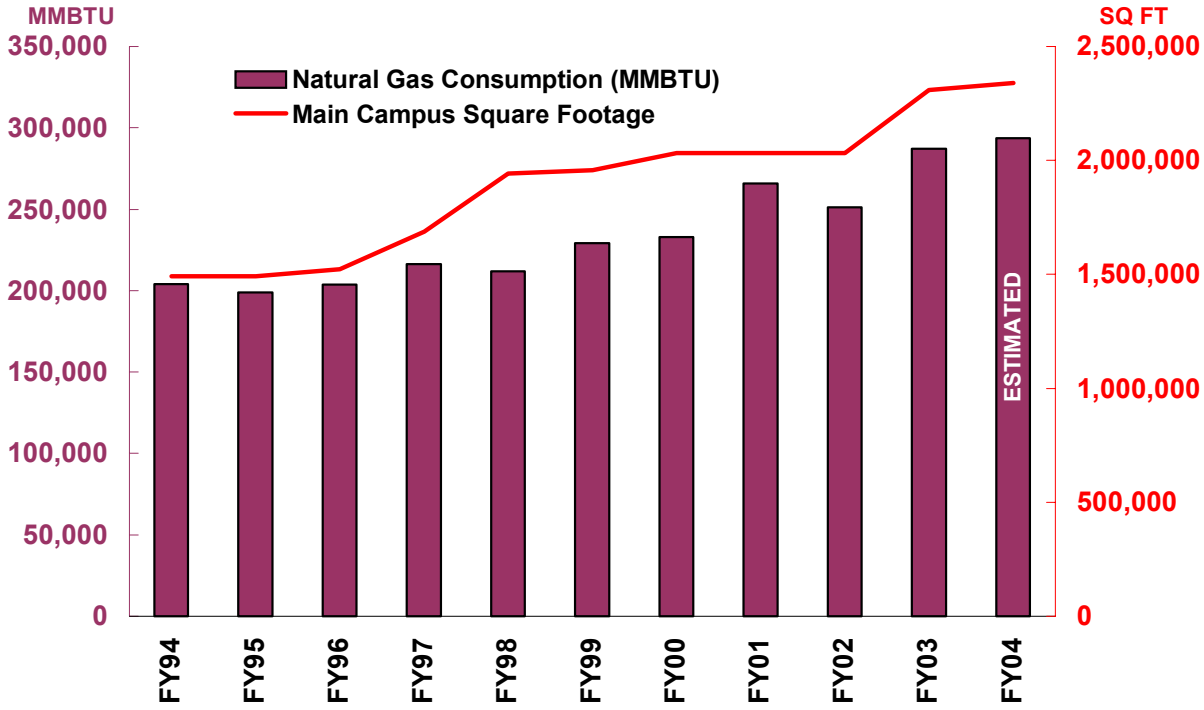


Figure A2 **Main campus natural gas consumption compared to facility growth in square feet**

