



THE UNIVERSITY *of* NORTH CAROLINA
GREENSBORO

STRATEGIC ENERGY PLAN

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I. EXECUTIVE SUMMARY

The University of North Carolina at Greensboro has adopted energy efficiency initiatives and worked to inform the campus community about the economic and environmental impacts of energy conservation. Through the implementation of performance contracts, installation of new technology, improvements to the steam and chilled water infrastructures, and education and outreach efforts, energy and water consumption have decreased significantly since 2003. Overall, UNCG has decreased energy use per GSF by 15.9% and water consumption per GSF by 71.0% from the FY2002-03 baseline, far surpassing the 20% water savings goal established by the State. When compared to FY2011-12, however, UNCG saw slight increases in both total energy (3.93%) and water (6.33%) use. These increases can be attributed in part to weather, as Greensboro saw 611 more total degree days in 2012-13.

UNCG understands that there is more to do to achieve the mandated 30% energy reduction by 2015. Guided by the new UNCG Climate Action Plan and other strategic documents, staff will continue to research and implement appropriate technologies and strategies to reduce fossil fuel consumption. Simultaneously, UNCG will continue to implement improvements as funding is available. The ultimate goal is that UNCG will move toward reliable and sustainable energy resources and become a model of campus energy efficiency through innovative energy supply and management programs.

II. FY2012-13 ACCOMPLISHMENTS

UNCG Facilities staff, including members of Facilities Operations, Facilities Design and Construction, and the Sustainability Office, conducts annual evaluations of energy management efforts by the university. In FY 2012-13, UNCG continued to introduce and grow initiatives across key strategic focus areas. In particular, the assessment revealed the following strengths in current efforts and programs:

- ***Energy Data Management*** – UNCG collects energy consumption and billing information on a monthly basis. Currently, meters are read manually and the data input into MS Excel spreadsheets. These data are used to detect trends in energy consumption, including excessive variation, to identify facilities for more detailed evaluations. UNCG staff also examines the monthly data to identify and correct billing errors.

UNCG also operates Tridium and Vykon Energy System software applications. The Facilities team continues to assess how best to incorporate these systems, which offer opportunities to remotely collect and analyze meter data. To this end, in FY2012-13 a University Mechanical Engineer joined the Facilities Operations team. His responsibilities include refining and completing utility meter installations, maximizing the efficacy of the BAS systems for UNCG applications, and leading the building controls team.

As noted in last year's report, two members of the Facilities Operations staff underwent training for the Time and Materials Accounting System (TMA) software, which captures utility billing data and monitors associated costs on a per meter/per facility basis. Once fully updated, this system will enable UNCG to conduct more rigorous data analyses on building energy use, helping to determine how best to apply funding for energy performance improvements; TMA will also expedite the billing process. Unfortunately, the loss of the Energy Manager position in FY2011-12 due to budget cuts has inhibited these efforts.

- ***Energy Supply Management*** – Most facilities at UNCG receive electricity from Duke Energy through the main campus substation via an underground distribution system. The campus substation is on a time-of-use electrical rate schedule that is reviewed annually to evaluate the best rate options and incentive programs for which UNCG qualifies.

The primary energy source for the UNCG steam plant remains natural gas, with No. 2 fuel oil serving as the backup source. Natural gas is purchased through a broker and is continually reviewed for changes in market pricing. Utilization of No. 2 fuel oil on-site not only serves as a reliable backup fuel source, it also allows UNCG to maintain an interruptible gas rate through the natural gas broker. This capability enhances the flexibility of UNCG's operations and also results in significant cost savings.

UNCG has also installed its first on-site renewable energy system (**Figure 1**). In June 2013, a 3.1 kW solar photovoltaic array was installed on the Grounds Maintenance Shop in the northwest section of campus. Facilities Management is also working to incorporate solar thermal for domestic hot water at the Spartan Village residence halls.



Figure 1: Solar PV installation at UNCG.

- **Energy Use in Facilities** – Several campus buildings are governed by a direct digital control (DDC) system for heating, ventilating, and air conditioning (HVAC). Temperature set points have been established in buildings via the DDC in order to maintain control of adjustments. UNCG reviewed these set points in 2011 and piloted a two-degree change in one building to assess levels of comfort and potential energy savings.

Based on the positive outcomes of this pilot study, coupled with evidence of significant energy savings via similar programs at other universities, UNCG began to phase in new set points and building occupancy hours in December 2011. This program, known as the “Standards of Comfort”, established set points as follows:

During occupied hours... thermostats will be set at 69-71°F in the heating season, and 74-78°F in the cooling season. During unoccupied hours, the building temperature will be set back at 80°F during the cooling season and at 55-60°F during the heating season. Building occupants are expected to comply with setting the thermostats within these ranges in buildings where thermostats cannot be automatically set by a building automation system (BAS) or other means.

Through June 2013, all campus facilities on the BAS had switched to this new policy. Further, three buildings not on the BAS incorporated these standards in FY 12-13; Facilities staff change the settings manually each season and thermostat locks prevent tampering. Since its inception through June 2013, this program has resulted in avoided costs of over \$179,000, avoided electrical consumption of almost 2.7 million kWh, and avoided greenhouse gas emissions of 1381.60 mtCO₂e. The remaining buildings not connected to the BAS will continue to be added to this program during FY2013-14. The entire policy can be found at:

http://facoperations.uncg.edu/UNCG_Standards_of_Comfort.pdf.

- **New Construction and Renovation** – UNCG established a standard that all new construction meet LEED-NC (Leadership in Energy and Environmental Design) Silver requirements; currently nine (9) buildings on the campus have met or exceeded this standard: Jefferson Suites residence hall completed in 2011 achieved LEED-NC Silver, while the School of Education building and the seven buildings of the Quad renovation earned LEED-NC Gold. Five more projects will fulfill this requirement as well: the Dining Hall renovation and the four new residence halls at Spartan Village.
- **Equipment Efficiency** – UNCG continues to conduct a comprehensive maintenance program to keep equipment and systems repaired and operating reliably. The HVAC system maintenance program includes regular filter changes, coil cleaning, and inspections. UNCG also routinely evaluates underground steam lines and performs repairs as necessary to reduce both energy and water consumption.

UNCG has created procedural guidelines and recommendations to improve equipment efficiency whenever possible based on Energy Star and other criteria. Examples include upgrading motors to higher efficiency models when replaced, retrofitting T-12 and other inefficient bulbs and lighting fixtures with more efficient models, installing synchronous belt drives on exhaust fans, and installing occupancy sensors and low flow water fixtures.

- **Organization Integration** – UNCG entered into a performance contract in 2007 as an alternative to the state funding facility utility upgrades, the first agreement of its kind for a school in the UNC system. This contract has resulted in significant energy reductions, with an excess of \$49,116 in savings over the \$548,474 savings guaranteed via the contract last year alone. Since the inception of the contract in 2008-09, UNCG has avoided over \$2 million.

The UNCG Office of Sustainability continued energy conservation campaigns in FY2012-13. Energy conservation is a primary focus of the Green Office program. Further, a student driven guerilla marketing campaign about “vampire energy” is in its 3rd year. “Vampire Energy Slayers” are students who periodically visit campus offices and classrooms to educate building occupants about vampire energy. “Slayers” receive a list of common vampire energy sources and place “tickets” (**Figure 2**) on devices found to be consuming vampire energy. The tickets incorporate humor and educational material to inform the device owner about vampire energy. Slayers are also encouraged to turn off lights in unoccupied areas and to turn off computer monitors in common spaces; however, personal electronic devices are considered off-limits.

Finally, the UNCG administration has given more overt support to energy and other resource conservation efforts. After Chancellor Brady signed the American College and University Presidents’ Climate Commitment (ACUPCC) in October 2011, UNCG was tasked with creating a Climate Action Plan to achieve carbon neutrality. This Plan was completed in FY 2012-13 and adopted by the Chancellor in July 2013. Chancellor Brady also works with Facilities to develop and promote an annual energy conservation goal for the campus.

- **Water Management** – UNCG has made tremendous progress in reducing water consumption. Facilities places special emphasis on leak investigation and underground steam repairs, as well as on identifying and eliminating wasteful operational practices. Installation of water conserving fixtures during new construction and renovations has also been implemented. These practices have led to a 71% reduction in water consumption (per GSF) since FY2002-03. University staff will continue these successful practices and investigate new technology to curb water consumption, guided in part by the strategies laid out in the Climate Action Plan.



Figure 2: Vampire Energy Slayer ticket.

III. BASELINE UTILITY USE

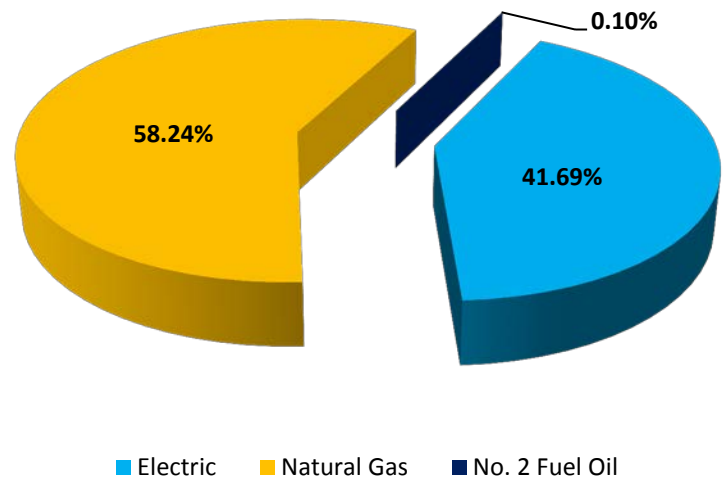
FY2002-2003 is the baseline year from which UNCG measures its energy and water consumption changes. The Key Performance Indicators (KPIs) used to track utility usage are listed in Section IV (Progress Toward Goals).

The university's energy usage for the fiscal year 2012-2013 was approximately 58.3% natural gas, 41.7% electricity, and less than 1% No. 2 fuel oil (**Figure 3**). This represents a shift toward more natural gas use versus electricity when compared to 2011-12. UNCG's energy usage is broken down into the following categories:

- **NATURAL GAS**

Piedmont Natural Gas (PNG) provides gas service through individual meters to the campus and outlying properties. Natural gas is used as fuel for furnaces, cooking, generators, and the boilers in the steam plant. All of these accounts, except for that of the steam plant, are small enough that the gas and delivery service are provided under PNG's small general service rate or residential rate schedules.

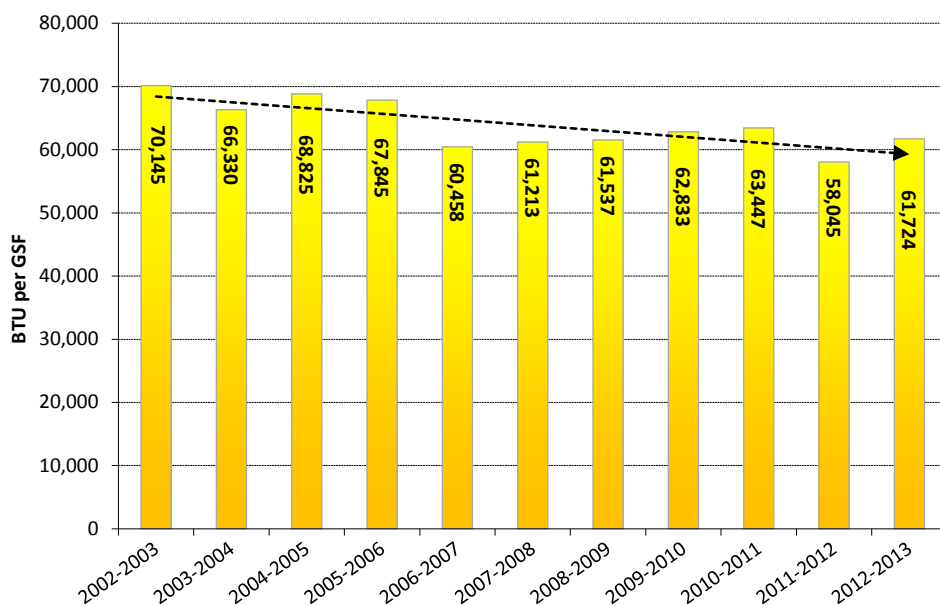
Figure 3: Energy Usage
FY 2012-2013



In fiscal year 2012-2013, the university's total natural gas bill was \$1.88 million for 352,861 MMBTUs, representing an 8.91% increase in total consumption over FY2011-12 and a 9.65% increase in costs. Consumption per GSF also increased, but only by 6.34% (**Figure 4**). This is likely due to the higher number of heating degree days observed in Greensboro in

2012-13; there were 810 more heating degree days than in 2011-12, an increase of 21.85% (see details in Section IV).

Fig. 4: Natural Gas Consumption (BTU per GSF)
FY2002-03 to FY2012-13



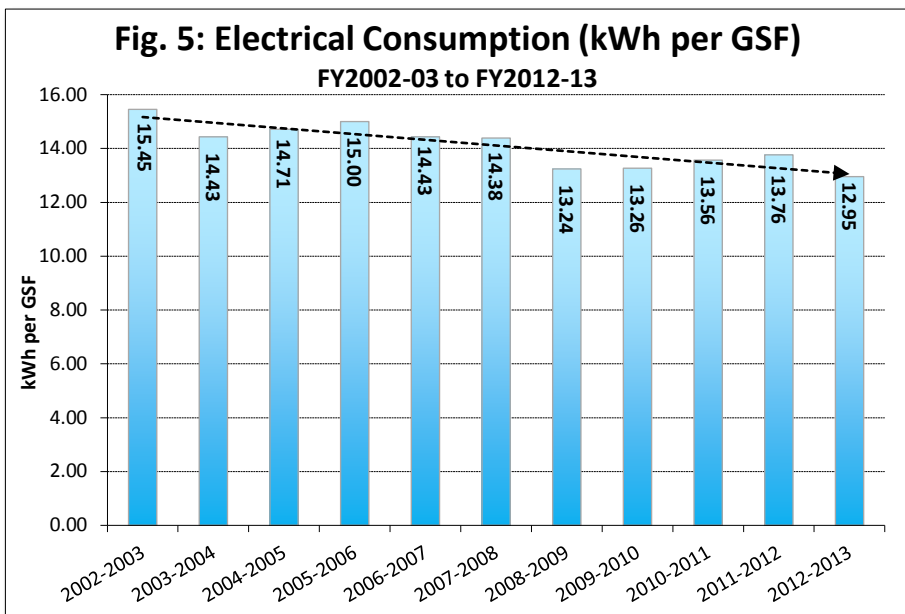
Natural gas for the steam plant is purchased through a broker that buys gas on the wholesale market and negotiates interstate and local transportation costs. The broker and UNCG negotiate the purchase price of gas futures and triggers are established to buy natural gas when prices reach those levels. FY2012-13 natural gas costs were \$ 141,979 lower because of the decreased Basis Cost of the new provider, Hess Corporation, when compared to the higher Basis Cost that was being charged by the former provider.

- **ELECTRICITY**

Duke Energy provides electric power to the campus through 84 accounts. Approximately 68 of those accounts are either leases for public lighting or for power to very small, dispersed loads such as irrigation systems, emergency phones, and entrance signs. An additional 15 accounts are for houses or offices not on the campus system.

By far the largest account is for the campus distribution system; the main campus receives power at a central substation that distributes that power through an underground system to about 62 buildings. Most of those buildings have sub-

meters that are read and the values manually entered into a database. Several buildings have multiple power feeds but not all those power feeds are metered.



In FY2012-13, the total electric bill for the campus was \$4.96 million for just over 74 million kWhs, or 252.6 billion BTUs of energy. Compared to FY2011-12, this is an increase of 0.44% in total costs, but a 2.36% decrease in total electrical consumption. On a gsf basis, **electrical use dropped 5.88% to the lowest level during the monitoring period (Figure 5).**

To further reduce costs, Duke Energy performs a best rate analysis yearly for all of the electric accounts. During the

2012 calendar year, UNCG avoided over \$500,000 of increased costs compared to the next best alternative rate.

- **FUEL OIL**

The steam plant is also capable of using No. 2 fuel oil as a backup fuel to natural gas. This provides the University with an emergency fuel source and allows PNG to interrupt gas service to the campus during times of peak gas demand. The ability to have gas service interrupted allows the university to purchase gas at a lower rate. And because PNG has needed to interrupt service to the university several times in the past, this backup energy source has proven very beneficial. In FY 2012-13, UNCG only used 3,175 gallons of No. 2 oil at the steam plant.

