

**Oakland University**

**Annual Energy Review**

**FY 2002**

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## EXECUTIVE SUMMARY

A mild winter and substantially lower natural gas prices in fiscal year 2002 gave Oakland University a temporary reprieve in our escalating utility costs. Total utility expenditures for main campus utilities were \$3.70 million, down 3.4% from FY01.

Currently, fiscal year 2003 has seen the addition of the School of Education & Human Services Building, the University Student Apartments, and the new parking structure. Coupled with increases in the use of technology on campus and intensity of building usage, FY03 will show a sizable increase in utility consumption.

However, due to favorable natural gas purchase contracts and a new electrical purchase contract on the Retail Open Access program, COSTS for FY03 are projected to remain approximately constant compared to FY02.

Numerous energy conservation projects are underway:

- The Campus Wide Energy Metering & Monitoring System is being commissioned and will be fully operational in spring of 2003
- A new energy management web site was created for the University at [www.oakland.edu/energy](http://www.oakland.edu/energy)
- A \$100,000 State of Michigan grant was obtained to install a 10-kilowatt solar electric demonstration project on the roof to the new Student Apartment Community Building
- The Science & Engineering Building chiller plant & ice storage system will receive a control system upgrade to avoid expensive peak time energy usage, for an estimated \$35,000 annual savings

## FISCAL YEAR 2002 USAGE AND COSTS

A mild winter and substantially lower natural gas prices gave Oakland University a temporary reprieve from escalating utility costs. Electricity consumption was up slightly and water/sewer was up significantly, likely due to the dry summer and added irrigation of the playfields.

**Table 1** *Fiscal year 2002 utility usage & cost with comparison to FY01 for the main campus*

|                      | Usage           | % change from FY01 | Cost (Millions) | % change from FY01 |
|----------------------|-----------------|--------------------|-----------------|--------------------|
| <b>Electricity</b>   | 29,674,680 kWhr | + 1.6%             | \$1.92          | + 0.3 %            |
| <b>Natural Gas</b>   | 245,021 MCF     | - 4.6%             | \$1.46          | - 10.6 %           |
| <b>Water / Sewer</b> | 11,253,500 CF   | + 12.4%            | \$0.32          | +12.4 %            |
| <b>TOTAL</b>         |                 |                    | <b>\$3.70</b>   | <b>- 3.4 %</b>     |

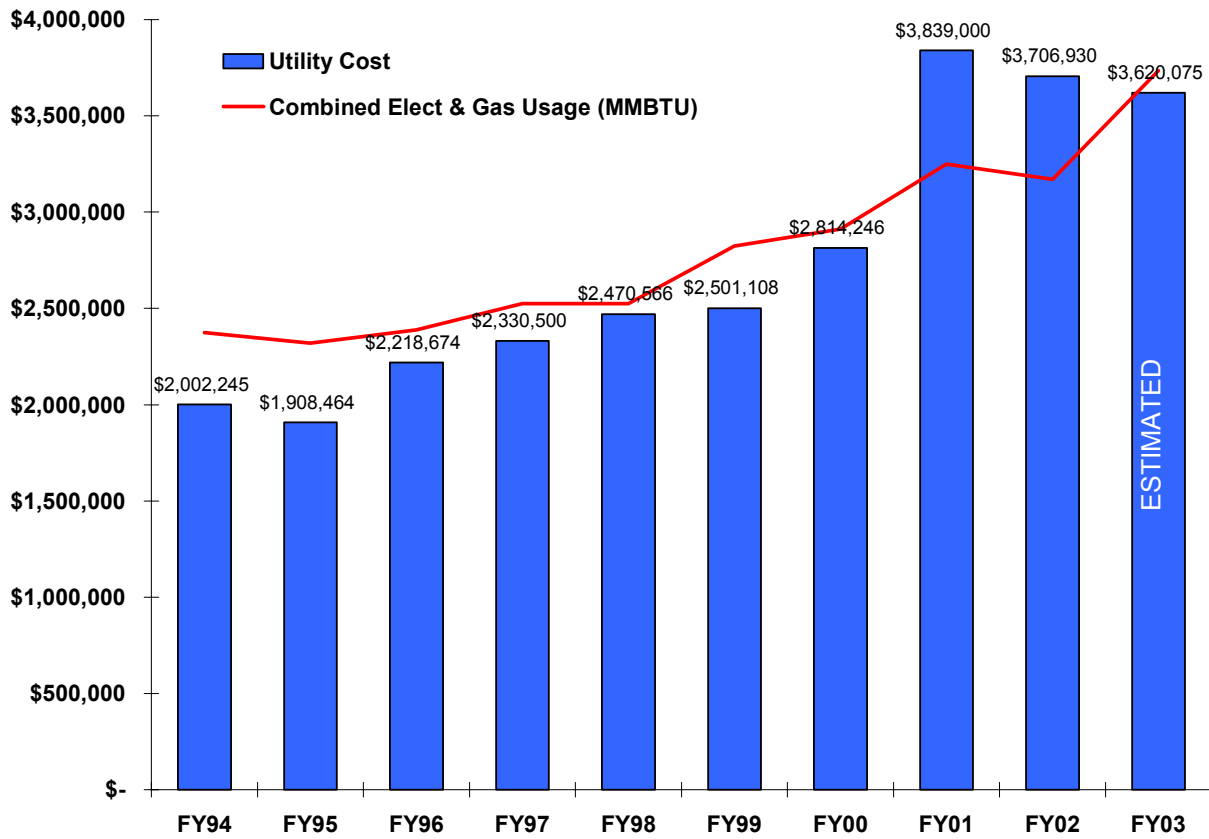
kWhr = kilowatt – hours  
MCF = 1,000 cubic feet  
CF = cubic feet = 7.5 gallons

Fiscal year 2003 has seen the addition of the School of Education and Human Services Building, the Student Apartment complex, and the parking structure. Coupled with increases in the use of technology on campus and intensity of building usage, FY03 will show a sizable increase in utility consumption. However, due to favorable gas purchase contracts and a new electrical purchase contract on the Retail Open Access program, costs for FY03 should be approximately the same as FY02. See below for more information on purchasing.