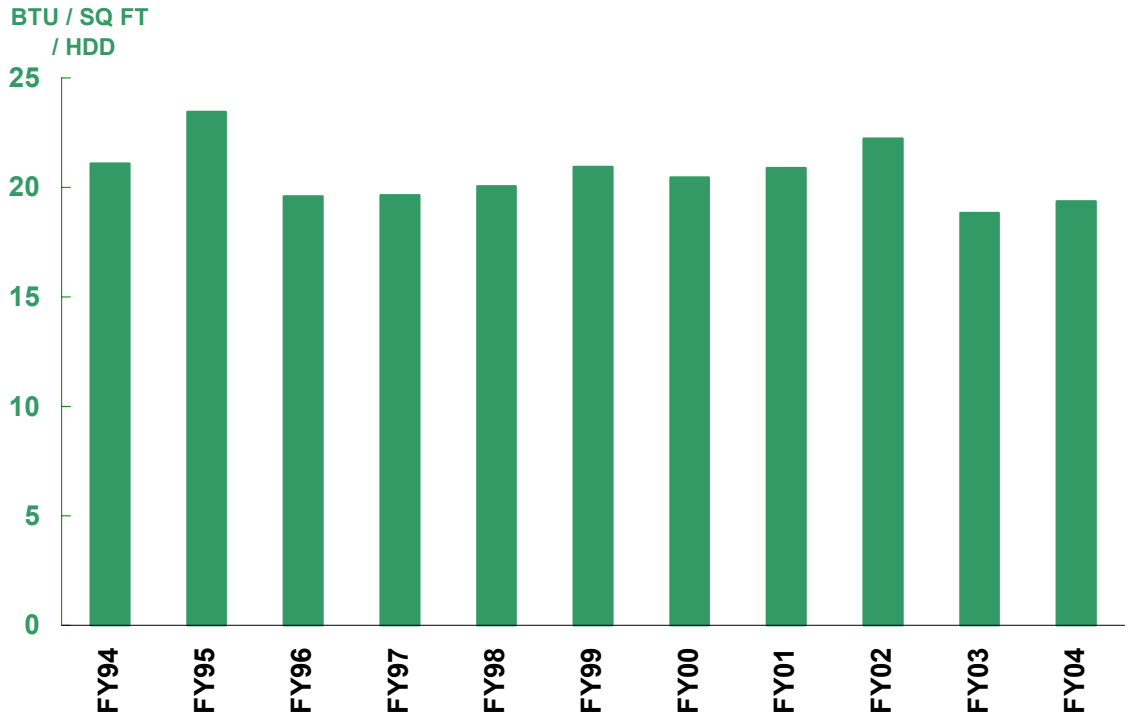


Figure A3 Main campus natural gas consumption normalized for winter weather in HHD and campus growth in square feet