- **STEAM AND CHILLED WATER**

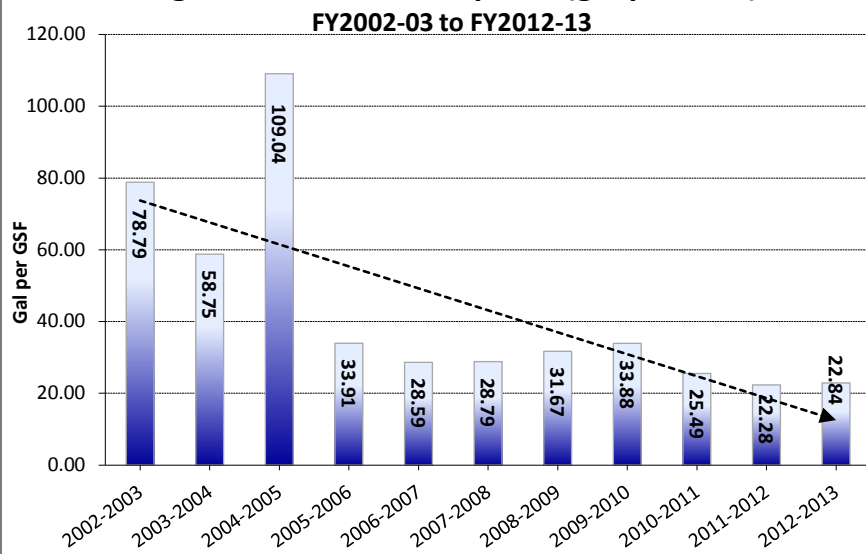
The university uses purchased power and natural gas to create steam and chilled water that are distributed to the campus. Steam goes to about 62 buildings on the main campus where it is used for climate control, humidification, and domestic water heating. The central chiller plant produces chilled water that serves HVAC needs in 41 buildings. Most buildings do not have a system in place to meter the steam or chilled water.

In 2012-13, the steam plant produced 287,700 lbs. of steam, using 4.9 million gallons of make-up water. These represent 11.2% more steam production and 11.5% less water consumption than in 2011-12. These results are in large part due to the robust steam and water line leak detection and repair programs.

• WATER

UNCG receives water and sewer service from the City of Greensboro. The university owns a distribution system that receives water through three master meters and distributes it to approximately 62 buildings. UNCG also has water service for several outlying properties as well. Most buildings on campus have sub-meters that are read and manually entered into a database. Where water is used for irrigation or cooling towers, additional sub-meters have been installed so that the university can calculate non-sewer credits for water that does not enter the sanitary sewer system and receive appropriate reimbursement from the city.

Fig. 6: Water Consumption (gal per GSF)



In fiscal year 2012-2013, university water accounts totaled \$758,603 for 130.6 million gallons of water. Total consumption rose 6.33% (7.77 million gallons) over FY 2011-12, or 2.49% when analyzing consumption per gross square footage (**Figure 6**). This increase in water consumption is likely due to the increased steam production that UNCG saw due to weather noted above and detailed in Section IV. Despite this increased consumption, total costs decreased \$20,295, due to claiming non-sewer water credits for approximately 42.4 million gallons of water. These credits allowed UNCG to avoid over \$178,000 in water charges.

IV. PROGRESS TOWARD GOALS

The primary goals of this Strategic Energy Plan are to decrease UNCG's total energy and water consumption to meet the respective State-mandated reductions by 2015. **Key Performance Indicators** include:

- *Total Energy Consumption (BTU/GSF)*
- *Total Energy Consumption (BTU/FTE)*
- *Electric Use (kWh/GSF)*
- *Water Use (Gal/GSF)*
- *Natural Gas Use (BTU/GSF)*

Energy: The primary metrics used to evaluate progress are Total Energy Consumption (BTU) per Gross Square Foot (GSF) and per Student (FTE). Using FY2002-03 as a baseline, total energy consumption per GSF has **decreased 15.9%**, or slightly more than half of the reduction necessary to meet the State's goal. This also represents an increase in total consumption (3.93%) over FY2011-12; total energy consumption per GSF increased only 0.18% (**Figure 7**).

Fig. 7: Total Energy Consumption (BTU/GSF)

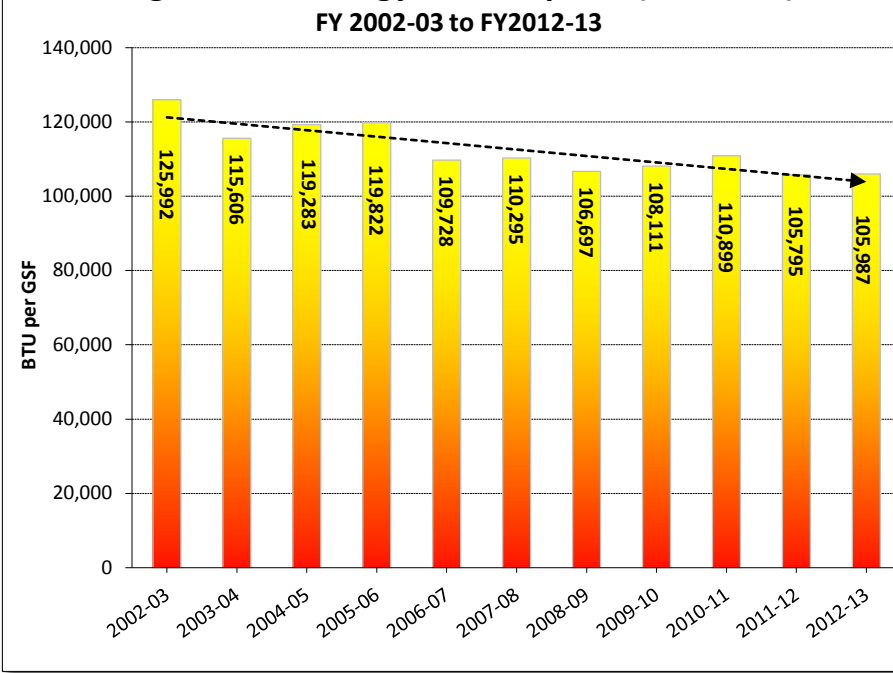
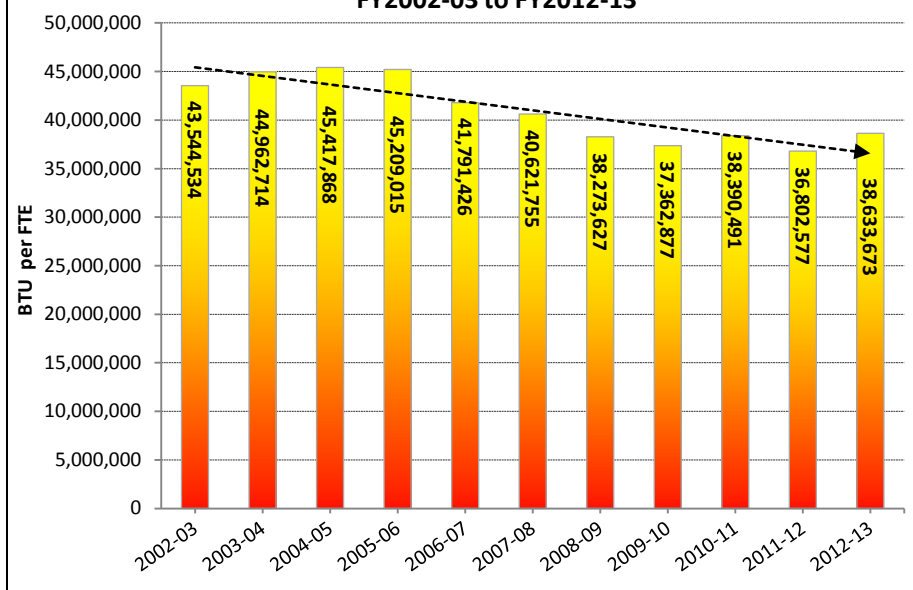


Fig. 8: Total Energy Consumption (BTU/FTE)
FY2002-03 to FY2012-13



Results of total energy consumption per FTE also reveal an increase of 4.98% over 2011-12 (**Figure 8**). Enrollment at UNCG has decreased since FY2010-11; combined with the increased campus building gsf and total energy consumption noted in 2012-13, this result was expected. However, energy cost per FTE remains below \$500 at \$443.05/student.

Water: As of FY2012-13, UNCG has reduced water consumption (per GSF) **by 71%**, far exceeding the mandated 20% reduction. As noted above, total water expenses fell over \$20,000 and the consumption based on square footage was the second lowest since the baseline was established (**Figure 6**).

Weather Effects: FY2012-13 saw a colder winter and mild summer compared to 2011-12. The total number of degree days in FY2012-13 exceeded those in FY2011-12 by 611, an increase of 13.4%. Broken out by season, 2012-13 saw 190 fewer CDD and 801 more HDD. Factoring in this weather variable reveals that FY2012-13 was the **third lowest** in terms of UNCG energy use intensity (BTU/gsf) – see **Figure 9**. As noted above, the cooler winter likely drove higher natural gas and water consumption to provide heat to campus buildings.

NOTE: For other graphs detailing UNCG's utility consumption data, please see the Appendices.

V. FUTURE ENERGY MANAGEMENT

UNCG has strengthened its commitment to energy conservation over the last year. The university incorporated several technical and operational upgrades, and launched or expanded programs to encourage resource conserving habits across the campus. Perhaps the most important action was that the UNCG administration endorsed its strategic Climate Action Plan to reduce energy consumption and eliminate greenhouse gas emissions. These and other efforts keep UNCG moving toward the 2015 energy reduction mandate (**Figure 10**) and the 2050 carbon neutrality directive.

Figure 9: EUI/TDD
FY2002-03 to FY2012-13

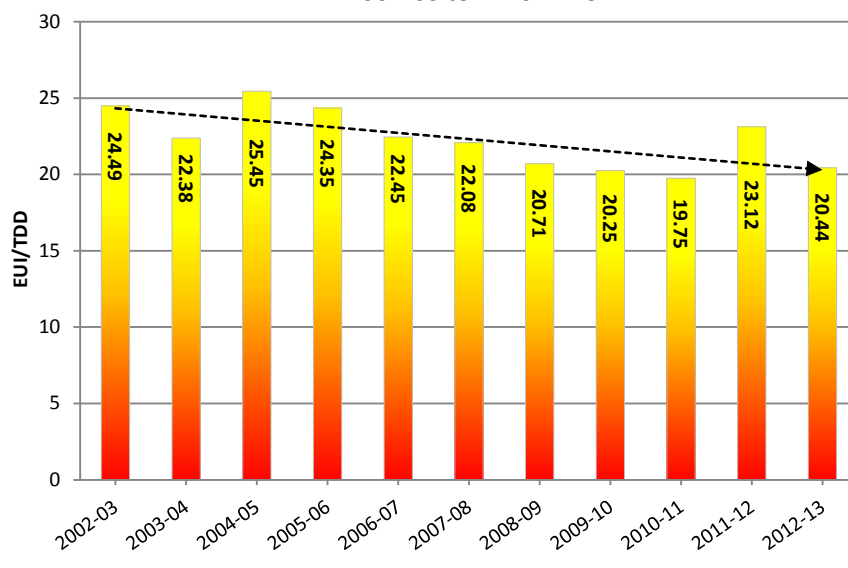
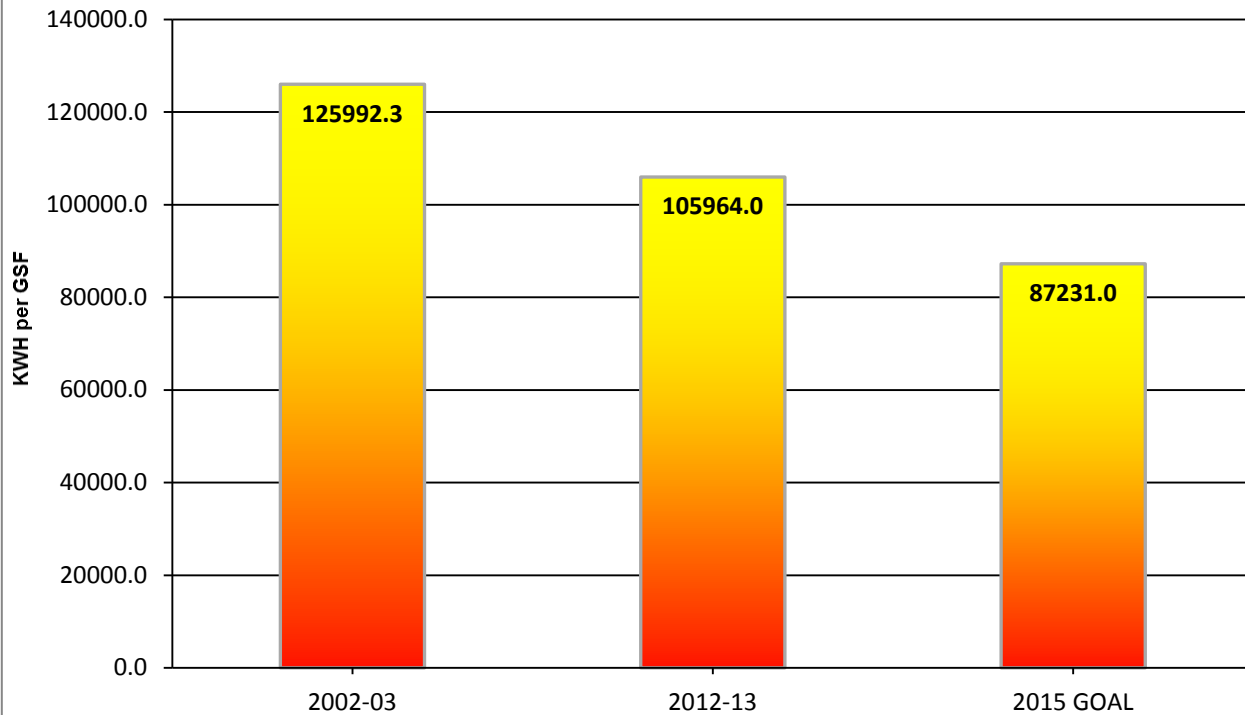
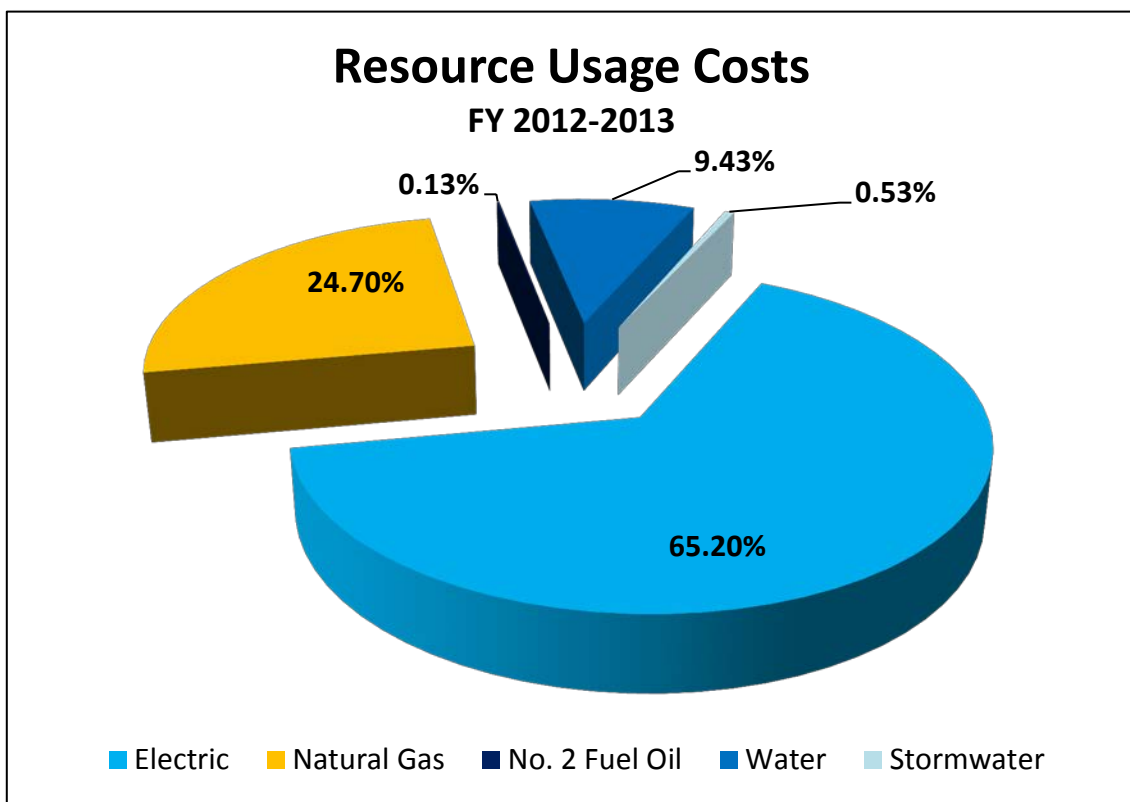
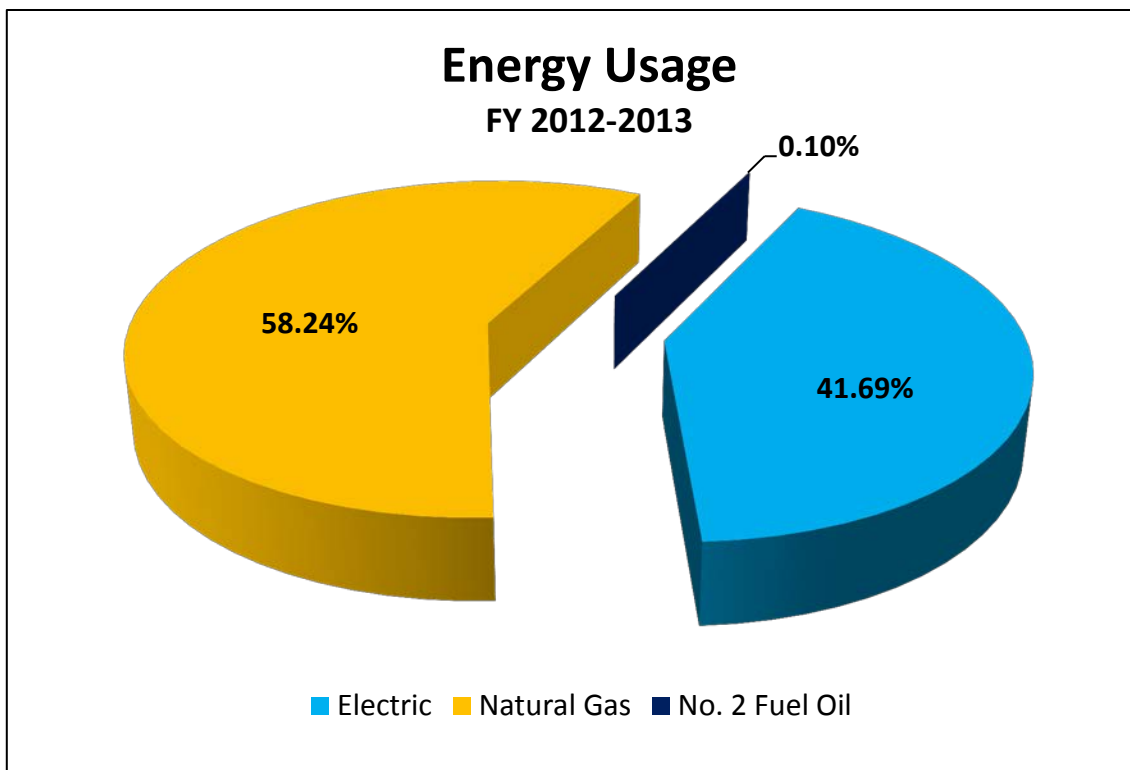