## HISTORICAL USAGE AND COSTS

Utility costs have climbed steadily through the mid 1990's as our campus has expanded. The large hike in natural gas prices in the winter of 2000/2001 was the biggest contributing factor for the significant increase in FY01. The natural gas market has still not fully recovered.

See Figure 1.



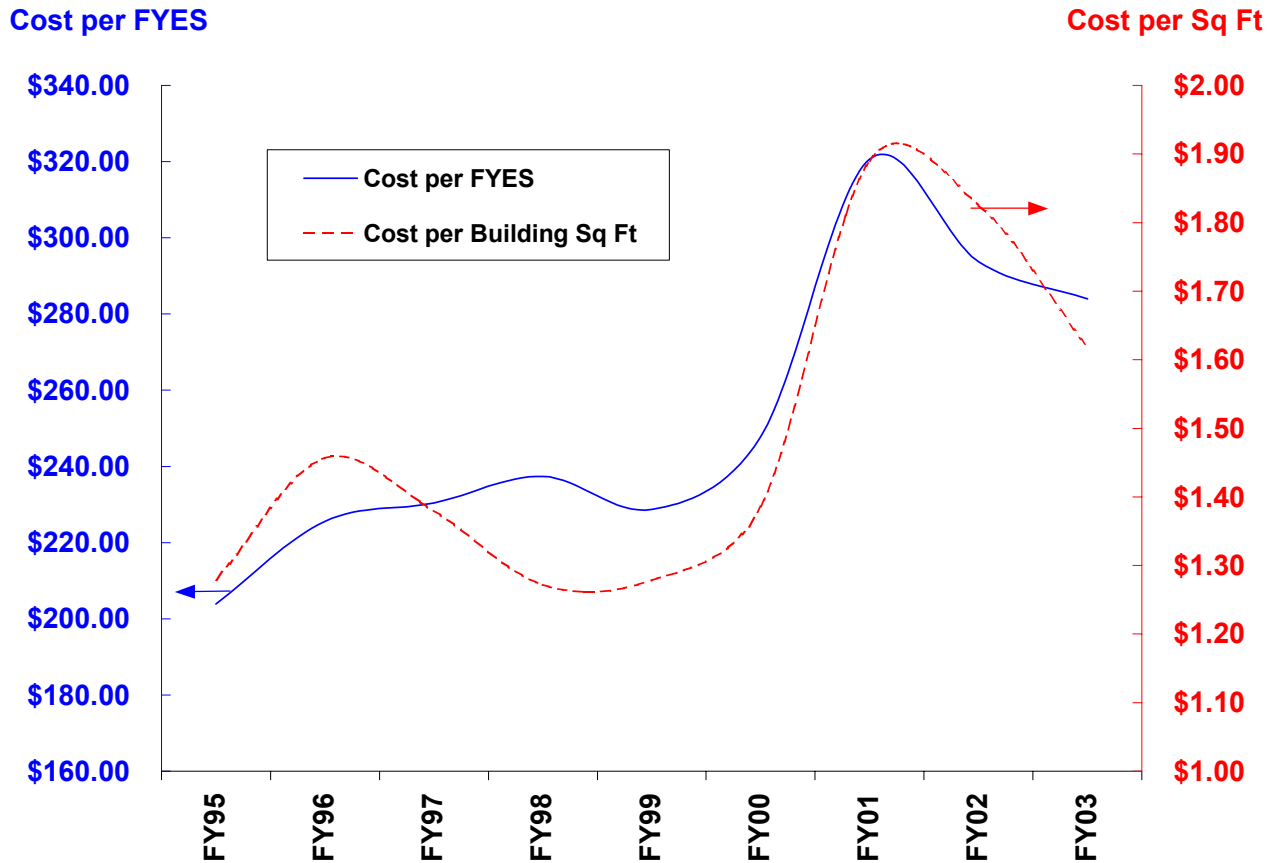
**Figure 1** Main campus annual utility expenditures and usage. Combined cost total for electricity, natural gas, and water/sewer, and combined usage for electricity and natural gas (in MMBTU)

Recent additions to our campus can be seen below in Table 2. Next to the gas price spike, OU's growth has been the largest contributing factor to escalating utility costs. Figure 2 illustrates utility costs per square foot and per full year equivalent student. It is notable that cost per square foot was maintained at a relatively constant level until the winter 2000/2001 natural gas market spike.