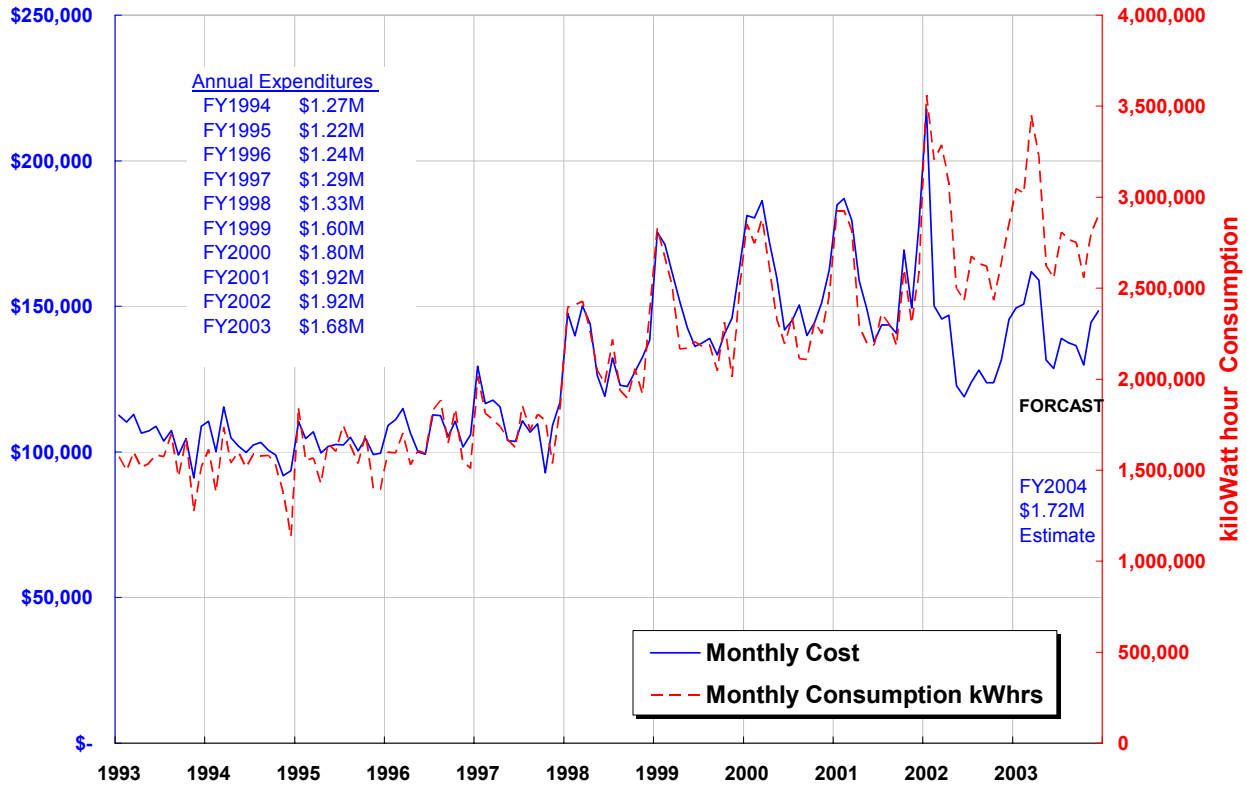


Figure A4 Main campus electrical cost and consumption beginning in FY94

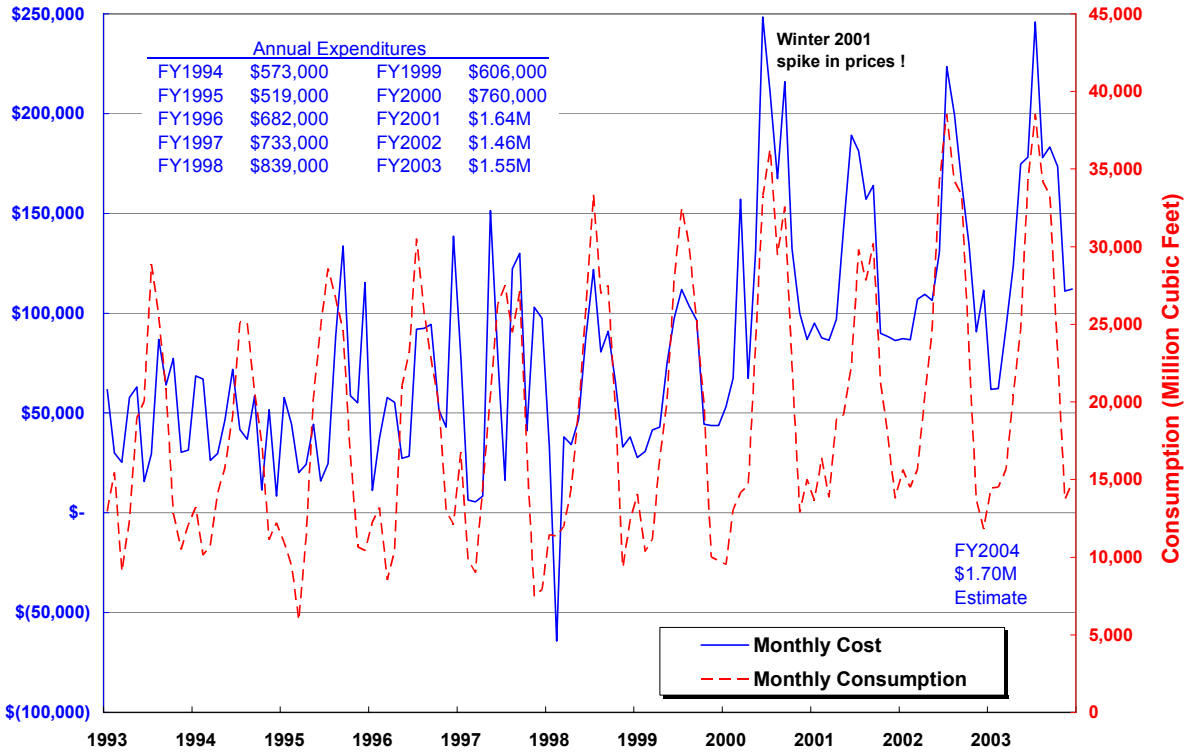