Figure 10: Progress Toward 2015 Energy Reduction Mandate



An important element to achieving both of these goals is a continued emphasis on improving UNCG's energy management. Energy management is making the most efficient use of energy to meet operational needs while simultaneously reducing operational costs and environmental impacts. Affiliated benefits include improved building occupant comfort, health and productivity. To address energy management, a UNCG Facilities Energy Team led by the Associate Vice Chancellor for Facilities meets monthly. Comprised of staff from Facilities Operations and the Sustainability Office, this group analyzes energy from various functional perspectives. Monthly energy data are reviewed to assess consumption patterns, potential problems, and the impacts that energy conservation programs have on buildings. The Team also helps to determine how best to apply funding to energy projects and works on strategies to engage all members of the UNCG community in energy conservation; the section on "future planned activities" in the attached tables is one outcome of their efforts. Improving and refining existing energy conservation and efficiency programs and creating new ones based on updated and accurate information will ensure UNCG's efforts continue progress toward its energy reduction goals.

APPENDICES



The University of North Carolina at Greensboro

Appendix B1

<u>FISCAL</u> <u>YEAR</u>	<u>TOTAL</u> <u>ENERGY</u> <u>(KWH)</u>	<u>%</u> <u>CHANGE</u>	<u>TOTAL</u> <u>ENERGY</u> <u>(MMBTU)</u>	<u>CAMPUS</u> <u>AREA</u> <u>(GSF)*</u>	<u>%</u> <u>CHANGE</u> <u>(GSF)</u>	<u>STUDENT</u> <u>POPULATION</u> <u>**</u>	<u>%</u> <u>CHANGE</u>
1999-2000	137,927,885	-	470,688	3,785,926	-	11,375	-
2000-01	143,521,857	4.06	490,226	3,838,194	1.38	11,250	-1.10
2001-02	142,712,609	-0.56	487,029	3,888,068	1.30	11,746	4.41
2002-03	157,607,223	10.44	537,949	4,269,699	9.82	12,354	5.18
2003-04	167,435,872	6.24	571,386	4,942,520	15.76	12,708	2.87
2004-05	174,331,841	4.12	594,929	4,987,544	0.91	13,099	3.08
2005-06	181,808,340	4.29	620,403	5,177,689	3.81	13,723	4.76
2006-07	174,131,771	-4.22	594,232	5,415,496	4.59	14,219	3.61
2007-08	173,886,580	-0.14	597,302	5,415,496	0.00	14,704	3.41
2008-09	169,320,720	-2.63	577,817	5,415,496	0.00	15,097	2.67
2009-10	171,564,636	1.33	585,476	5,415,496	0.00	15,670	3.80
2010-11	180,390,415	5.14	615,630	5,551,245	2.51	16,036	2.34
2011-12	170,836,779	-5.30	582,990	5,510,548	-0.73	15,841	-1.22
2012-13	177,549,166	3.93	605,902	5,716,735	3.74	15,683	-1.00

The University of North Carolina at Greensboro

Appendix B1

<u>FISCAL</u> <u>YEAR</u>	<u>TOTAL</u> <u>ENERGY</u> (KWH/GSF)	<u>%</u> <u>CHANGE</u>	<u>TOTAL</u> <u>ENERGY</u> (BTU/GSF)	<u>BTU</u> per <u>GSF</u> per <u>HDD</u>	<u>BTU</u> per <u>GSF</u> per <u>CDD</u>	<u>HDD</u>	<u>CDD</u>
1999-2000	36.43	-	124,326	37	86	3368	1448
2000-01	37.39	2.64	127,723	32	100	3951	1279
2001-02	36.71	-1.84	125,262	38	91	3276	1380
2002-03	36.91	0.57	125,992	34	89	3730	1415
2003-04	33.88	-8.23	115,606	32	77	3664	1501
2004-05	34.95	3.18	119,283	35	91	3371	1316
2005-06	35.11	0.46	119,822	37	70	3203	1717
2006-07	32.15	-8.43	109,728	34	68	3273	1614
2007-08	32.11	-0.14	110,295	36	58	3103	1892
2008-09	31.27	-2.63	106,697	30	69	3606	1547
2009-10	31.68	1.33	108,111	30	64	3640	1699
2010-11	32.50	2.57	110,899	30	58	3696	1918
2011-12	31.00	-4.60	105,795	37	62	2865	1710
2012-13	31.06	0.18	105,987	29	70	3666	1520

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Appendix B1

<u>FISCAL</u> <u>YEAR</u>	<u>TDD</u>	<u>EUI/TDD</u>	<u>BTU per</u> <u>STUDENT</u>	<u>%</u> <u>CHANGE</u>	<u>TOTAL</u> <u>ENERGY</u> <u>(\$)</u>	<u>%</u> <u>CHANGE</u>	<u>COST</u> <u>per GSF</u> <u>(\$)</u>	<u>COST per</u> <u>STUDENT</u> <u>(\$)</u>
1999-2000	4816	25.81512513	41,379,137	-	3,916,913	-	1.03	344.34
2000-01	5230	24.42123102	43,575,627	5.31%	4,810,563	22.82	1.25	427.61
2001-02	4656	26.90345185	41,463,392	-4.85%	6,110,962	27.03	1.57	520.26
2002-03	5145	24.4882984	43,544,534	5.02%	4,953,663	-18.94	1.16	400.98
2003-04	5165	22.38262225	44,962,714	3.26%	5,528,107	11.60	1.12	435.01
2004-05	4687	25.44973074	45,417,868	1.01%	6,251,452	13.08	1.25	477.25
2005-06	4920	24.35415405	45,209,015	-0.46%	7,685,754	22.94	1.48	560.06
2006-07	4887	22.45306652	41,791,426	-7.56%	7,041,951	-8.38	1.30	495.25
2007-08	4995	22.08108696	40,621,755	-2.80%	7,602,526	7.96	1.40	517.04
2008-09	5153	20.70579399	38,273,627	-5.78%	6,872,383	-9.60	1.27	455.22
2009-10	5339	20.2493525	37,362,877	-2.38%	6,535,847	-4.90	1.21	417.09
2010-11	5614	19.75408462	38,390,491	2.75%	6,753,156	3.32	1.22	421.12
2011-12	4575	23.12463777	36,802,577	-4.14%	6,716,483	-0.54	1.22	423.99
2012-13	5186	20.43720476	38,633,673	4.98%	6,948,523	3.45	1.22	443.05

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<u>YEAR</u>	<u>TOTAL</u>	<u>AVERAGE</u>	<u>JUL</u>	<u>AUG</u>	<u>SEPT</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>
	(HDD)	(Monthly)												
1999-2000	3368	280.67	6	0	31	236	341	671	856	575	354	264	29	5
2000-2001	3951	329.25	0	0	62	165	546	984	809	553	584	209	39	0
2001-2002	3276	273.00	0	0	61	248	303	582	720	624	471	162	105	0
2002-2003	3730	310.83	0	0	1	217	495	782	877	692	369	207	85	5
2003-2004	3664	305.33	0	0	22	206	331	792	871	758	428	224	32	0
2004-2005	3371	280.92	0	1	7	131	379	720	690	590	553	212	78	10
2005-2006	3203	266.92	0	0	3	162	397	791	568	629	428	135	90	0
2006-2007	3273	272.75	0	0	31	253	398	574	663	729	319	239	64	3
2007-2008	3103	258.58	0	0	7	91	437	556	775	570	414	214	39	0
2008-2009	3606	300.50	0	0	14	239	543	626	837	604	497	199	47	0
2009-2010	3640	303.33	0	0	14	205	375	800	890	791	421	109	35	0
2010-2011	3696	308.00	0	0	4	123	449	980	910	543	474	163	50	0
2011-2012	2865	238.75	0	0	20	224	382	565	685	562	208	196	19	4
2012-2013	3666	305.50	0	0	18	213	557	561	691	686	646	196	98	0

Source: NOAA/National Weather Service
Heating Degree Days (Base 65 Degrees F)

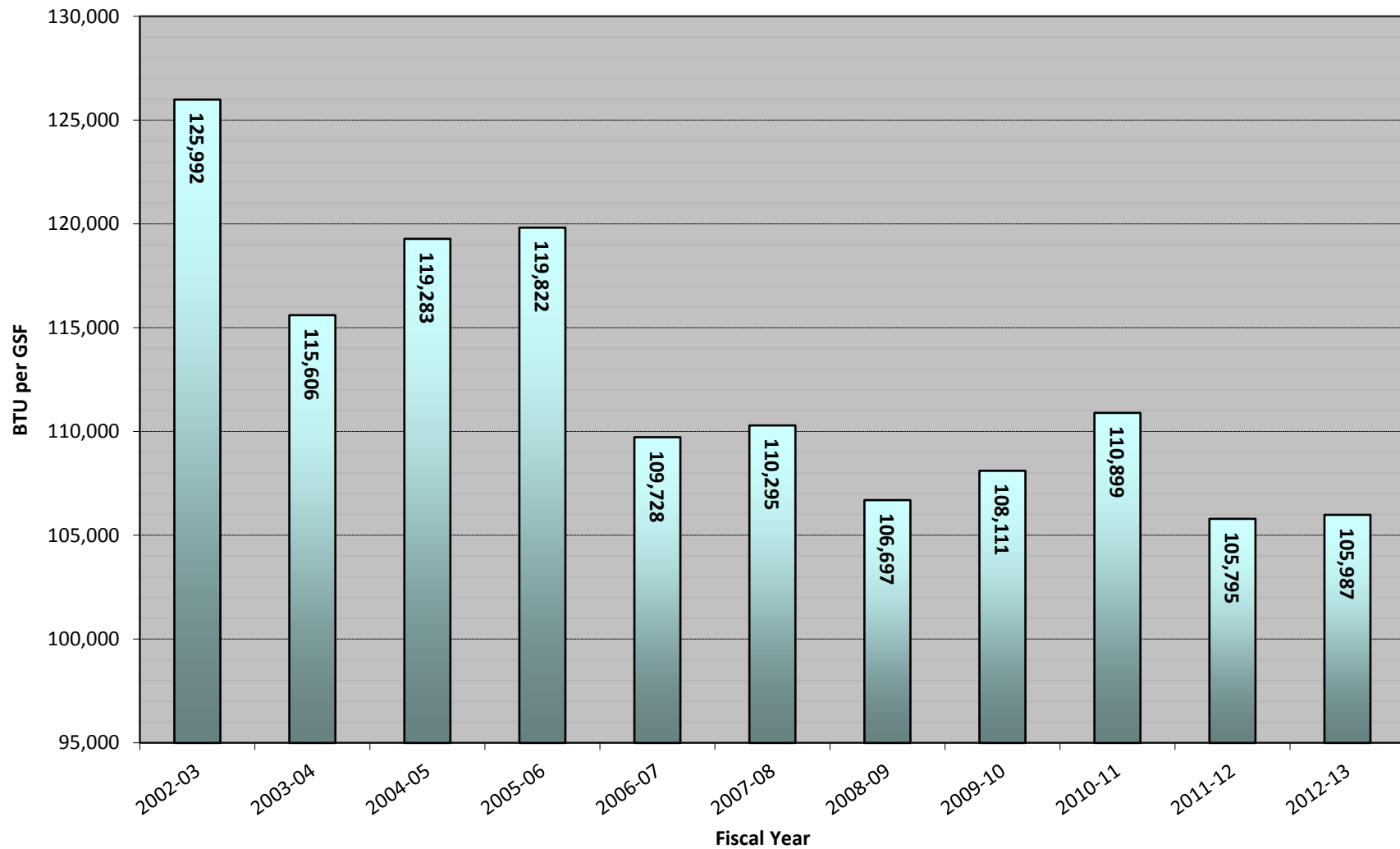
The University of North Carolina at Greensboro

<u>YEAR</u>	<u>TOTAL</u>	<u>AVERAGE</u>	<u>JUL</u>	<u>AUG</u>	<u>SEPT</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>
	(CDD)	(Monthly)												
1999-2000	1448	120.67	434	396	124	13	0	0	0	0	6	9	152	314
2000-2001	1279	106.58	329	331	134	24	2	0	0	0	0	57	87	315
2001-2002	1380	115.00	304	379	137	18	5	0	1	0	2	82	127	325
2002-2003	1415	117.92	440	375	214	72	0	0	0	0	6	18	69	221
2003-2004	1501	125.08	350	394	142	6	17	0	0	0	7	42	245	298
2004-2005	1316	109.67	415	316	173	28	10	0	0	0	0	17	58	299
2005-2006	1717	143.08	468	453	274	62	4	0	0	0	10	64	98	284
2006-2007	1614	134.50	434	455	135	21	2	0	0	0	38	48	162	319
2007-2008	1892	157.67	381	572	279	131	0	3	0	0	1	17	84	424
2008-2009	1547	128.92	420	368	198	23	0	0	0	0	8	36	158	336
2009-2010	1699	141.58	368	432	169	14	0	0	0	0	0	52	215	449
2010-2011	1918	159.83	500	463	296	38	0	0	0	0	8	61	155	397
2011-2012	1710	142.50	503	444	209	9	4	0	0	0	26	33	199	283
2012-2013	1520	126.67	510	364	175	26	0	0	0	0	0	35	113	297

Source: NOAA/National Weather Service
Cooling Degree Days (Base 65 Degrees F)