**Table 2** Recent additions to main campus building area

| Building Name                    | Sq Feet <sup>A</sup> | Year | Total Main Campus Sq Feet |
|----------------------------------|----------------------|------|---------------------------|
|                                  |                      | 1996 | <b>1,523,024</b>          |
| Science & Engineering Bldg.      | 165,494              | 1997 | <b>1,688,518</b>          |
| Recreation & Athletic Center     | 253,494              | 1998 | <b>1,942,012</b>          |
| Biomedical Res. Support Facility | 14,300               | 1999 | <b>1,956,312</b>          |
| Elliott Hall (BIT)               | 74,582               | 2000 | <b>2,030,894</b>          |
| Education & Human Serv. Bldg.    | 130,075              | 2002 | <b>2,160,969</b>          |
| Student Apartments               | 148,123              | 2002 | <b>2,309,092</b>          |
| Parking Structure                | 179,820              | 2002 | <b>2,488,912</b>          |

<sup>A</sup> These 7 facilities increased the main campus square footage by 63% since 1996.



**Figure 2 Main campus total utility cost per Full Year Equivalent Student (FYES) and per square foot**

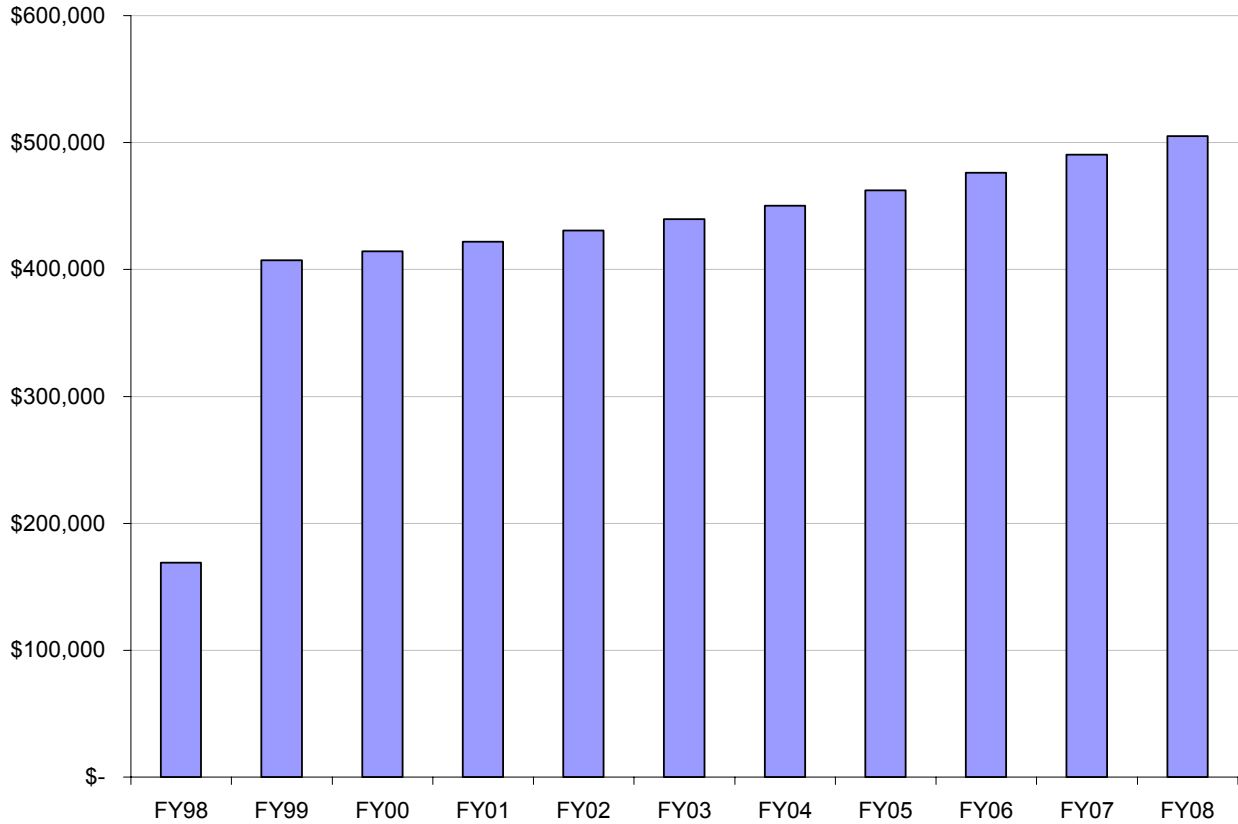
Additional detail on expenditures and rates for electricity, natural gas, and water/sewer are shown in figures A1-A6 at the end of this document.

## **VIRON ENERGY SERVICES – ENERGY SERVICES AGREEMENT (ESA) UPDATE**

With Board approval, Viron Energy Services discontinued their annual energy savings report beginning with FY2002. Per the agreement approved by the Board and executed with Viron, in place of the annual report and savings guarantee, the ESA now provides engineering services to assist with additional energy conservation and project implementation. Several of the more significant activities to date under the revised agreement include:

- design of North Foundation Hall Admissions area lighting retrofit
- design of Oakland Center Student Services area lighting retrofit
- analysis of east campus utilities and potential service from the new substation which shows a potential \$73,000 per year savings
- study & auditing of individual building energy usage

The figure below graphically illustrates the originally estimated cost savings resulting from the Viron ESA. These savings were documented and verified for the first 3 full years of the project verification phase (through FY01).