Figure A5 Main campus natural gas cost and consumption beginning in FY94

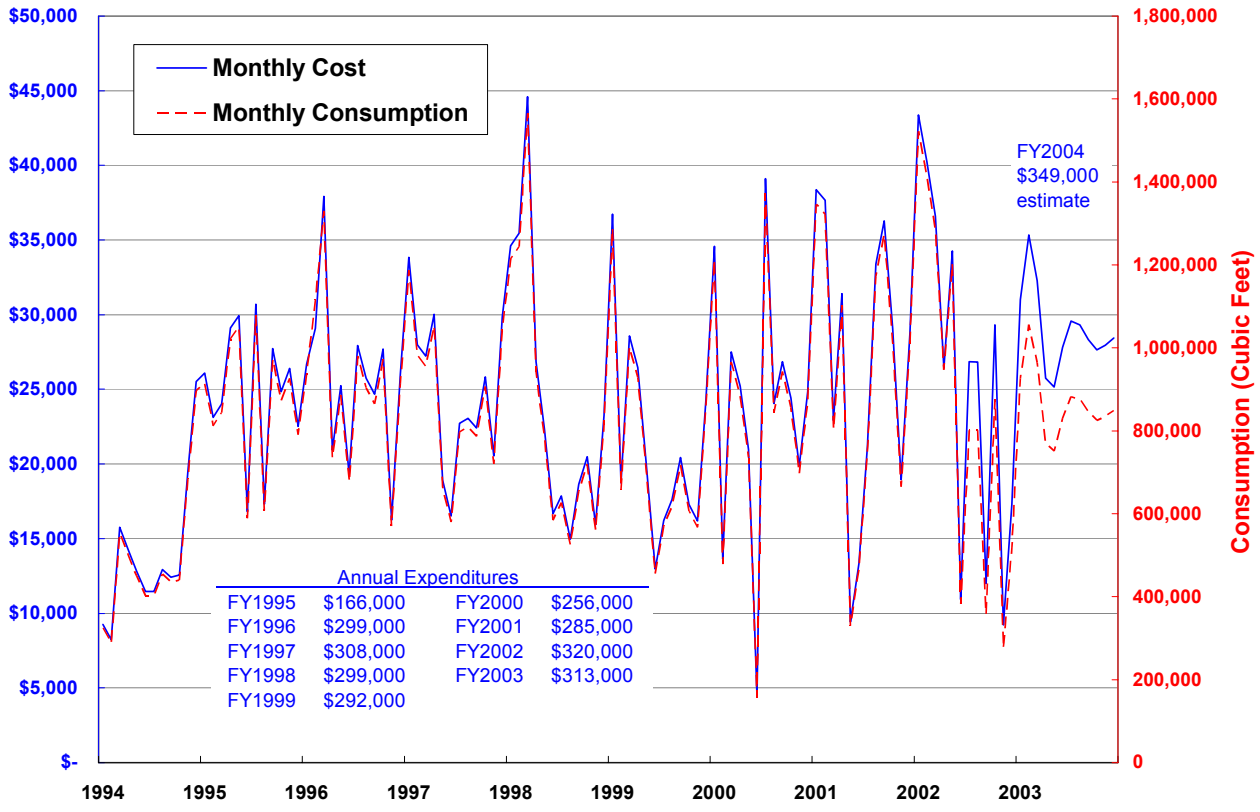
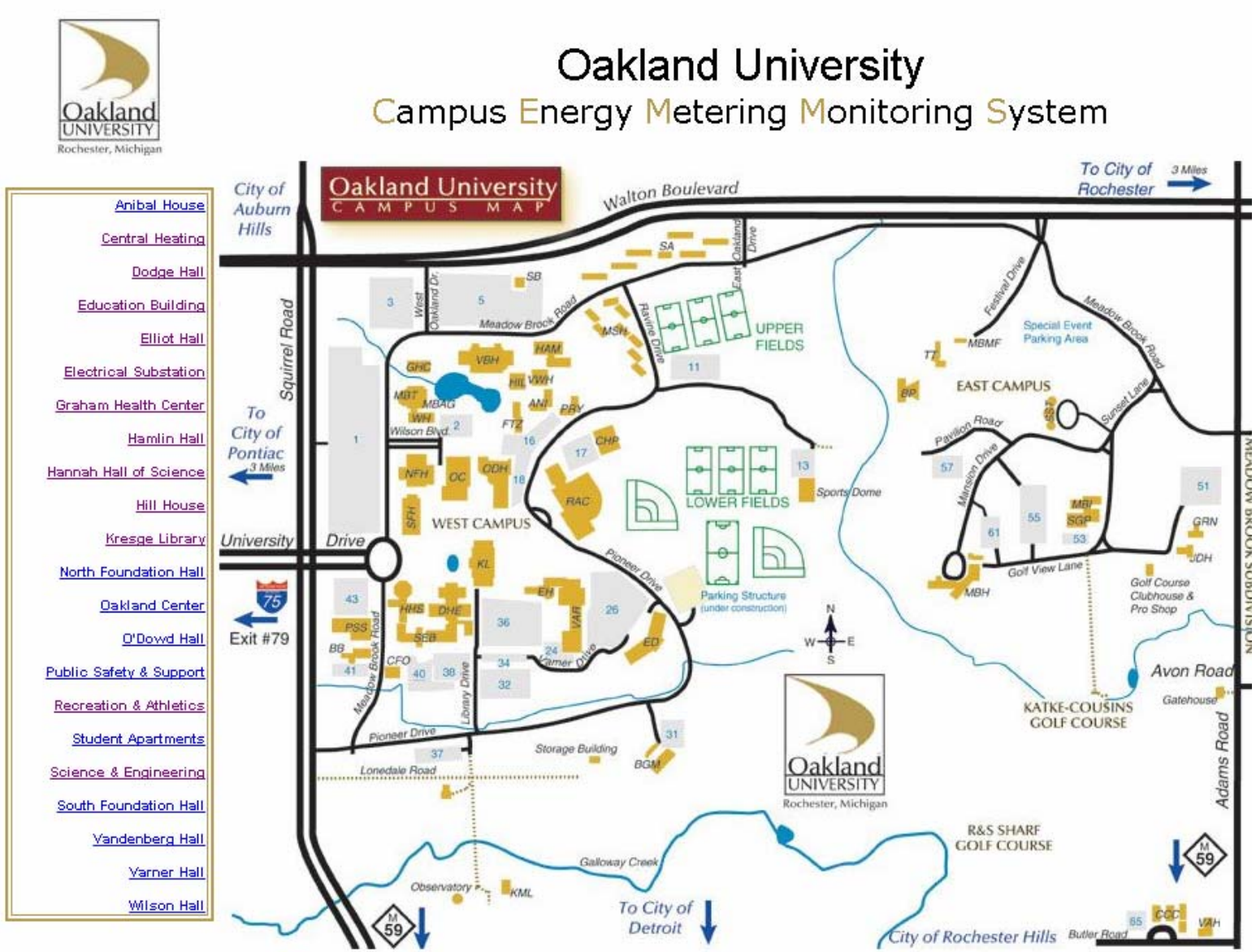


Figure A6 Main campus water & sewer cost and consumption beginning in FY94

APPENDIX 2– UTILITY METERING SYSTEM – SAMPLE CHARTS

Below is a small sample of the data and reporting available on the new system.