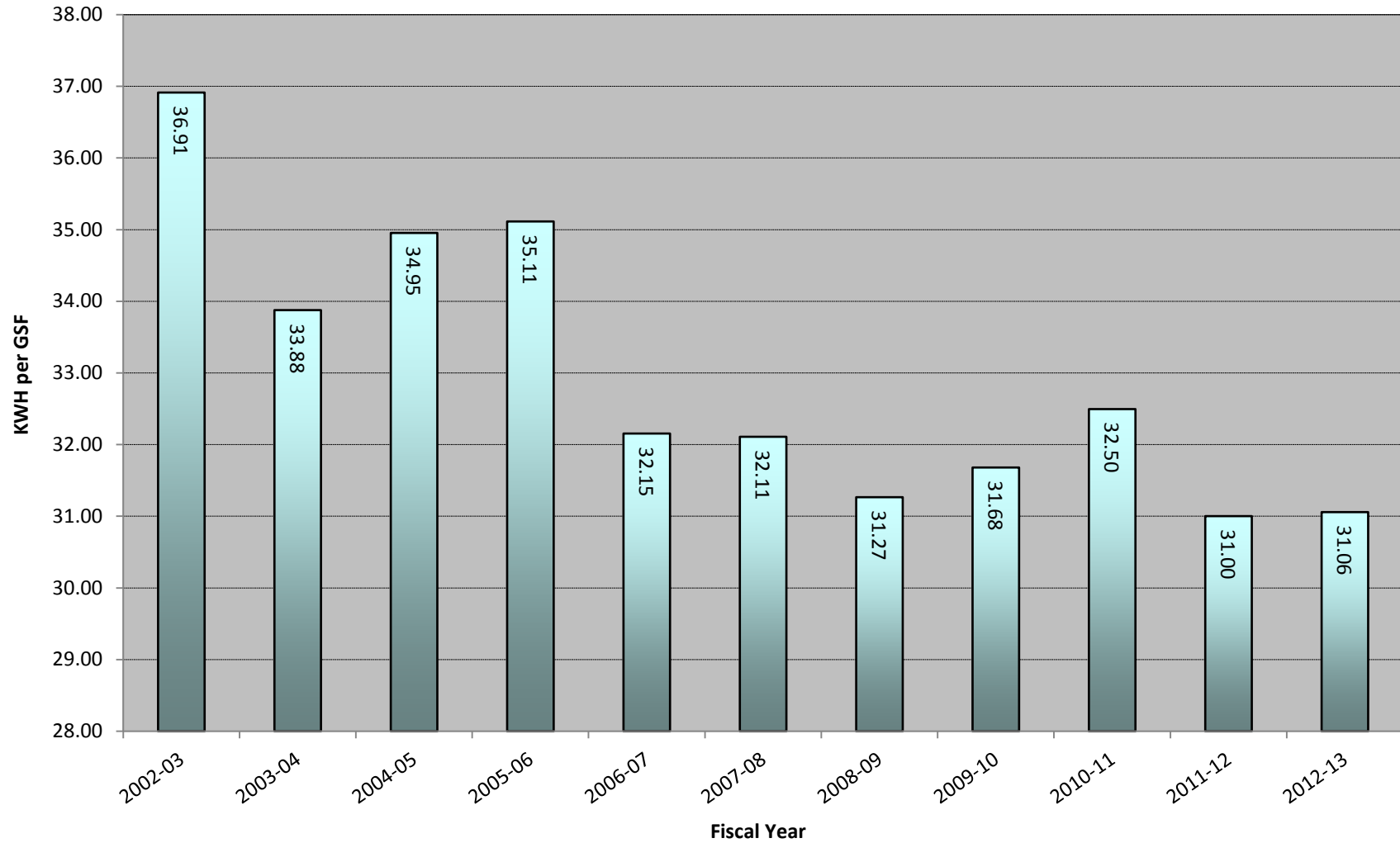
Total Energy Consumption (BTU/GSF):

FY2002-03 to FY2012-13



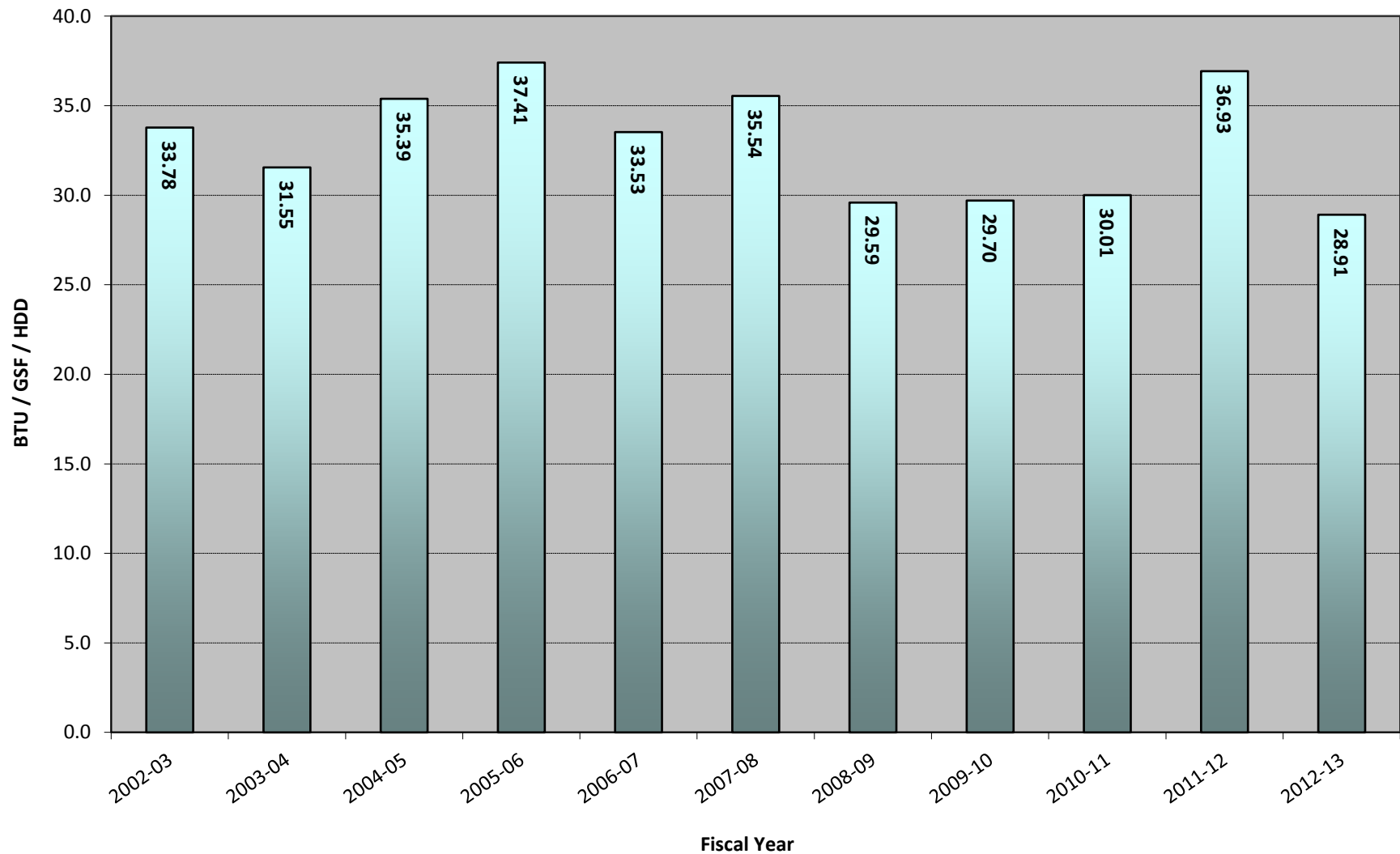
Total Energy Consumption (kWh/GSF):

FY2002-03 to FY2012-13



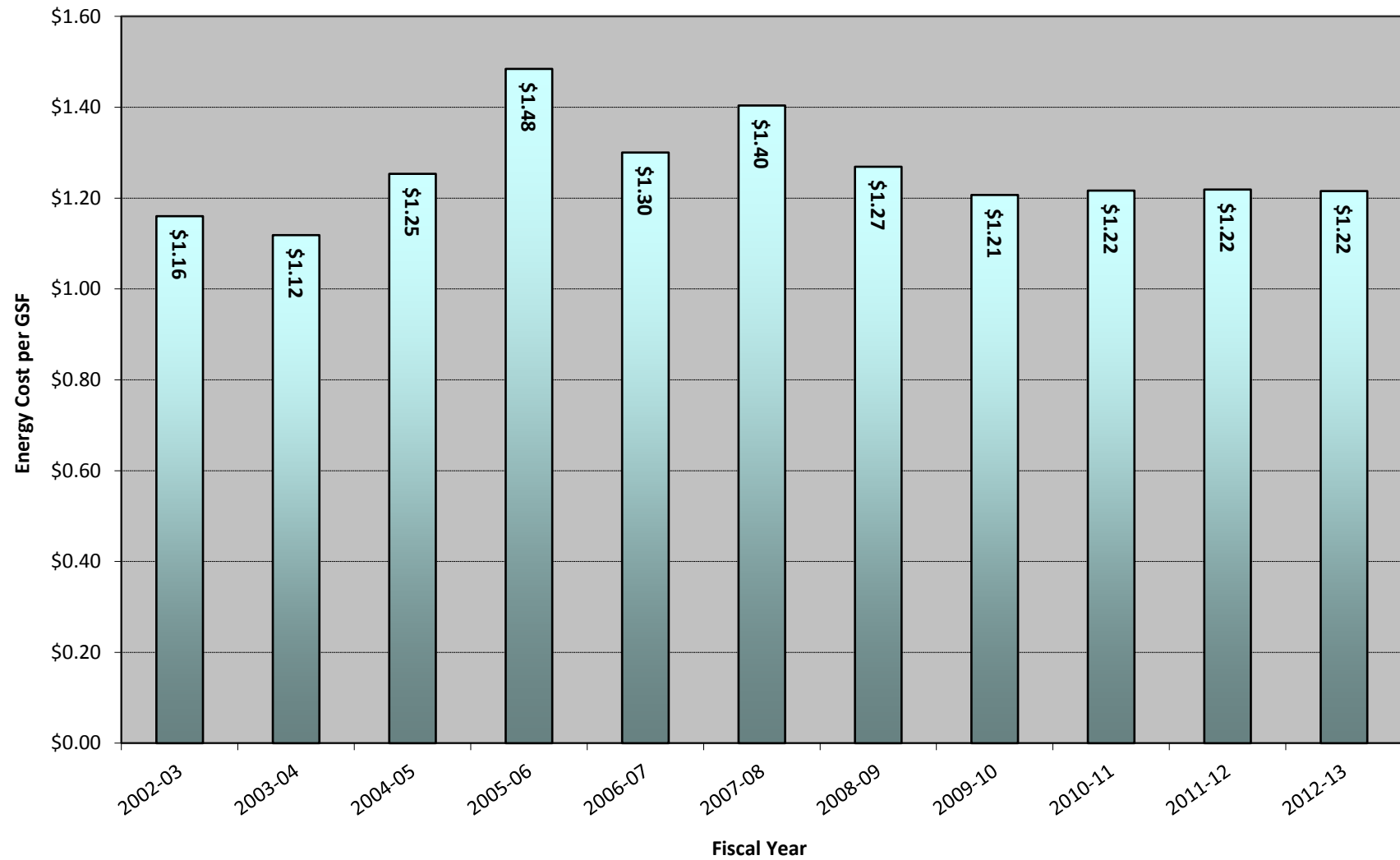
Total Energy Consumption (BTU/GSF) per Heating Degree Days:

FY2002-03 to FY2012-13



Total Energy Cost per GSF:

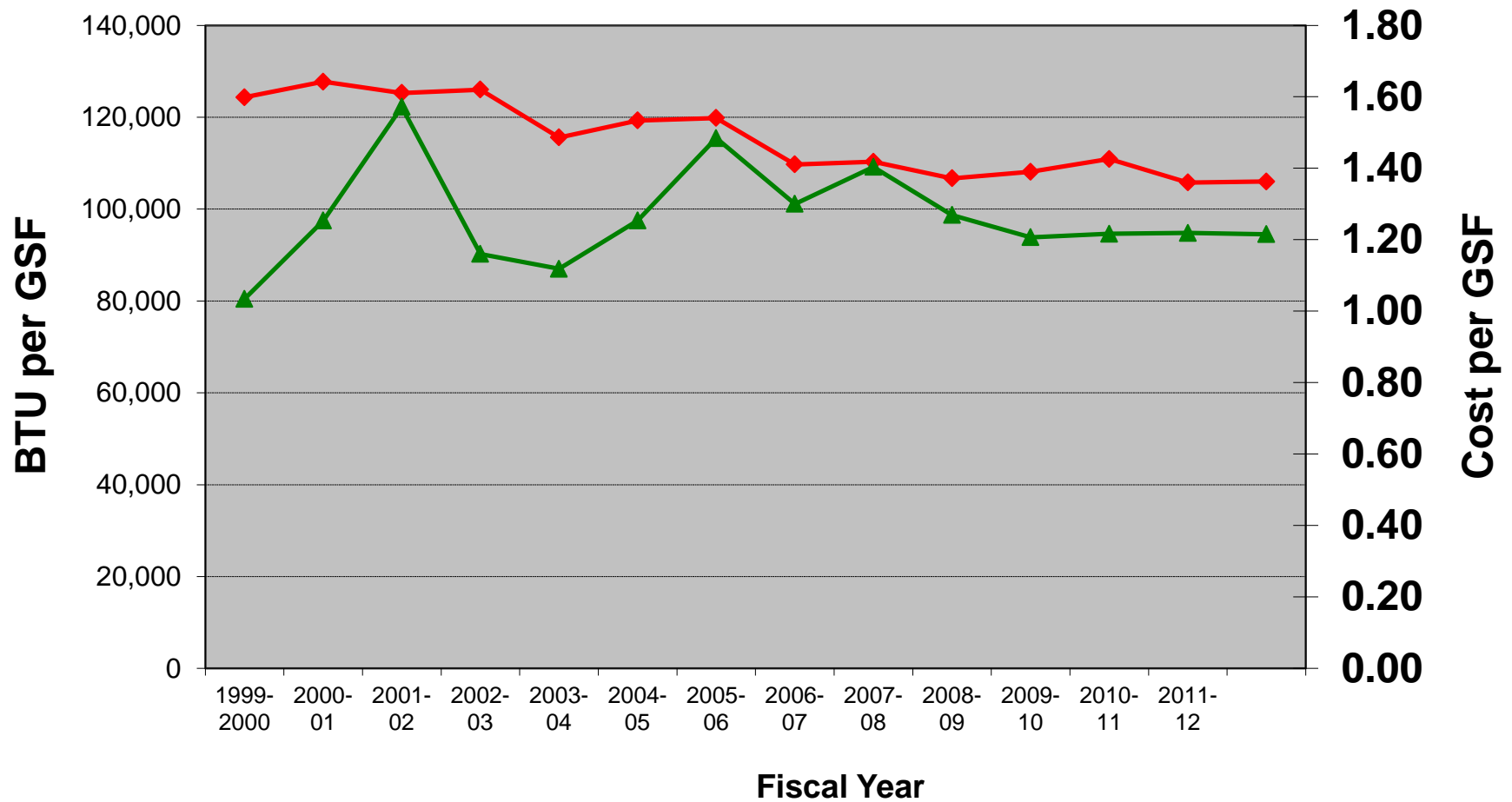
FY2002-03 to FY2012-13



Total Energy Consumption

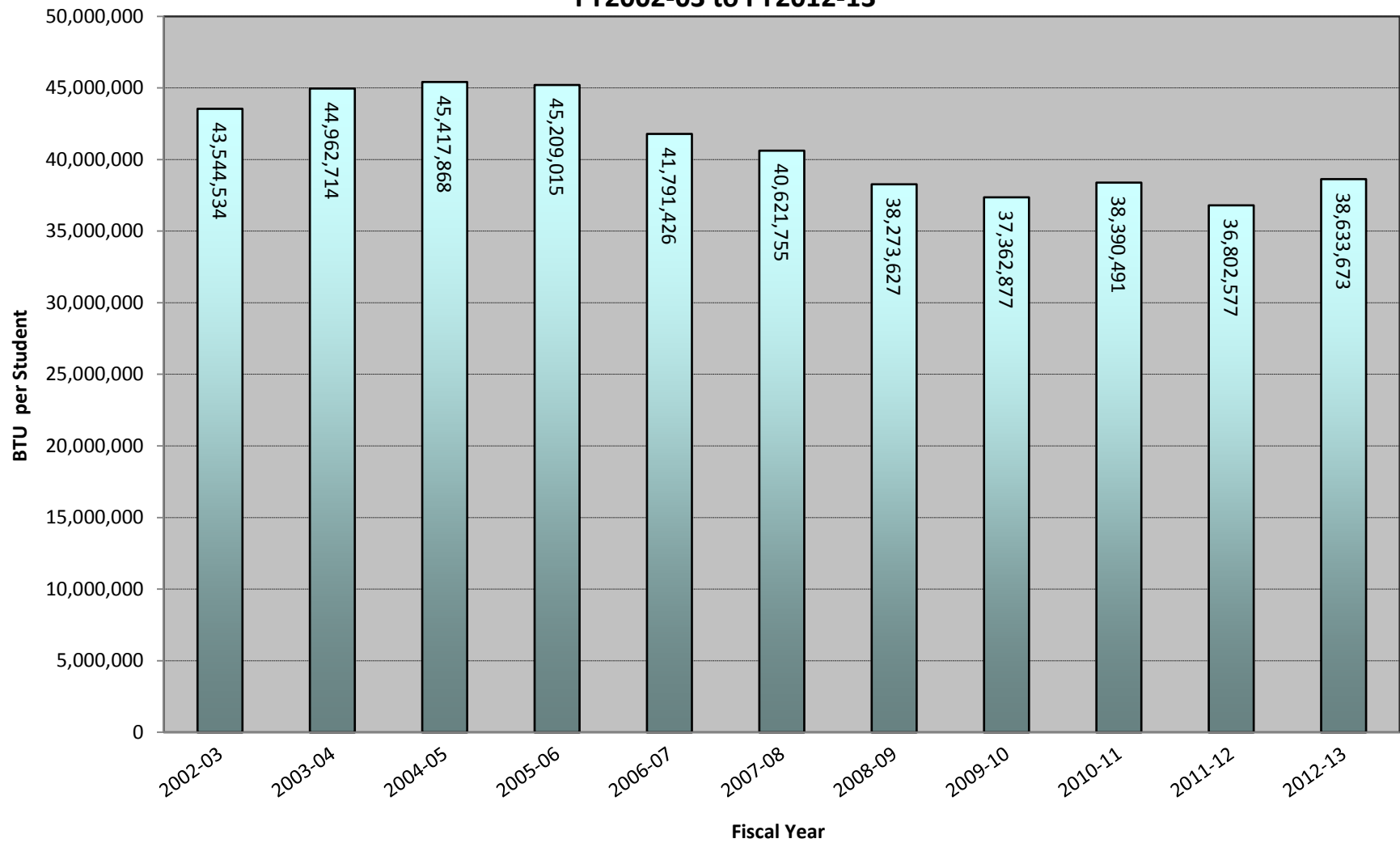
◆ BTU per GSF

▲ Cost per GSF

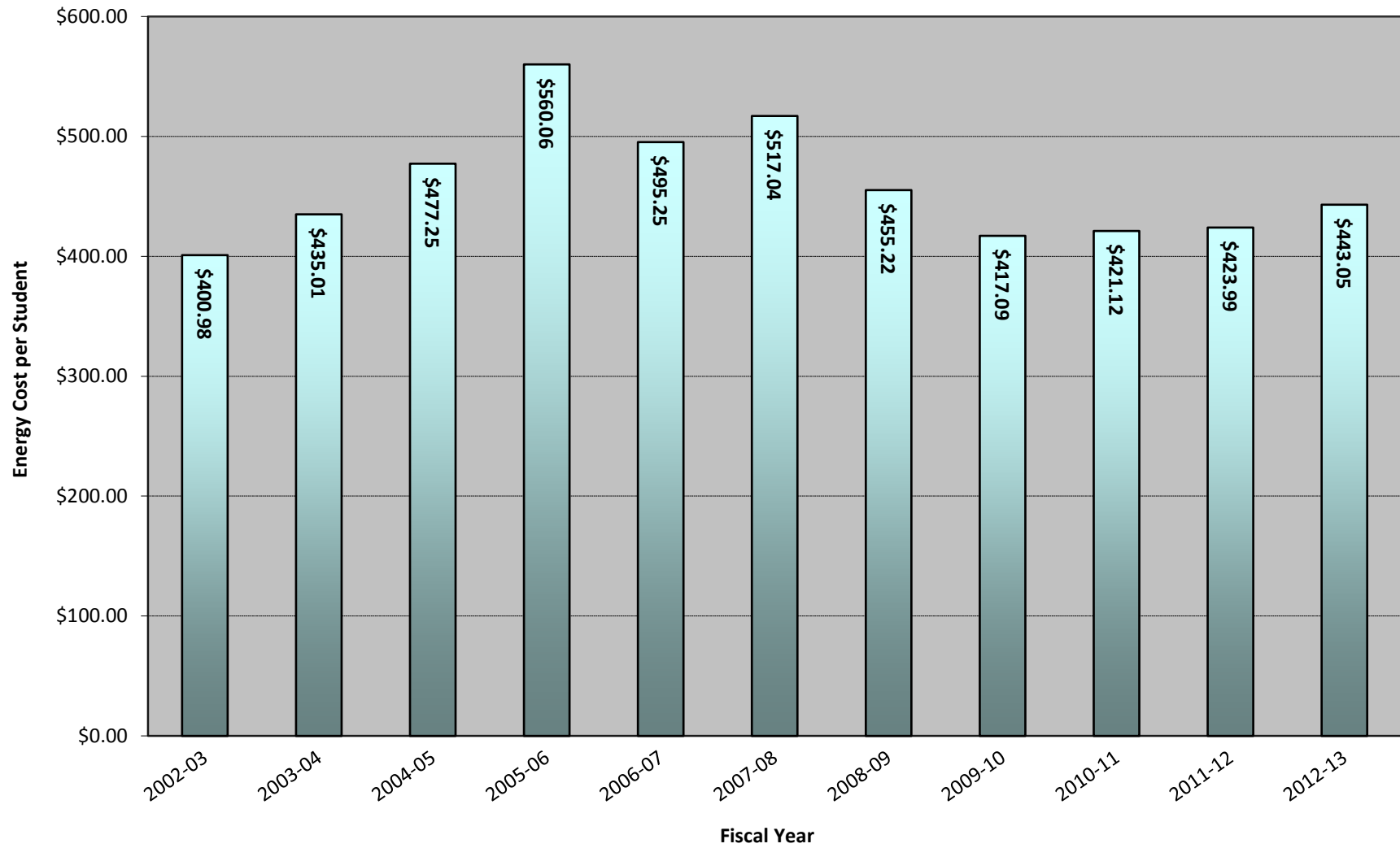


Total Energy Consumption (BTU/Student):

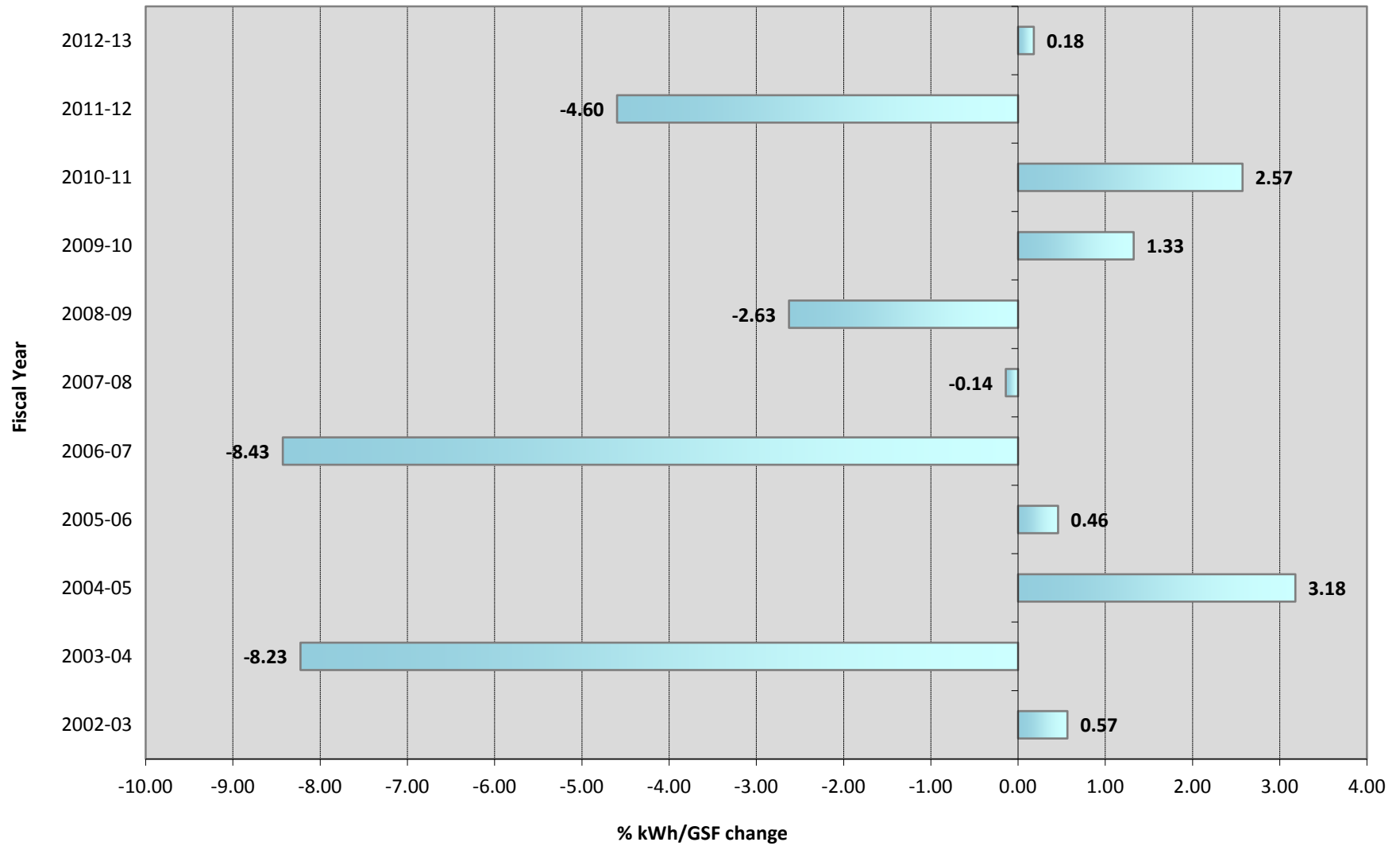
FY2002-03 to FY2012-13



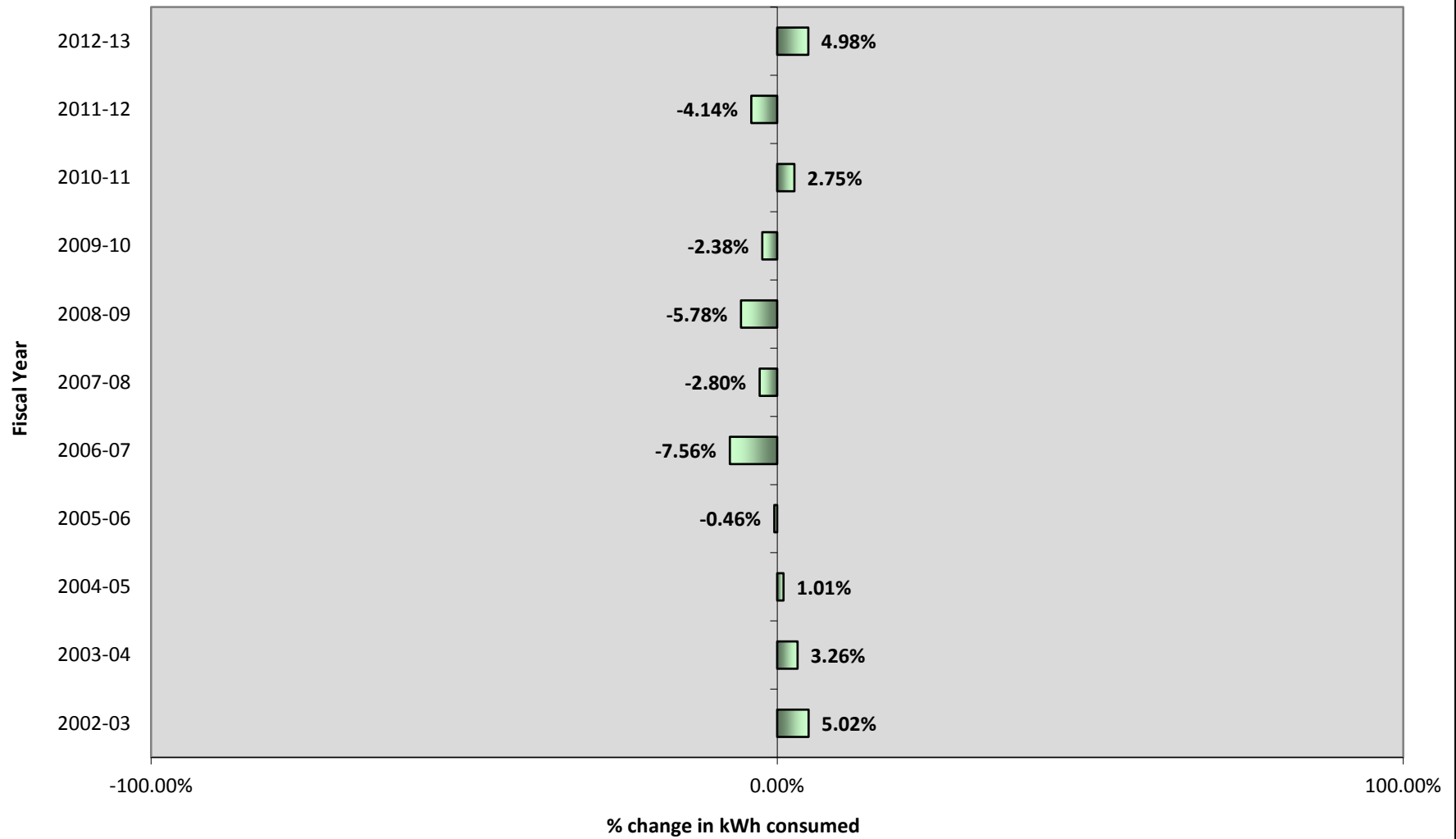
Total Energy Cost Per Student: FY2002-03 to FY2011-12



% KWH per GSF Change From Previous FY



% KWH per Student Change From Previous FY



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Appendix B2

<u>FISCAL</u> <u>YEAR</u>	<u>TOTAL</u> <u>ELECTRICITY</u>	<u>%</u> <u>CHANGE</u>	<u>CAMPUS</u> <u>AREA</u>	<u>STUDENT</u> <u>POPULATION</u>	<u>KWH</u> per <u>GSF</u>	<u>%</u> <u>CHANGE</u>
	(KWH)		(GSF)			
1999-2000	60,092,024	-	3,785,926	11,375	15.87	-
2000-2001	61,255,546	1.94	3,838,194	11,250	15.96	0.55
2001-2002	63,511,420	3.68	3,888,068	11,746	16.33	2.35
2002-2003	65,959,835	3.86	4,269,699	12,354	15.45	-5.43
2003-2004	71,312,536	8.12	4,942,520	12,708	14.43	-6.60
2004-2005	73,361,469	2.87	4,987,544	13,099	14.71	1.94
2005-2006	77,641,218	5.83	5,177,689	13,723	15.00	1.95
2006-2007	78,140,112	0.64	5,415,496	14,219	14.43	-3.78
2007-2008	77,894,921	-0.31	5,415,496	14,704	14.38	-0.31
2008-2009	71,678,060	-7.98	5,415,496	15,097	13.24	-7.98
2009-2010	71,825,485	0.21	5,415,496	15,670	13.26	0.21
2010-2011	75,289,775	4.82	5,551,245	16,036	13.56	2.26
2011-2012	75,819,228	0.70	5,510,548	15,841	13.76	1.45
2012-2013	74,031,758	-2.36	5,716,735	15,683	12.95	-5.88