**Figure 3** Originally estimated avoided costs from Viron ESA throughout the 10 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 CONTRACT**

In February of 2000, the Board authorized the University to enter into an electrical “wheeling” purchasing program. This came into being under a contract with Quest Energy, LLC of Ann Arbor. We began receiving power through Quest in August of 2002. As a result the University is saving an estimated \$30,000 per month in electrical cost. Each year the Michigan Public Service Commission (MPSC) rules on the Detroit Edison “local delivery charges”. These charges may increase in the coming months, reducing our savings by some percentage, but we should continue to see substantial savings over the two-year life of the Quest contract. See Figure A2 for a historical illustration of OU’s electrical unit cost per kilowatt-hour.

## **NATURAL GAS PURCHASING UPDATE**

Natural gas costs have been unstable since the aforementioned market price spike in FY01, which prompted the University to initiate an 18 month term “layered” purchasing program. The bulk of our gas is now supplied via contracts in the range of \$3.80 per million BTU. Consumers Energy also charges approximately \$0.55 per million BTU to deliver the natural gas to our campus. See Figure A4 for a historical illustration of the OU’s natural gas unit costs.

## **ALTERNATIVE ENERGY AT OU**

### ***Solar Energy***

OU Facilities Management has been awarded a \$100,000 grant from the State of Michigan Energy Office for a 10-kilowatt solar electric public demonstration project. In March of 2003, we installed 10 kilowatts of a solar shingle product on the roof of the new student apartment community building. It is an attractive, building-integrated product that will provide over \$1,000 per year of electricity for the University Student Apartments.

A lot of interest and exposure has been generated by this project that is expected to be completed by June of 2003. The Detroit News and Oakland Post have both featured the project in recent articles.



### ***Wind Energy?***

In addition, the potential for a small, utility scale wind turbine is being investigated for installation on campus. Although our wind resources might not be sufficient to make a project feasible with older technology, new low-wind speed turbines are becoming



available. The costs of new turbines sited with a good wind resource are now producing electricity in the range of 3-4 cents per kilowatt-hour across the United States.

### ***Cogeneration***

Perhaps the greatest potential for an “alternative energy” installation here at OU may be a cogeneration system. A cogeneration system is an electric power generator that simultaneously provides an electrical output and a thermal output. The University’s heating and cooling systems are almost ideally suited to utilize the waste heat from such a system. Although a conventional natural gas driven turbine or engine would be the driver of a cogeneration unit, the efficiency of energy conversion would be in the 80% range, while our current power supply from conventional coal-fired power plants is at best 40% efficient.

A feasibility study is currently underway to review the economics and engineering viability of cogeneration at OU. This project would be largely dependent upon future electrical and natural gas prices. The project could also be installed and financed by a third party to yield a net positive cash flow to the University.

Lastly, the installation of a sizable generator on campus would give increased reliability in the remote event of a power outage by Detroit Edison. The generator could be connected to the campus electrical systems such that critical buildings and information technology systems would remain on-line.

## **ENERGY CONSERVATION MEASURES**

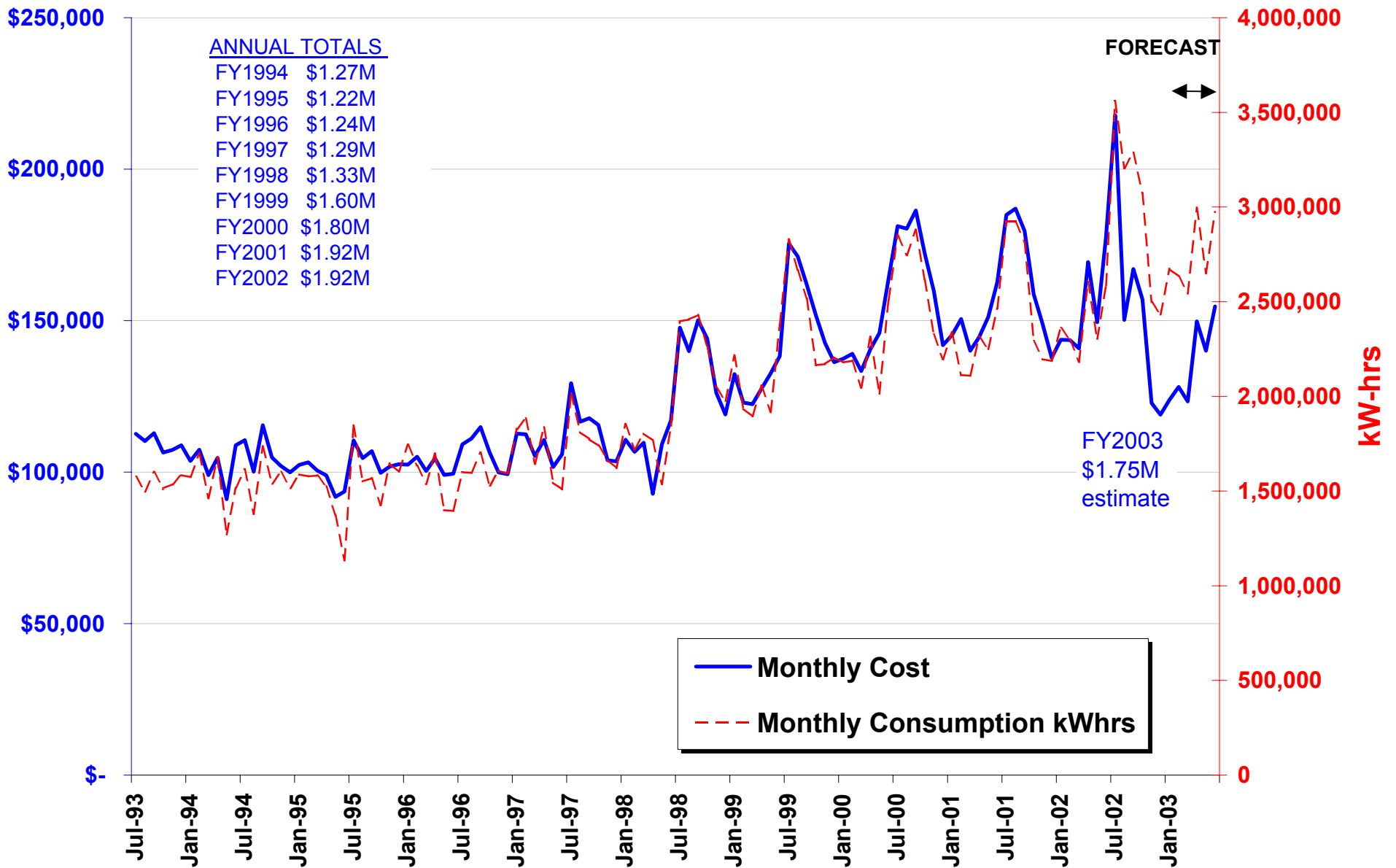
### ***Current Activities (a few major items)***