This is the main page of energy metering web site. Each building on the main campus is a clickable link

to the building specific page similar to the example shown on the next page.

Real-time data is displayed per meter for each building. We monitor electricity, natural gas, domestic water, and the central heating hot water system. This data is logged to the archive, where multiple types of reports can be generated for analysis. See examples below.

PROFILE

The profile graph displays the typical (average) load shape for a given set of days over a time period, i.e. what does a typical Sunday look like or what does a typical weekday look like.

Days of the Week

- [ ] Sunday
- [x] Monday
- [x] Tuesday
- [x] Wednesday
- [x] Thursday
- [x] Friday
- [ ] Saturday

START

October

2003

END

October

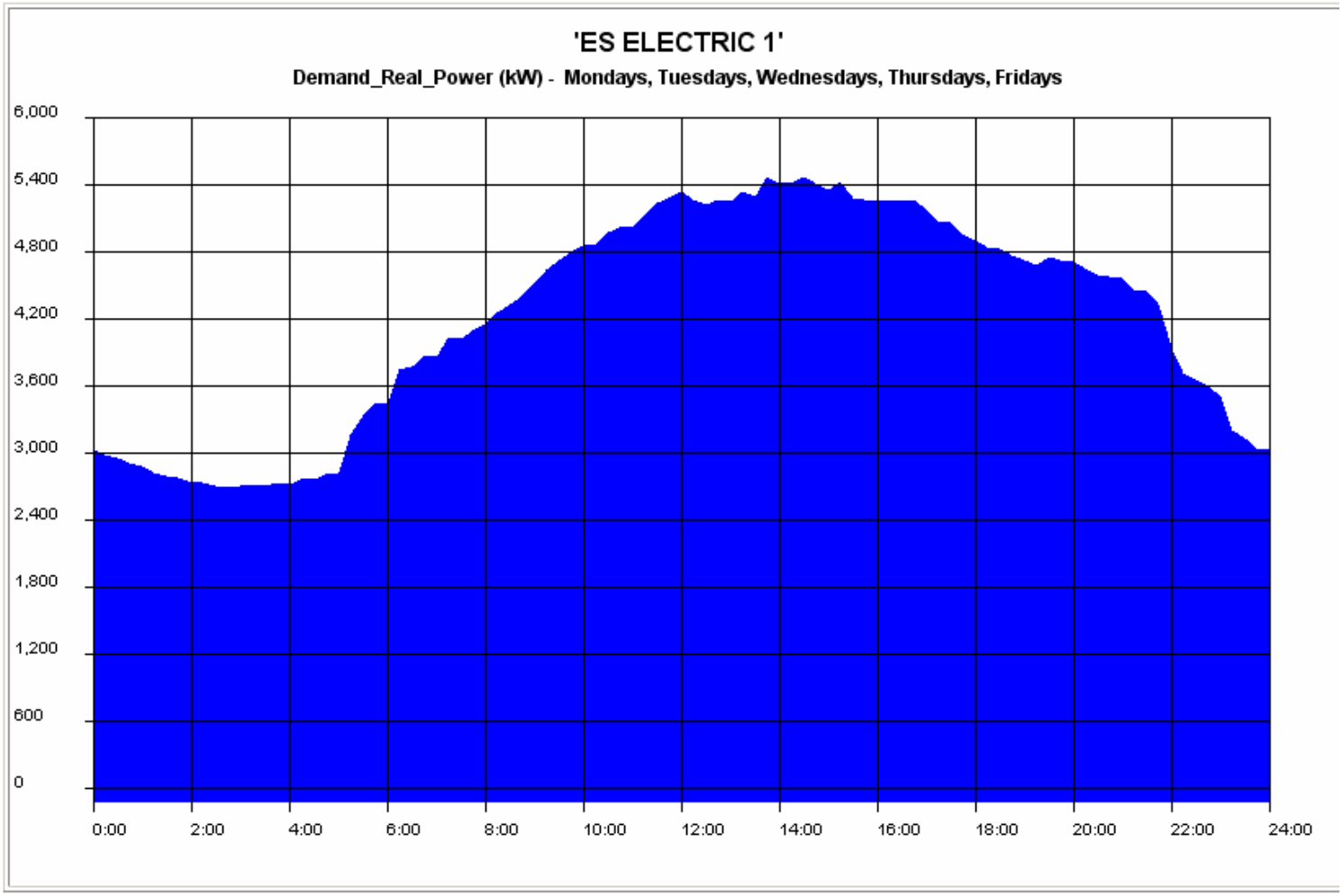
2003

Granularity

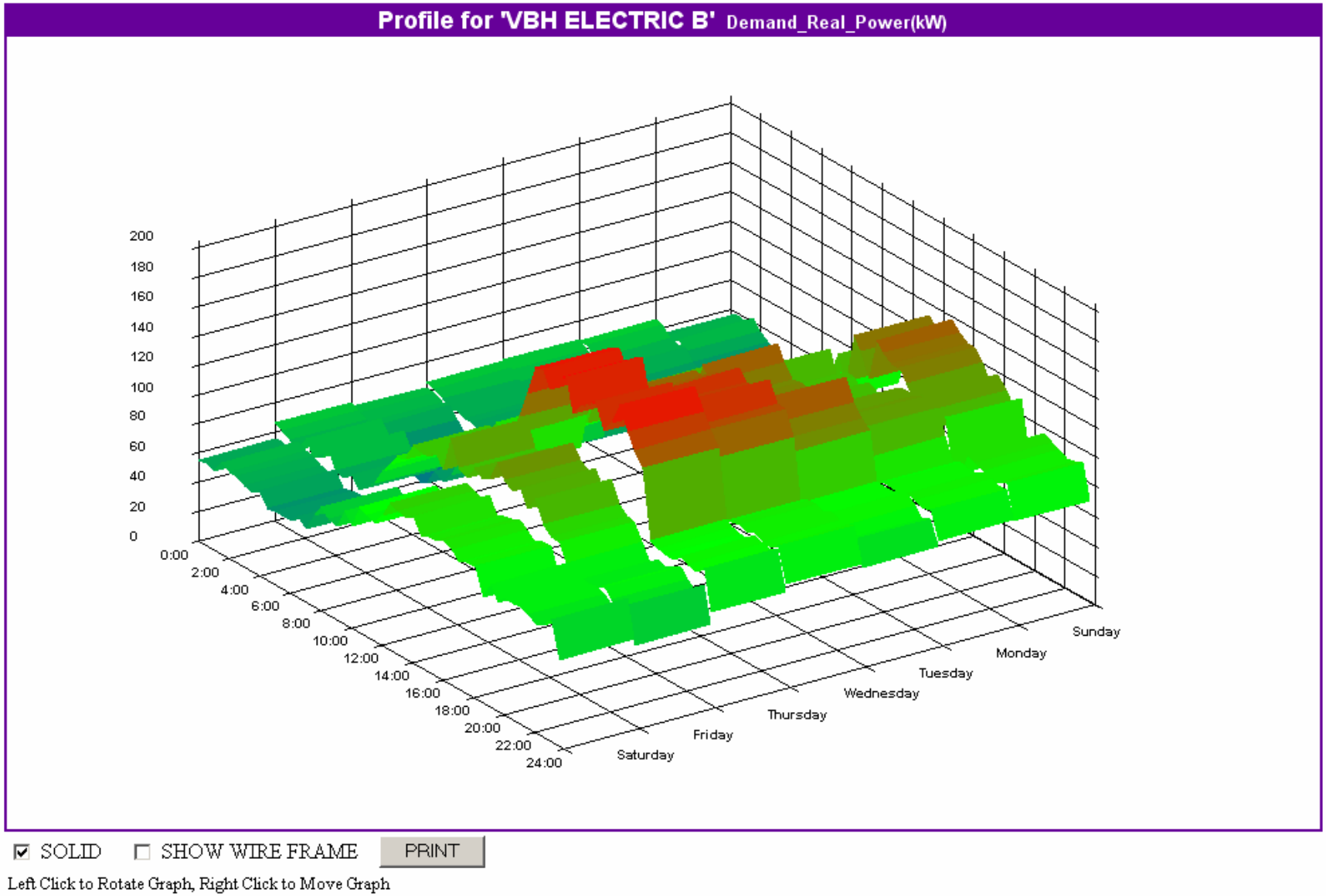
15 Minute

VIEW PROFILE

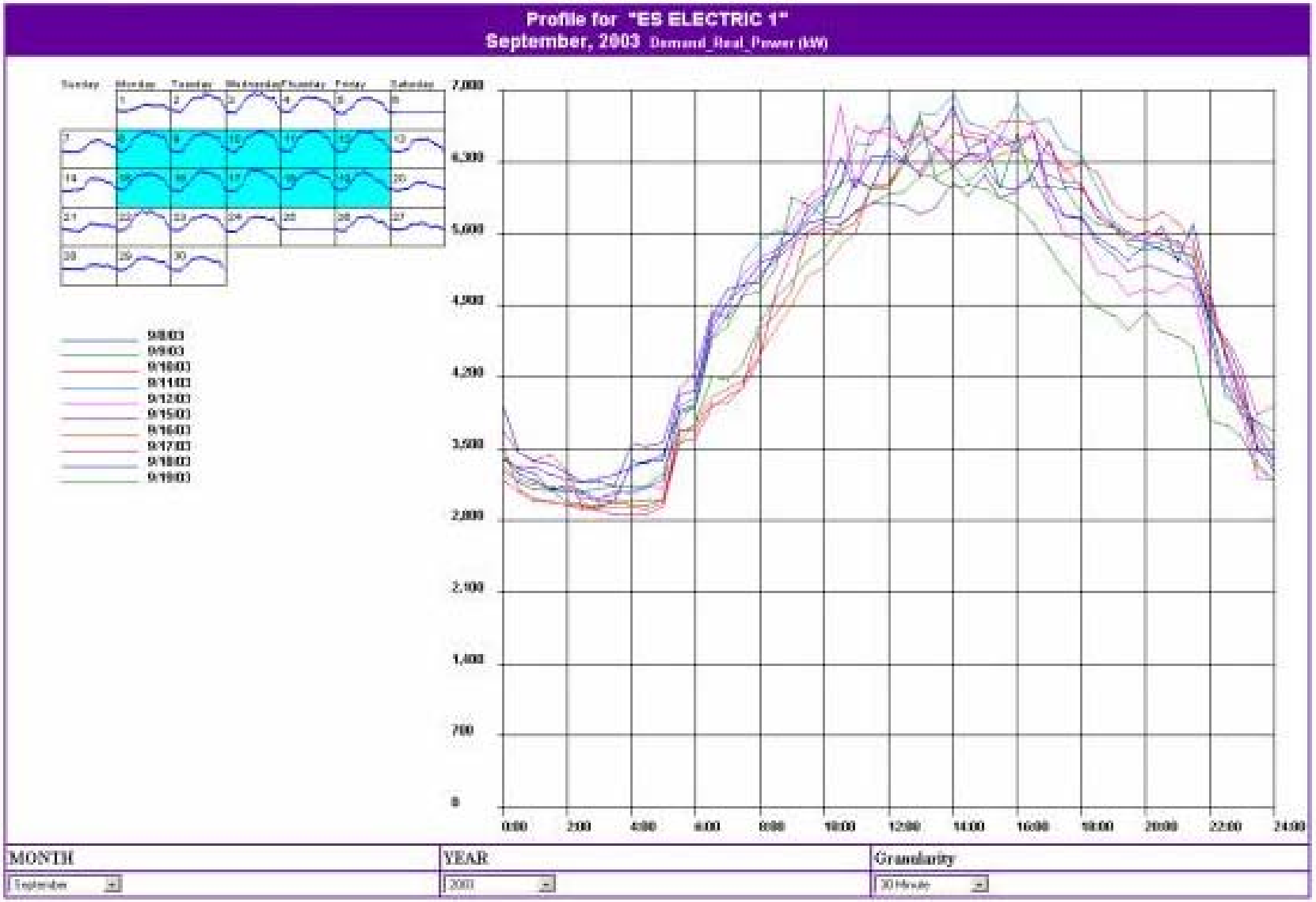
PRINT



This is the entire main campus weekday electrical load profile for the first two weeks of October 2003. Shown is the Monday through Friday load profile illustrating a broad peak from noon until 4pm of about 5,400 kilowatts. It is interesting to note that our night time usage never drops below 2,500 kilowatts. This highlights the need to target our nighttime electrical consumption.



This chart shows a one week period for one of Vandenburg Hall's electric meters in three dimensions. The time of day axis is on the left, and the days of the week are on the right. This view allows a quick reference to when energy is being used throughout the week. The chart may be rotated to view from any direction.



This chart shows a calendar report which shows energy usage patterns viewed throughout the month at a glance. Any day, or group of days may be analyzed. Here, the all week days for the 2nd and 3rd week of September are highlighted. Aberrations from the normal pattern will uncover operation issues such as equipment running off of desired schedules, equipment requiring maintenance, or other building problems. Evening and weekend energy usage will also be analyzed in detail per building as well as other opportunities for savings.