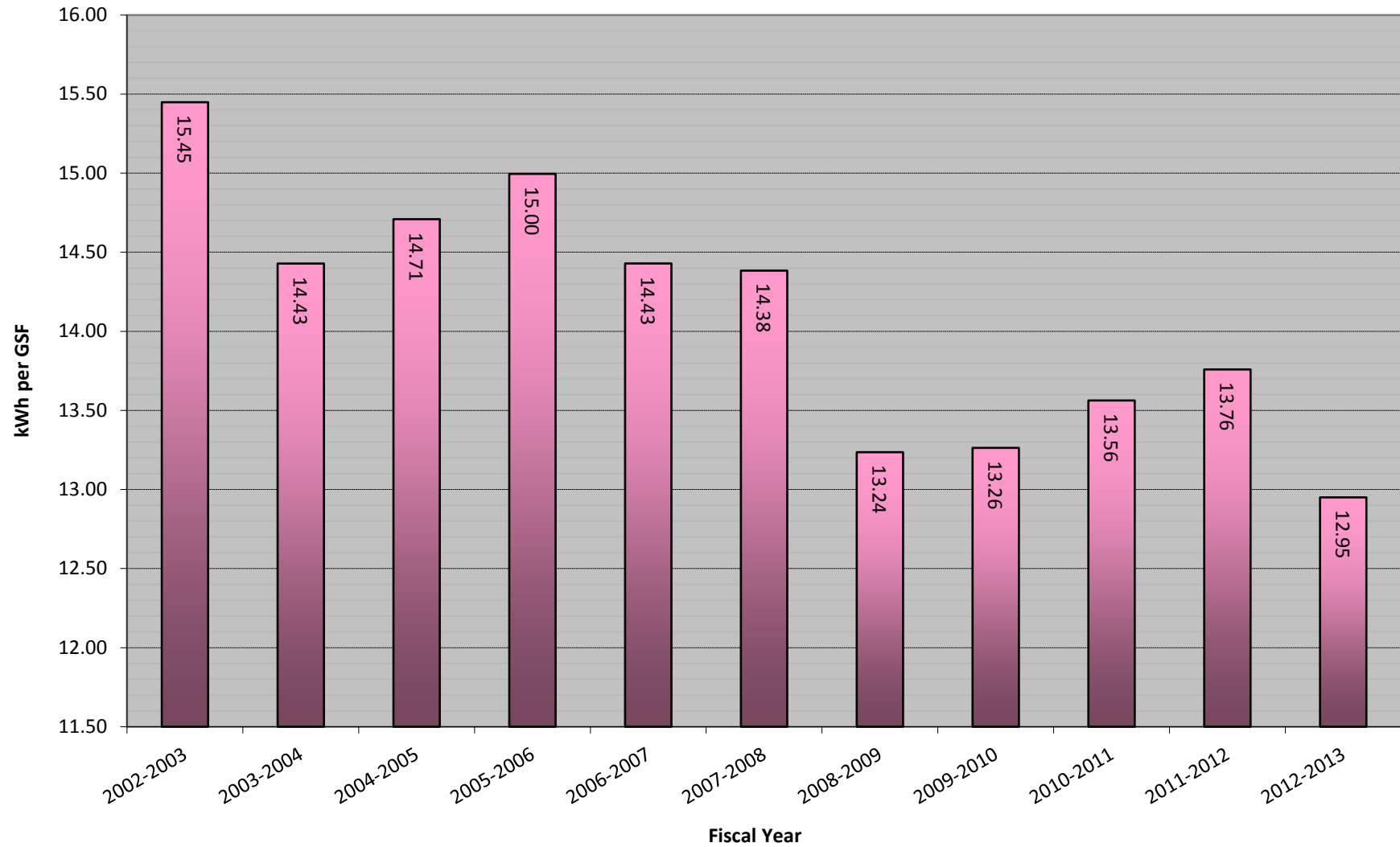
The University of North Carolina at Greensboro

Appendix B2

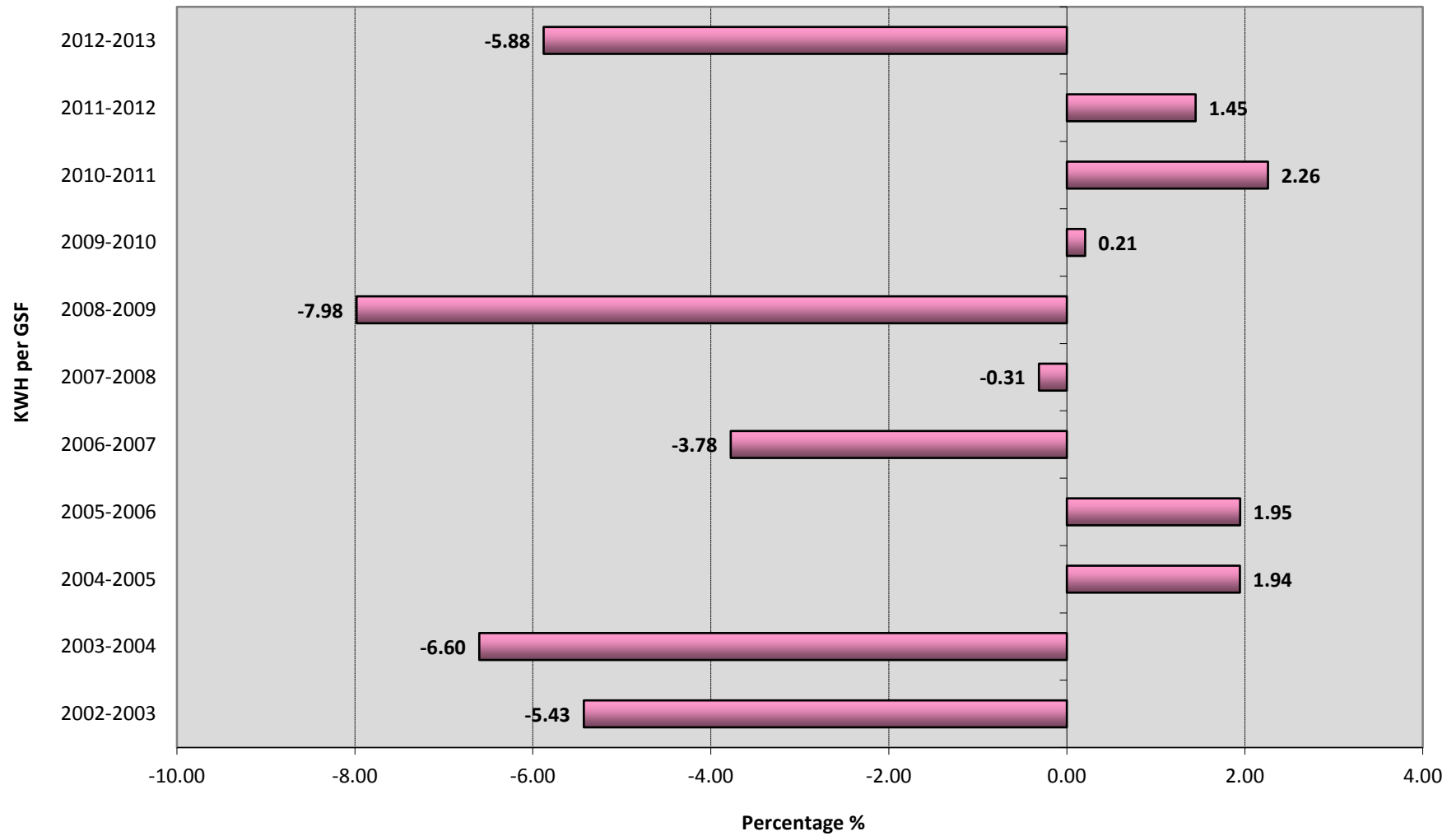
<u>FISCAL</u> <u>YEAR</u>	<u>KWH</u> per <u>STUDENT</u>	<u>COST</u>	<u>%</u> <u>CHANGE</u>	<u>COST</u> per <u>GSF</u>	<u>COST</u> per <u>STUDENT</u>
		(\$)		(\$)	(\$)
1999-2000	5282.82	2,753,822	-	0.73	242.09
2000-2001	5444.94	2,843,341	3.25	0.74	252.74
2001-2002	5407.07	2,922,005	2.77	0.75	248.77
2002-2003	5339.15	3,018,653	3.31	0.71	244.35
2003-2004	5611.63	3,306,739	9.54	0.67	260.21
2004-2005	5600.54	3,482,453	5.31	0.70	265.86
2005-2006	5657.74	3,669,415	5.37	0.71	267.39
2006-2007	5495.47	4,209,021	14.71	0.78	296.01
2007-2008	5297.53	4,349,068	3.33	0.80	295.77
2008-2009	4747.83	4,109,335	-5.51	0.76	272.20
2009-2010	4583.63	4,398,506	7.04	0.81	280.70
2010-2011	4695.05	4,607,914	4.76	0.83	287.35
2011-2012	4786.27	4,941,445	7.24	0.90	311.94
2012-2013	4720.43	4,963,407	0.44	0.87	316.48

Electric Consumption (kWh per GSF):

FY2002-03 to FY2012-13



% Electric Use Change From Previous FY



The University of North Carolina at Greensboro

Appendix B3

<u>FISCAL YEAR</u>	<u>TOTAL WATER</u>	<u>% CHANGE</u>	<u>CAMPUS AREA</u>	<u>STUDENT POPULATION</u>	<u>GAL per GSF</u>
	(Gallons)		(GSF)		
1999-2000	727,433,740	-	3,785,926	11,375	192.14
2000-2001	596,379,652	-18.02	3,838,194	11,250	155.38
2001-2002	545,374,280	-8.55	3,888,068	11,746	140.27
2002-2003	336,408,512	-38.32	4,269,699	12,354	78.79
2003-2004	290,356,396	-13.69	4,942,520	12,708	58.75
2004-2005	543,824,424	87.30	4,987,544	13,099	109.04
2005-2006	175,592,520	-67.71	5,177,689	13,723	33.91
2006-2007	154,828,520	-11.83	5,415,496	14,219	28.59
2007-2008	155,922,844	0.71	5,415,496	14,704	28.79
2008-2009	171,504,432	9.99	5,415,496	15,097	31.67
2009-2010	183,458,968	6.97	5,415,496	15,670	33.88
2010-2011	141,496,916	-22.87	5,551,245	16,036	25.49
2011-2012	122,794,672	-13.22	5,510,548	15,841	22.28
2012-2013	130,566,923	6.33	5,716,735	15,683	22.84

1 CCF = 748 Gallon
1 CF = 7.48 Gallon

10/4/2013

CF = Cubic Feet
CCF = 100 Cubic Feet

The University of North Carolina at Greensboro

Appendix B3

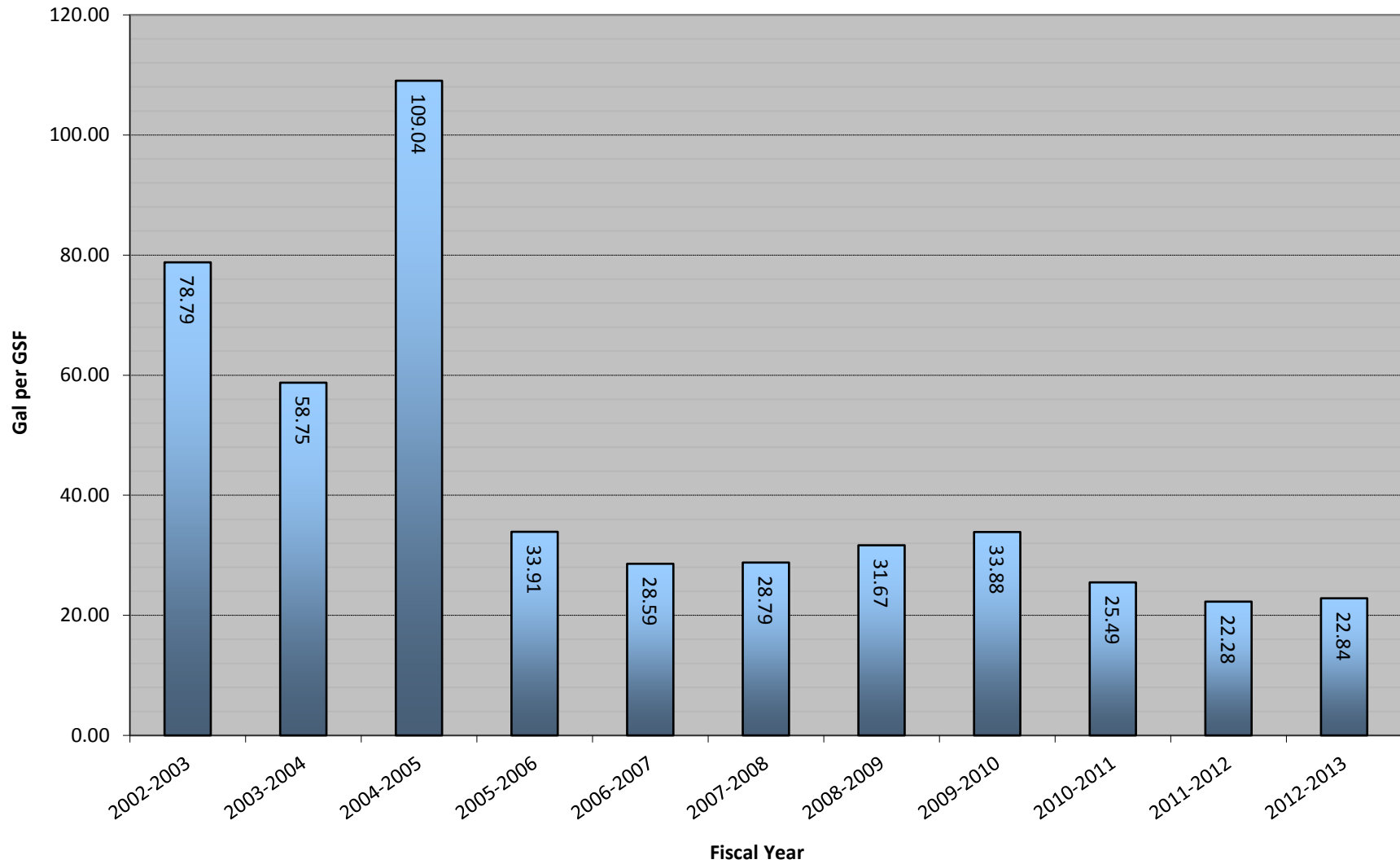
<u>FISCAL</u> <u>YEAR</u>	<u>%</u> <u>CHANGE</u>	<u>GAL</u> per <u>STUDENT</u>	<u>COST</u>	<u>%</u> <u>CHANGE</u>	<u>COST</u> per <u>GSF</u>	<u>COST</u> per <u>STUDENT</u>
			(\$)		(\$)	(\$)
1999-2000	-	63,950	482,158	-	0.13	42.39
2000-2001	-19.13	53,012	531,332	10.20	0.14	47.23
2001-2002	-9.73	46,431	605,869	14.03	0.16	51.58
2002-2003	-43.83	27,231	587,408	-3.05	0.14	47.55
2003-2004	-25.44	22,848	594,070	1.13	0.12	46.75
2004-2005	85.60	41,516	659,042	10.94	0.13	50.31
2005-2006	-68.90	12,795	880,466	33.60	0.17	64.16
2006-2007	-15.70	10,889	895,439	1.70	0.17	62.97
2007-2008	0.71	10,604	943,305	5.35	0.17	64.15
2008-2009	9.99	11,360	1,074,919	13.95	0.20	71.20
2009-2010	6.97	11,708	1,222,175	13.70	0.23	77.99
2010-2011	-24.76	8,824	940,796	-23.02	0.17	58.67
2011-2012	-12.58	7,752	778,897	-17.21	0.14	49.17
2012-2013	2.49	8,325	758,603	-2.61	0.13	48.37