The Campus Wide Energy Metering & Monitoring project is nearing completion. The installation is complete, and programming and commissioning is underway. This system will provide a detailed view into when, where, and how energy is used on campus. Numerous cost savings and operational benefits will be identified with the information provided from this project.

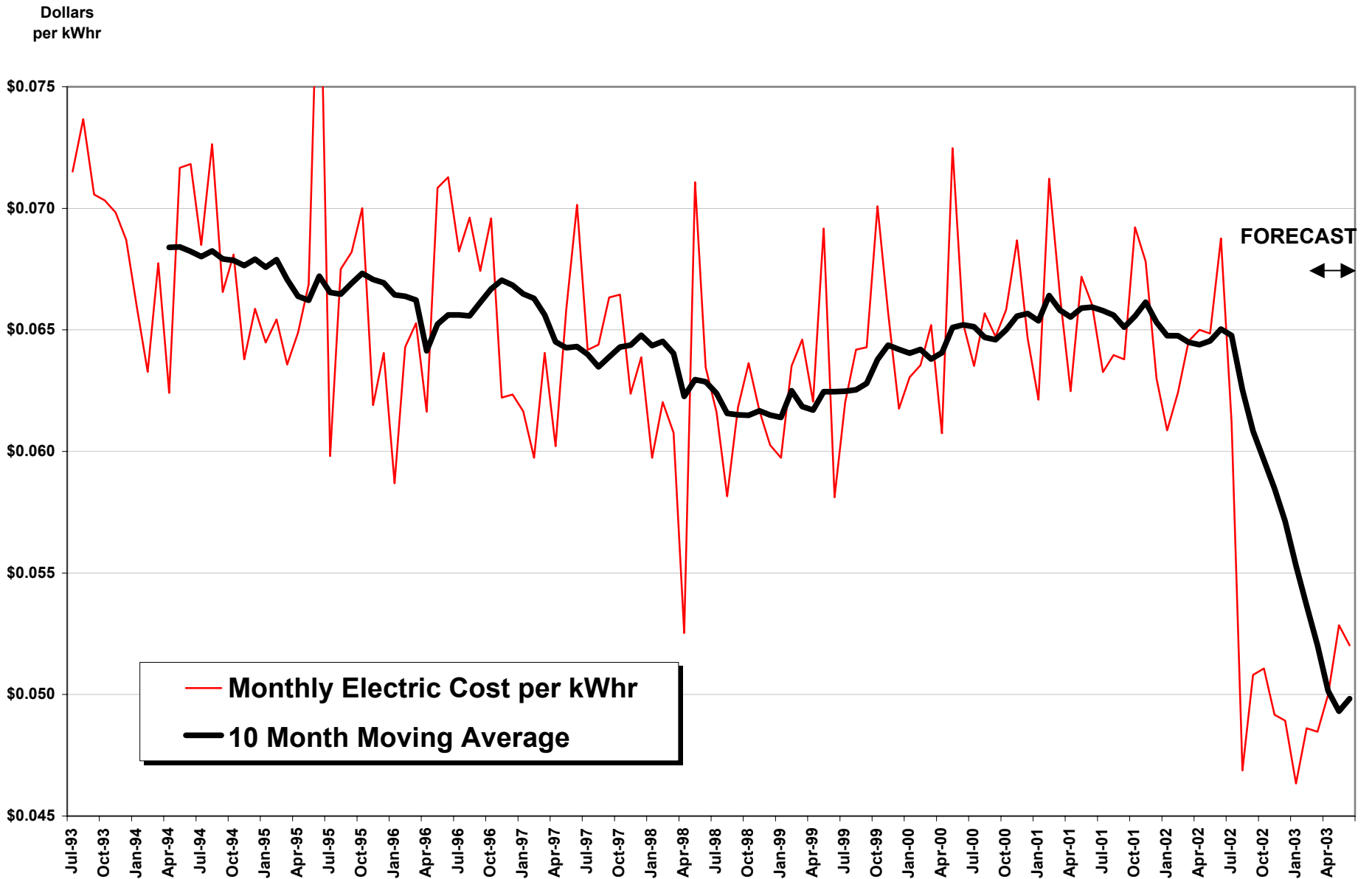
Also, an Oakland University energy management web site was created to begin an outreach program to involve the campus faculty & staff in energy awareness and conservation. The web site is [www.oakland.edu/energy](http://www.oakland.edu/energy) .