PROFILE

The profile graph displays the typical (average) load shape for a given set of days over a time period, i.e. what does a typical Sunday look like or what does a typical weekday look like.

Days of the Week

- ☑ Sunday
- ☑ Monday
- ☑ Tuesday
- ☑ Wednesday
- ☑ Thursday
- ☑ Friday
- ☑ Saturday

START

October

2003

END

October

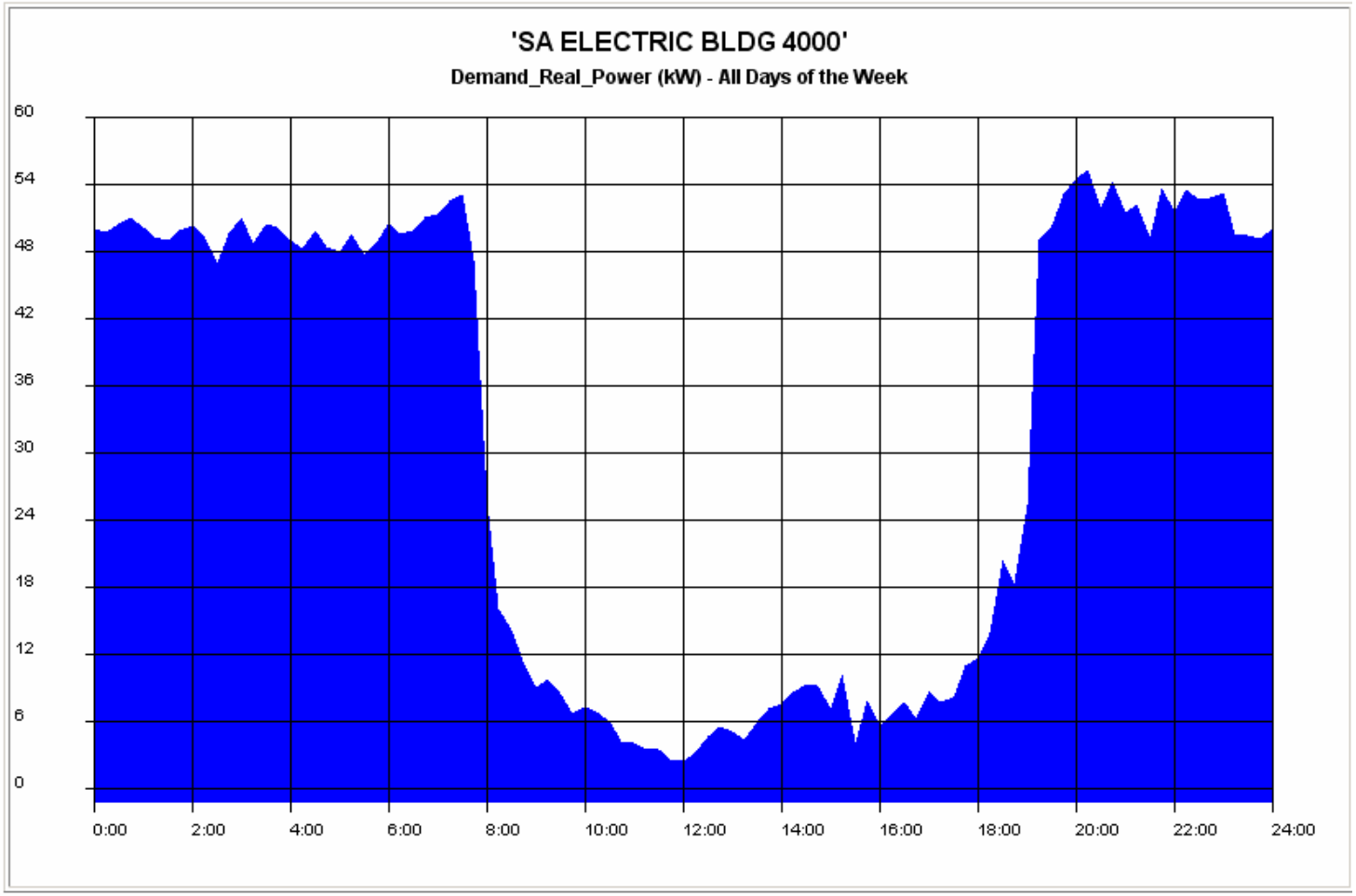
2003

Granularity

15 Minute

VIEW PROFILE

PRINT



This load profile is from the 4000 Meadowbrook Drive building of the University Student Apartments for the first half of October. This is the site of the solar roof project (photovoltaics). You can see that from around 8AM until 7PM the electrical load is minimal. This is mainly due to the production of solar electricity throughout the day offsetting the required grid power.