1 CCF = 748 Gallon
1 CF = 7.48 Gallon

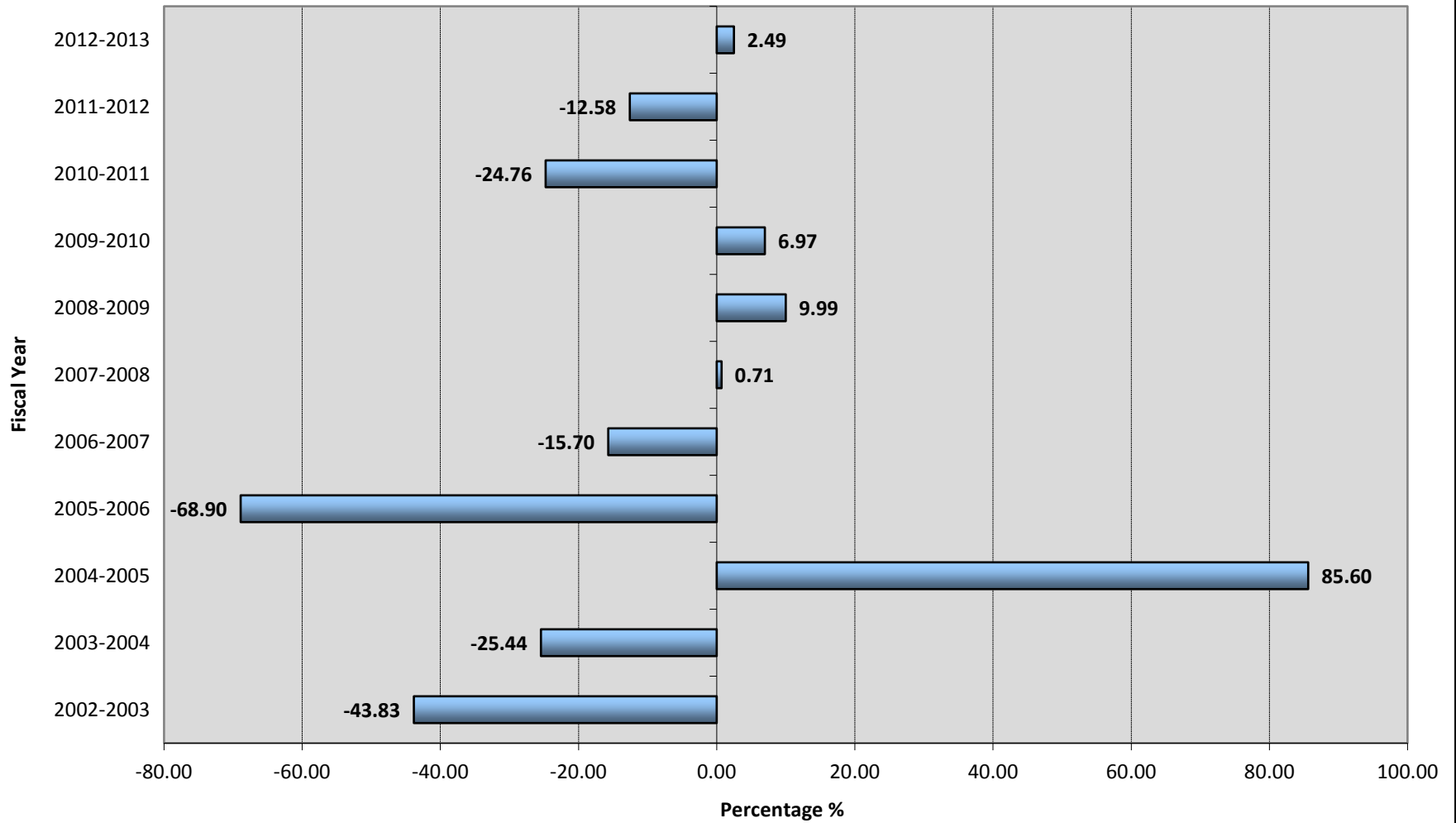
10/4/2013

CF = Cubic Feet
CCF = 100 Cubic Feet

Water Consumption (gal per GSF): FY2002-03 to FY2012-13



% Water Use Change From Previous FY



The University of North Carolina at Greensboro

Appendix B4

<u>FISCAL</u> <u>YEAR</u>	<u>TOTAL</u> <u>GAS</u>	<u>%</u> <u>CHANGE</u>	<u>CAMPUS</u> <u>AREA</u>	<u>STUDENT</u> <u>POPULATION</u>	<u>BTU</u> per <u>GSF</u>	<u>%</u> <u>CHANGE</u>
	(MMBTU)		(GSF)			
1999-2000	265,359	-	3,785,926	11,375	70,091	-
2000-2001	223,604	-15.74	3,838,194	11,250	58,258	-16.88
2001-2002	268,172	19.93	3,888,068	11,746	68,973	18.39
2002-2003	299,499	11.68	4,269,699	12,354	70,145	1.70
2003-2004	327,836	9.46	4,942,520	12,708	66,330	-5.44
2004-2005	343,268	4.71	4,987,544	13,099	68,825	3.76
2005-2006	351,280	2.33	5,177,689	13,723	67,845	-1.42
2006-2007	327,409	-6.80	5,415,496	14,219	60,458	-10.89
2007-2008	331,499	1.25	5,415,496	14,704	61,213	1.25
2008-2009	333,251	0.53	5,415,496	15,097	61,537	0.53
2009-2010	340,272	2.11	5,415,496	15,670	62,833	2.11
2010-2011	354,134	4.07	5,581,592	16,036	63,447	0.98
2011-2012	323,982	-8.51	5,581,593	15,841	58,045	-8.51
2012-2013	352,861	8.91	5,716,735	15,683	61,724	6.34

1 Therm = 10 mmBTU

1 Therm = 29.3 KWH

10/4/2013

The University of North Carolina at Greensboro

Appendix B4

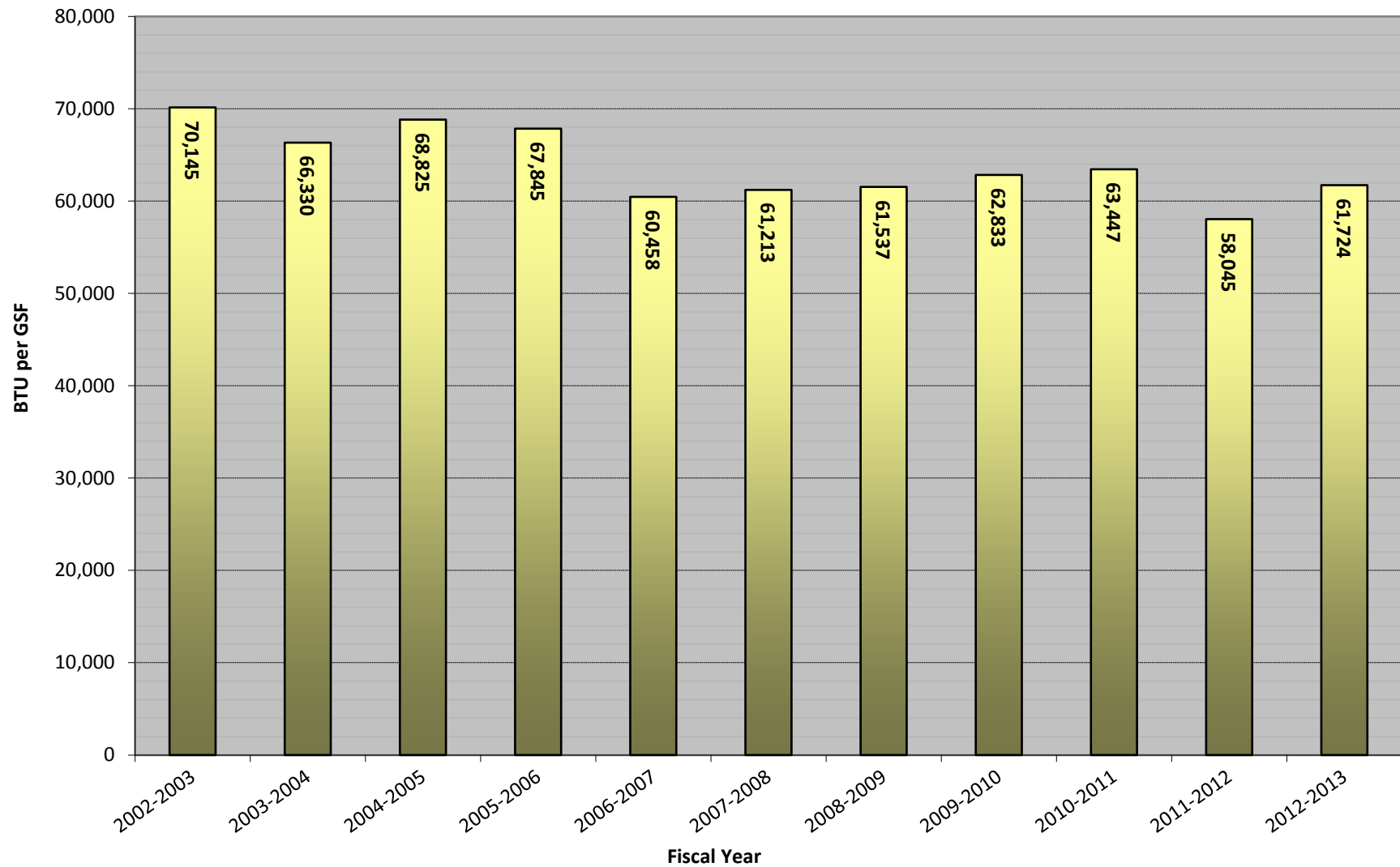
<u>FISCAL</u> <u>YEAR</u>	<u>COST</u>	<u>%</u> <u>CHANGE</u>	<u>MMBTU</u> per <u>STUDENT</u>	<u>COST</u> per <u>GSE</u>	<u>COST</u> per <u>STUDENT</u>
	(\$)			(\$)	(\$)
1999-2000	1,161,590	-	23.33	0.31	102.12
2000-2001	1,576,937	35.76	19.88	0.41	140.17
2001-2002	3,171,851	101.14	22.83	0.82	270.04
2002-2003	1,870,689	-41.02	24.24	0.44	151.42
2003-2004	2,219,449	18.64	25.80	0.45	174.65
2004-2005	2,756,240	24.19	26.21	0.55	210.42
2005-2006	3,901,745	41.56	25.60	0.75	284.32
2006-2007	2,828,934	-27.50	23.03	0.52	198.95
2007-2008	3,244,681	14.70	22.54	0.60	220.67
2008-2009	2,751,995	-15.18	22.07	0.51	182.29
2009-2010	2,129,166	-22.63	21.71	0.39	135.88
2010-2011	2,064,099	-3.06	22.08	0.37	128.72
2011-2012	1,714,907	-16.92	20.45	0.31	108.26
2012-2013	1,880,320	9.65	22.50	0.33	119.89

1 Therm = 10 mmBTU

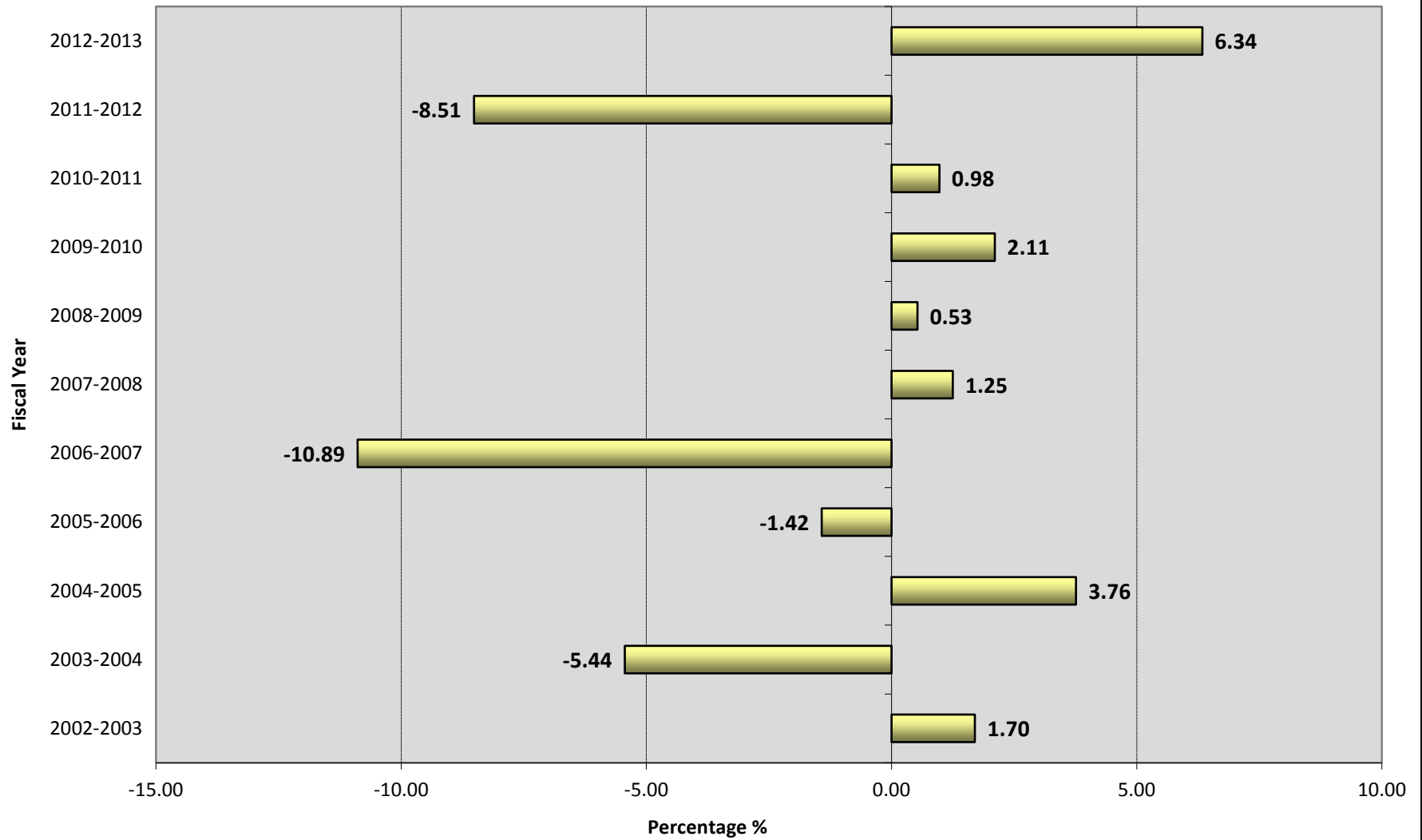
1 Therm = 29.3 KWH

10/4/2013

Natural Gas Consumption (BTU per GSF): FY2002-03 to FY2012-13



% Gas Use Change From Previous FY



**STRATEGIC ENERGY PLAN:
1. Energy Data Management**

Past Year Accomplishments	Measurement	Savings Actual or Calculated	Cost	Funding Source
KPI data updated.	Yearly.		8 man-hours	O&M funds
Updated utility data and charts posted on UNCG website for energy.	Yearly.		8 man-hours	O&M funds
Installed electric submeters for multiple systems at the Quad and Spartan Village Residence Halls.				Quad Renovation Budget/Spartan Village Construction Budget
Programmed submeters at Jefferson Suites and added them to the BAS.				Other
Install 7 chilled water and steam meters at the 7 Quad Buildings.				Quad Renovation Budget
Future Planned Activities	Measurement	Savings Estimated	Cost	Funding Source
Update utility data and charts posted on UNCG website for energy usage.	Yearly		8 man-hours	O&M funds
Benchmark energy usage in campus buildings and compare results.	Monthly / Annually		40 man-hours	O&M funds
Continue to connect individual building electric meters to an Energy Management Software system to track energy usage.				TBD
Determine a method of collecting and evaluating meter information for trends and data-driven decision making. Will be implemented once all meters are integrated.			TBD	O&M funds
Utilize TMA Software for analysis, tracking, and continued data input. Will be implemented once all meters are integrated.			TBD	O&M funds
Install steam meters at Bryan and the Library				O&M funds
Standardize UNCG's steam and chilled water meters; recommission and integrate existing steam and chilled water meters.				O&M funds

**STRATEGIC ENERGY PLAN:
2. Energy Supply Management**

Past Year Accomplishments	Measurement	Savings Actual or Calculated	Cost	Funding Source
Worked with Duke Energy on a rate analysis.	Annual	>\$500,000	8-16 man-hours	O&M funds
New natural gas provider.	Annual	\$ 141,979 due to decreased Basis Cost of the new provider, Hess Corporation, when compared to the higher Basis Cost charged by the former provider	8-16 man-hours	Utility Budget
Installed first solar PV array at Grounds Maintenance Shop.			Approx. \$19,000	O&M funds
Future Planned Activities	Measurement	Savings Estimated	Cost	Funding Source
Continue to work with Duke Energy to perform rate analysis as necessary.	Annual	Approx. \$400,000-\$450,000	8-16 man-hours	O&M funds
Continue to work with natural gas marketer to get the lowest gas rates possible.	Annual	Approx. \$100,000-\$150,000	8-16 man-hours	Utility Budget
Work to incorporate solar thermal heating to supply domestic hot water for the new Spartan Village residence halls.				Project Budget
Continue to investigate alternative energy generation on campus as part implementing the CAP.				Other