Also, the University Student Apartments original design had called for a dedicated Detroit Edison electrical service. Instead, the OU electrical system was extended to serve the site. As a result, the University will realize annual electrical cost savings of about \$70,000.

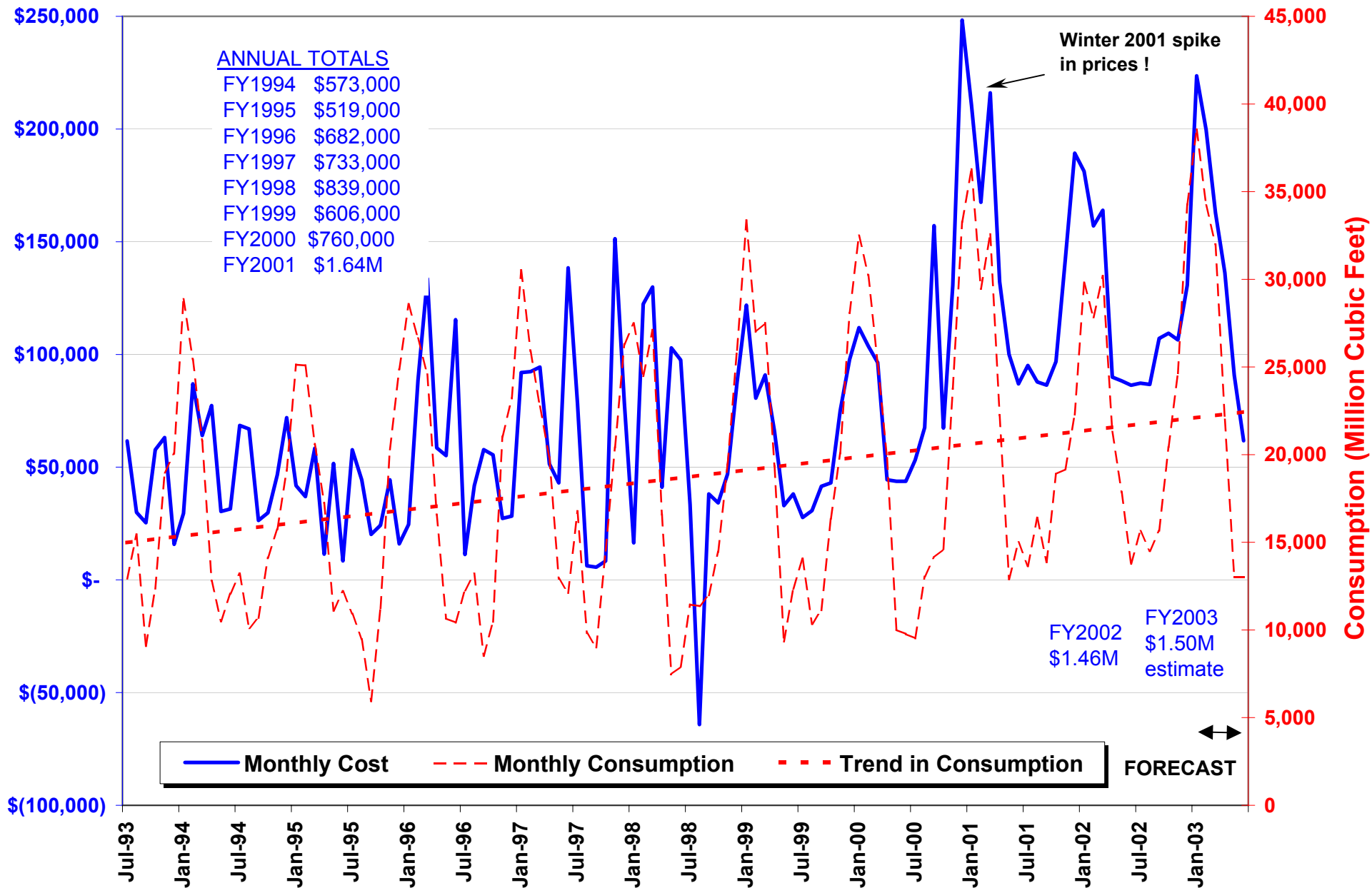
Lastly, an upgrade to the Science & Engineering chilled water – ice storage plant is underway. This upgrade will allow the SEB building to avoid expensive summer peak electrical loads for an estimated savings of \$35,000 per year.



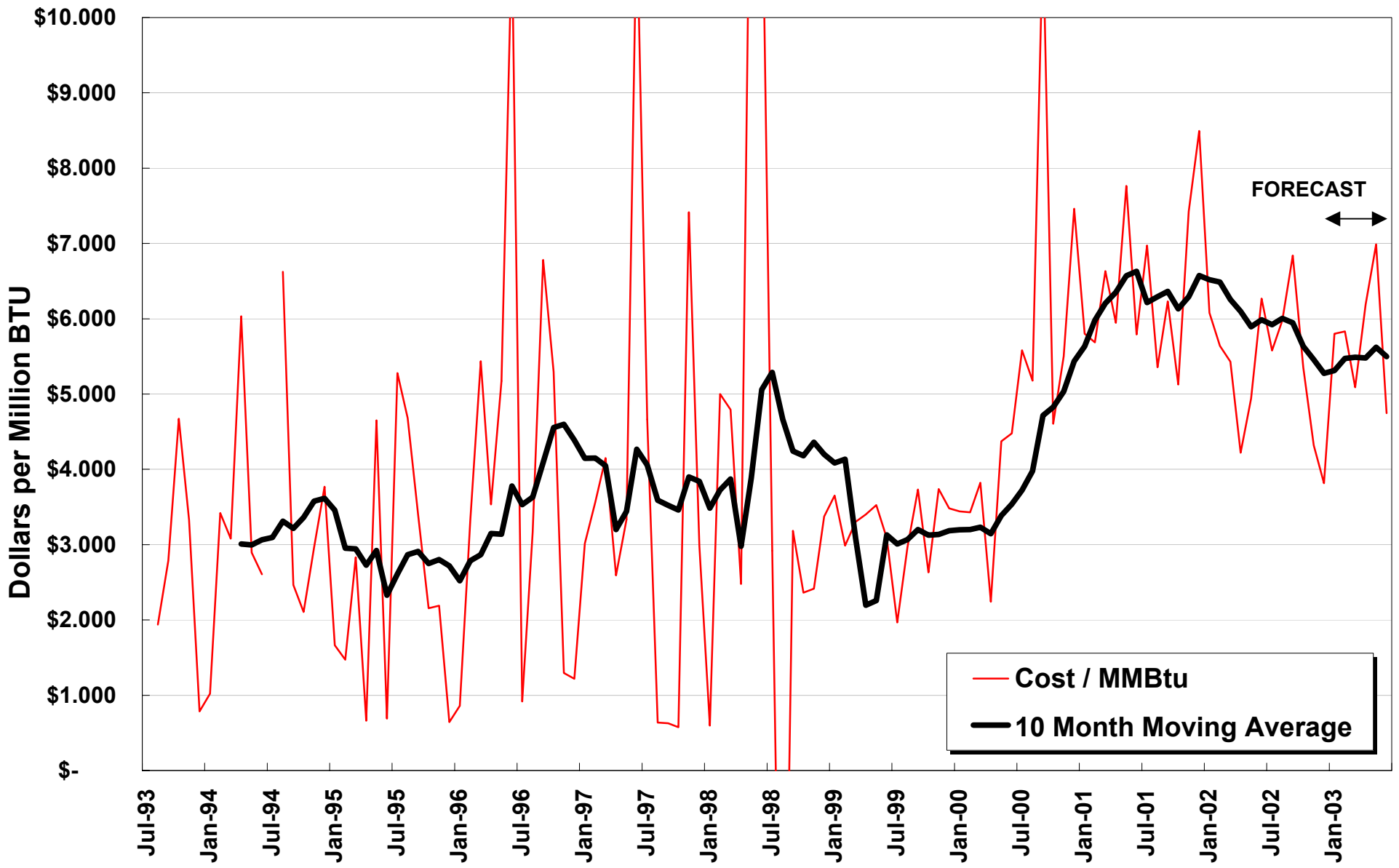
**Figure A1 Historical monthly electric consumption and cost for main campus**