**STRATEGIC ENERGY PLAN:
3. Energy Use in Facilities**

Past Year Accomplishments	Measurement	Savings Actual or Calculated	Cost	Funding Source
Performance Contract for four campus buildings and main chiller plant.	Annual	\$597,590 total (\$548,474 guaranteed, \$49,116 excess)	Approx. \$500,000/year for 12 years	Utility Budget (Performance Contract)
Renovation of the seven (7) Quad residence halls received LEED-NC Gold certification. Major renovations to the Dining Hall (Moran Commons) continue and will achieve LEED-NC Silver at minimum. The four new residence halls of the Spartan Village (3 complete, 1 currently under construction) will also meet LEED-NC Silver standards.				R&R funds, Capital Project funding
Completed lighting retrofits in the Family Research Center and Weatherspoon Art Museum.	Annual	\$603 / year	\$6,426	ARRA grant
Install 7 LED outdoor lights as pilot project.			\$2,239.06	O&M funds
Expanded the "Standards of Comfort" policy (set points for occupied/unoccupied modes and occupancy hours in buildings) to three buildings outside the BAS. Complemented this policy with a "commissioning light" program to ensure thermostats and HVAC equipment were operating properly.	Monthly	>\$179,000	1 man hour per building. per thermostat cover. \$15	O&M funds
Scope second ESCO project with engineering firm.	Monthly		\$50,000	O&M funds
Retrocommissioned building at 1100 W. Market St. (University Advancement offices)				
Moved Quad Buildings to DDC after their renovations.				R&R funds, Capital Project funding
Expanded the compressed gas leak detection program for monitoring and maintenance using the Ultra-Probe. Also used the heat probe to detect inefficiencies and problems in chiller plant.				O&M funds
Future Planned Activities	Measurement	Savings Estimated	Cost	Funding Source
Continue to monitor Performance Contract stipulations for four campus buildings and main chiller plant.	Annual	Approx. \$500,000/year for 12 years plus \$15,000-\$25,000 in excess savings	Approx. \$500,000/year for 12 years	Utility Budget (Performance Contract)
Continue use of the Ultra-Probe to detect leaks and inefficiencies in gas and electric systems.				O&M funds
Continue to upgrade DDC control system in conjunction with renovation projects. The Dining Hall will be moved to DDC after renovations are complete (2013-14).				R&R funds, Capital Project funding
Continue to seek low/no cost ways to improve utility operations system.	Annual	TBD		O&M funds
Continue to establish a commissioning/re-commissioning/retro-commissioning program, using Standards of Comfort implementation as the jumping off point. Goal is to retrocommission 2 buildings in 2013-14.	Annual	Approx. 5-25% energy use per building	Approx. \$25,000-\$50,000 per building	TBD
Continue to retrofit lighting fixtures with electronic ballasts and T8, CFL or LED lamps. Replace 29 150-watt incandescent bulbs with 19-watt LED bulbs in Weatherspoon Art Museum.				O&M funds
Select and install an Energy Dashboard software system.		Approx. 3-5% energy use per building	Approx. \$50,000 plus annual fee	TBD
Update Facility Design and Construction Guidelines to incorporate language in support of SB668 goals.				No cost - staff time
Expand the Standards of Comfort policy to at least two more buildings not connected to the BAS.	Quarterly		1 man-hour per building + cost for thermostat covers.	O&M funds
Finalize pilot scheduling of week-end classes in energy efficient buildings. Determine most appropriate buildings to use with Registrar.				O&M funds
Participate in UNCGA lighting ESCO.		TBD	TBD	TBD

**STRATEGIC ENERGY PLAN:
4. Equipment Efficiency**

Past Year Accomplishments	Measurement	Savings Actual or Calculated	Cost	Funding Source
Conducted boiler tune-ups.	Annual		\$5,000	O&M funds
Finalized cost/benefit study on new economizers for the 4 boilers in the steam plant during the Climate Action Plan development.				O&M funds
Replaced any failed motors with high efficiency models.				O&M funds
Replaced exit signs with LED signs.				O&M funds
Replace windows in the 1951 wing of Stone Building.			Approx. \$400,000	R&R funds
Replaced the roof on the Weatherspoon Art Museum with a white, reflective roof.		TBD	Approx. \$550,000	R&R funds
Future Planned Activities	Measurement	Savings Estimated	Cost	Funding Source
Continue to conduct boiler tune-ups on an annual basis.	Annual		\$5,000	O&M funds.
Replace failed motors with high efficiency motors.				O&M funds
Replace exit signs with LED signs.				TBD
Install occupancy sensors.			\$30,000	TBD
Install VFDs where applicable to achieve energy savings.				TBD
Replace air handling units in Curry and Eberhardt Buildings.				
Once funding is released, implement Phase II of replacing the old steam and condensate underground distribution piping from the steam plant to various campus locations.		TBD	Approx. \$1.6 million	R&R funds

**STRATEGIC ENERGY PLAN:
5. Organization Integration**

Past Year Accomplishments	Measurement	Savings Actual or Calculated	Cost	Funding Source
Sent 11 representatives to the Appalachian Energy Summit. Sustainability Coordinator part of summit planning team and co-facilitated one session.			Travel	
Updated the Strategic Energy Plan and submitted to the State Energy Office.	Annual		Approx. 40-80 man-hours	O&M funds
Completed and adopted the Climate Action Plan to fulfill our obligation to the American College and University Presidents' Climate Commitment.			None	None
Sent representatives to the Annual Sustainable Energy Conference in Raleigh, April 2013.				
Chancellor established an energy reduction goal for the campus in FY2012-13.			None	None
Continued Green Office program to spread awareness of energy conservation and other sustainability issues and practices.			Approx. 8-20 man-hours per month	O&M funds
Future Planned Activities	Measurement	Savings Estimated	Cost	Funding Source
University Mechanical Engineer to complete Energy Management Diploma program at NCSU.				
Send team to Appalachian Energy Summit.			Travel	
Chancellor to announce an energy reduction goal for the campus of 3% in FY2013-14.		3% savings versus FY2012-13		None
Continue to update the Strategic Energy Plan and monitor progress.	Annual			O&M funds
Revise and develop new "behavioral" based energy conservation programs.	Monthly			O&M funds
Expand Green Office, and other education/awareness programs for faculty, staff, and students.			Sustainability Manager & Education Coordinator staff salaries	O&M funds

**STRATEGIC ENERGY PLAN:
6. Water Management**

Past Year Accomplishments	Measurement	Savings Actual or Calculated	Cost	Funding Source
Installed low flow devices in Quad Residence Hall and Dining Hall renovations, as well as the 4 new residence halls of Spartan Village.		TBD		Project Budget
Collected data from metered irrigation and cooling towers in order to receive non-sewer water credits from the City of Greensboro.	Read meters and reported data to the City on a monthly basis	\$178,049 (@2.94/ccf)	8 man-hours per month	O&M funds
A Water Resources team helped create the Climate Action Plan.				No cost
Implemented waterless mopping system	Gallons of water saved	34,304 gallons		O&M funds
Performed leak repairs on water and steam condensate lines.				O&M funds
Future Planned Activities	Measurement	Savings Estimated	Cost	Funding Source
Continue to install low flow devices and building water meters for buildings undergoing renovation or repair.				Capital projects
Continue to gather meter data from irrigation and cooling towers in order to receive non-sewer water credits from the City of Greensboro.	Read meters and report the data to the City on a monthly basis	Approx. \$150,000-\$200,000	8 man-hours per month	O&M funds
Implement a study to track, record, and verify cost of automating water sub-meters.				O&M funds
Continue to investigate and repair water and steam condensate line leaks.				O&M funds, R&R?
Implement recommendations of the Water Resources Team from the Climate Action Plan.				

The University of North Carolina Greensboro

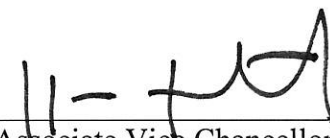
We have read the Strategic Energy & Water Plan for our University. The plan, as presented, supports the reductions required in G.S. 143-64.12(a).

Implemented this 4th day of October, 2013.

Energy Manager



Director of Facilities Operations



Associate Vice Chancellor for Facilities

UNCG Annual Utility Comparison Data

id	year	name	total utility \$	total energy \$	total btu	kwh	kwh \$	ng therms	ng \$	2oil gals	2oil \$	6 oil gals	6oil \$	propane gals	propane \$	coal tons	coal \$	wood tons	wood \$	steam lbs	steam \$	chw tons	chw \$	mgal water	water sewer \$	gsf	construction gsf	renovated gsf				
60005004	2002-03	UNC Greensboro	\$5,537,461	\$4,990,987	537,824,280,132	65,959,835	\$3,018,653	2,994,990	\$1,870,689	95,683	\$101,645	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	336,409	\$546,474	4,269,699	0	0				
60005004	2003-04	UNC Greensboro	\$6,085,348	\$5,527,654	571,384,005,610	71,312,536	\$3,306,739	3,278,361	\$2,219,449	1,655	\$1,466	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	290,356	\$557,694	4,942,520	0	0				
60005004	2004-05	UNC Greensboro	\$6,878,519	\$6,248,603	594,916,011,625	73,361,469	\$3,482,455	3,432,679	\$2,756,241	9,653	\$9,907	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	543,823	\$629,916	4,987,544	0	46,245				
60005004	2005-06	UNC Greensboro	\$8,455,503	\$7,622,474	620,424,415,114	77,641,218	\$3,669,416	3,512,803	\$3,901,745	30,516	\$51,313	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	175,592	\$833,029	5,177,689	95,350	273,666				
60005004	2006-07	UNC Greensboro	\$7,309,737	\$6,520,081	579,986,482,493	71,586,027	\$3,844,688	3,355,272	\$2,674,278	1,498	\$1,115	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	144,127	\$789,656	5,415,496	0	266,527				
60005004	2007-08	UNC Greensboro	\$8,500,093	\$7,593,983	597,302,044,266	77,894,921	\$4,349,067	3,314,985	\$3,244,678	188	\$238	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	155,923	\$906,110	5,415,496	0	139,845				
60005004	2008-09	UNC Greensboro	\$7,906,663	\$6,861,603	577,867,007,991	71,678,060	\$4,109,335	3,332,514	\$2,751,994	361	\$274	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	171,504	\$1,045,060	5,415,496	0	49,459				
60005004	2009-10	UNC Greensboro	\$7,713,099	\$6,530,241	585,475,000,677	71,825,485	\$4,398,506	3,402,715	\$2,129,166	973	\$2,569	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	183,459	\$1,182,858	5,415,496	0	0				
60005004	2010-11	UNC Greensboro	\$7,653,606	\$6,753,156	615,586,816,655	75,289,775	\$4,607,914	3,541,338	\$2,064,099	32,910	\$81,143	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	141,497	\$900,450	5,551,245	205,419	0				
60005004	2011-12	UNC Greensboro	\$7,402,485	\$6,663,983	582,985,314,918	75,819,228	\$4,941,445	3,239,818	\$1,714,907	2,223	\$7,631	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	122,795	\$738,502	5,510,548			Quad and Curry renovations			
60005004	2012-13	UNC Greensboro	\$7,681,444	\$6,853,774	605,765,965,759	74,031,758	\$4,963,407	3,528,606	\$1,880,320	3,175	\$10,047	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	130,567	\$717,952	5,716,735	421,972	0	Includes Spartan Village and Moran Commons			
60005004	2013-14	UNC Greensboro	\$0	\$0	0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	0	0				
60005004	2014-15	UNC Greensboro	\$0	\$0	0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	0	0				
60005004	2015-16	UNC Greensboro	\$0	\$0	0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	0	0				
60005004	2016-14	UNC Greensboro	\$0	\$0	0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	0	0				
60005004	2017-18	UNC Greensboro	\$0	\$0	0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	0	0				
60005004	2018-19	UNC Greensboro	\$0	\$0	0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	0	0				
60005004	2019-20	UNC Greensboro	\$0	\$0	0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	0	0				
			energy evaluation						water/sewer evaluation																							
			energy \$ avoided	energy \$/gsf	\$/mmbtu	\$/mmbtu %change	btu/sf	btu/sf %change	water \$ avoided	\$/kgal	\$/kgal %change	gal/sf	gal/sf %change																			
60005004	2002-03	UNC Greensboro		\$1.17	\$9.28		125,963		\$1.62			78.79																				
60005004	2003-04	UNC Greensboro	\$495,228	\$1.12	\$9.67	4%	115,606	-8.22%	\$190,276	\$1.92	18%	58.75	-25.44%																			
60005004	2004-05	UNC Greensboro	\$350,078	\$1.25	\$10.50	13%	119,280	-5.31%	-\$174,737	\$1.16	-29%	109.04	38.39%																			
60005004	2005-06	UNC Greensboro	\$390,361	\$1.47	\$12.29	32%	119,827	-4.87%	\$1,102,331	\$4.74	192%	33.91	-56.96%																			
60005004	2006-07	UNC Greensboro	\$1,148,526	\$1.20	\$11.24	21%	107,098	-14.98%	\$1,548,111	\$5.48	237%	26.61	-66.22%																			
60005004	2007-08	UNC Greensboro	\$1,078,770	\$1.40	\$12.71	37%	110,295	-12.44%	\$1,573,477	\$5.81	258%	28.79	-63.46%																			
60005004	2008-09	UNC Greensboro	\$1,238,286	\$1.27	\$11.87	28%	106,706	-15.29%	\$1,554,953	\$6.09	275%	31.67	-59.81%																			
60005004	2009-10	UNC Greensboro	\$1,078,315	\$1.21	\$11.15	20%	108,111	-14.17%	\$1,568,215	\$6.45	297%	33.88	-57.00%																			
60005004	2010-11	UNC Greensboro	\$917,827	\$1.22	\$10.97	18%	110,892	-11.96%	\$1,882,934	\$6.36	292%	25.49	-67.65%																			
60005004	2011-12	UNC Greensboro	\$1,270,418	\$1.21	\$11.43	23%	105,794	-16.01%	\$1,872,674	\$6.01	270%	22.28	-71.72%																			
60005004	2012-13	UNC Greensboro	\$1,293,571	\$1.20	\$11.31	22%	105,964	-15.88%	\$1,758,788	\$5.50	239%	22.84	-71.01%																			
60005004	2013-14	UNC Greensboro	\$0	\$0.00	\$0.00	0%	0	0.00%	\$0	\$0.00	0%	0.00	0%																			
60005004	2014-15	UNC Greensboro	\$0	\$0.00	\$0.00	0%	0	0.00%	\$0	\$0.00	0%	0.00	0%																			
60005004	2015-16	UNC Greensboro	\$0	\$0.00	\$0.00	0%	0	0.00%	\$0	\$0.00	0%	0.00	0%																			
60005004	2016-14	UNC Greensboro	\$0	\$0.00	\$0.00	0%	0	0.00%	\$0	\$0.00	0%	0.00	0%																			
60005004	2017-18	UNC Greensboro	\$0	\$0.00	\$0.00	0%	0	0.00%	\$0	\$0.00	0%	0.00	0%																			
60005004	2018-19	UNC Greensboro	\$0	\$0.00	\$0.00	0%	0	0.00%	\$0	\$0.00	0%	0.00	0%																			
60005004	2019-20	UNC Greensboro	\$0	\$0.00	\$0.00	0%	0	0.00%	\$0	\$0.00	0%	0.00	0%																			
			\$/kwh	\$/therm	2 oil \$/gal	6 oil \$/gal	propane\$/gal		coal \$/ton	wood \$/ton	steam \$/mb	chw \$/ton																				
60005004	2002-03	UNC Greensboro	\$0.0458	\$0.625	\$1.06	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00																				
60005004	2003-04	UNC Greensboro	\$0.0464	\$0.677	\$0.89	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00																				
60005004	2004-05	UNC Greensboro	\$0.0475	\$0.803	\$1.03	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00																				
60005004	2005-06	UNC Greensboro	\$0.0473	\$1.111	\$1.68	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00																				
60005004	2006-07	UNC Greensboro	\$0.0537	\$0.797	\$0.74	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00																				
60005004	2007-08	UNC Greensboro	\$0.0558	\$0.979	\$1.26	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00																				
60005004	2008-09	UNC Greensboro	\$0.0573	\$0.826	\$0.76	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00																				
60005004	2009-10	UNC Greensboro	\$0.0612	\$0.626	\$2.64	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00																				
60005004	2010-11	UNC Greensboro	\$0.0612	\$0.583	\$2.47	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00																				
60005004	2011-12	UNC Greensboro	\$0.0652	\$0.529	\$3.43	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00																				
60005004	2012-13	UNC Greensboro	\$0.0670	\$0.533	\$3.16	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00																				
60005004	2013-14	UNC Greensboro	\$0.0000	\$0.000	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00																				
60005004	2014-15	UNC Greensboro	\$0.0000	\$0.000	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00																				
60005004	2015-16	UNC Greensboro	\$0.0000	\$0.000	\$0.00	\$0.00	\$0																									