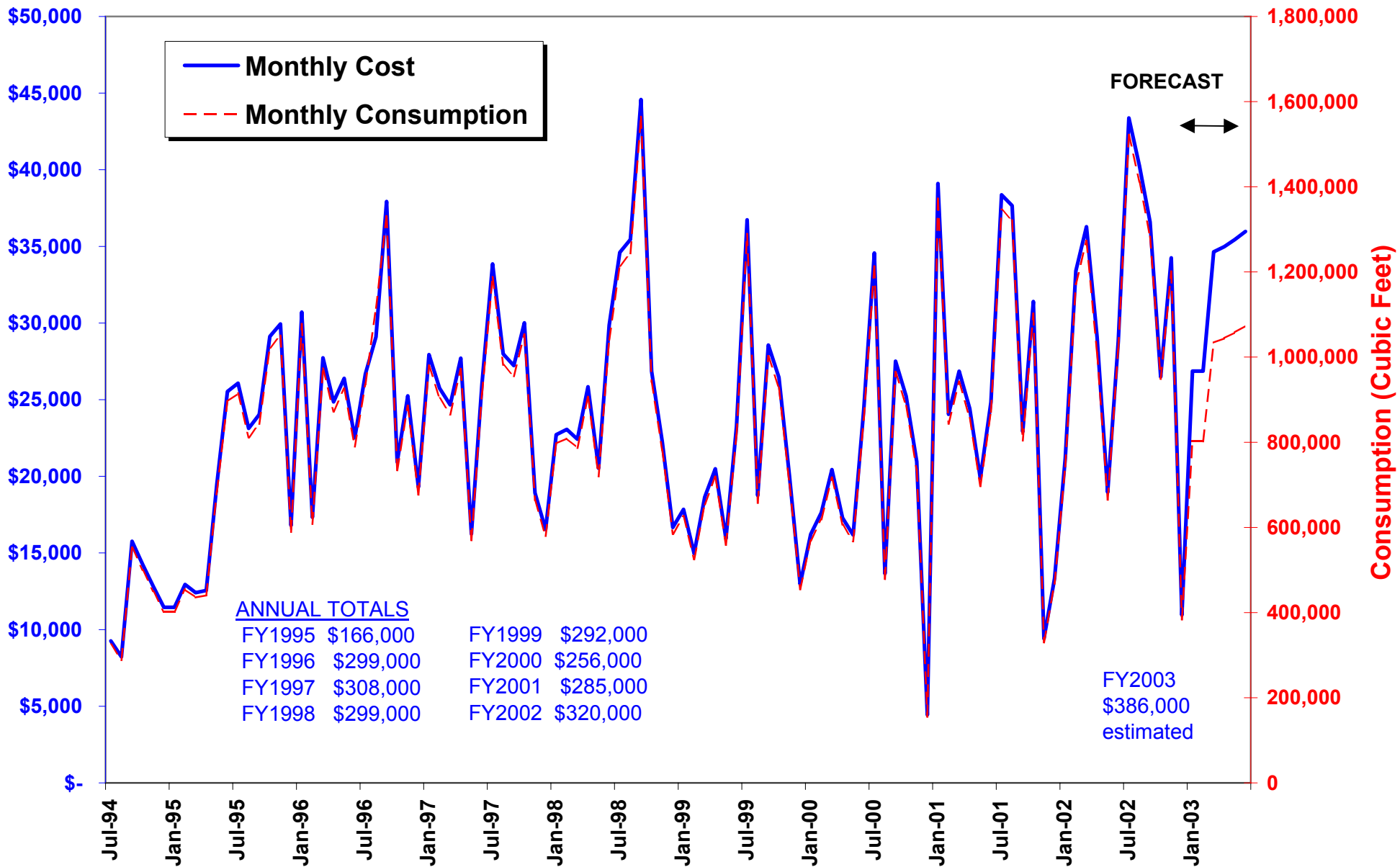
**Figure A2 Historical monthly electric unit price for main campus**



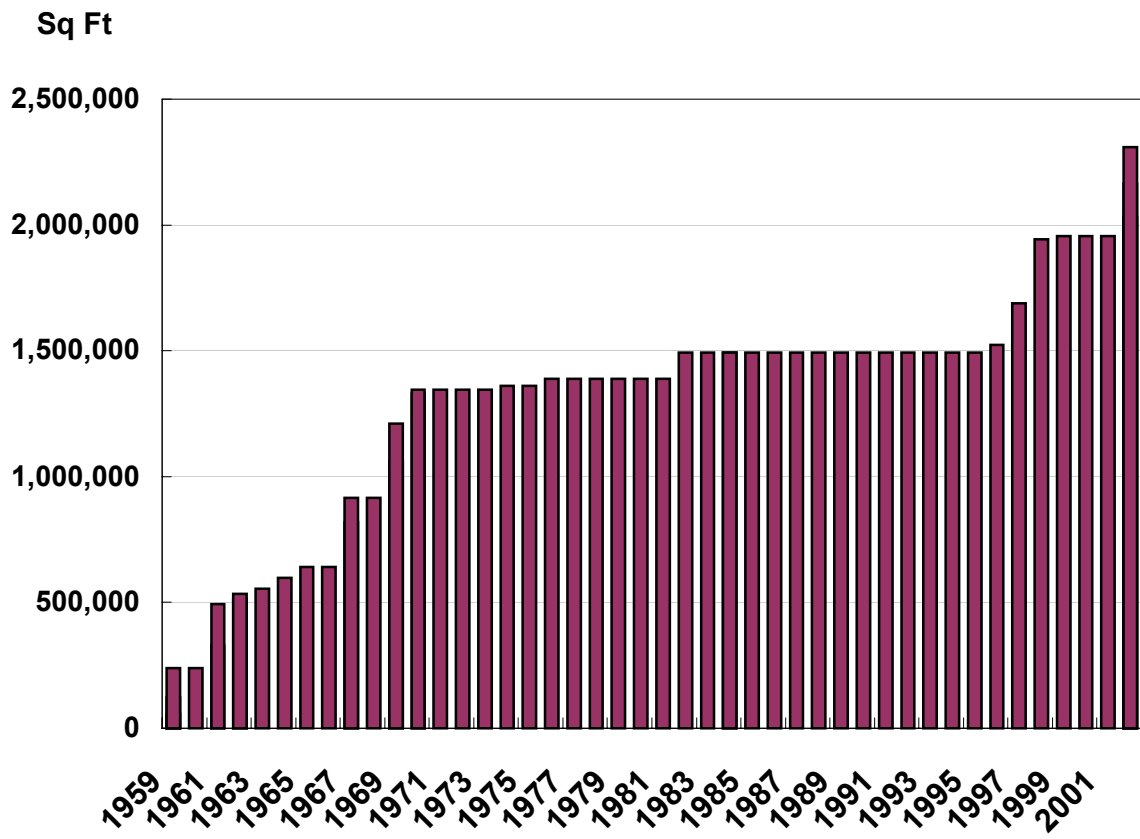
**Figure A3 Historical monthly natural gas consumption and cost for main campus**



**Figure A4 Historical monthly natural gas unit price for main campus**



**Figure A5 Historical monthly water/sewer consmptn & cost for main campus**



**Figure A6** *Historical main campus facility square footage growth*