

Winston-Salem State University



Strategic Energy Plan

September 2013

Winston-Salem State University

Strategic Energy Plan

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Executive Summary

Energy Data Management:

- In order to improve clarity of this report, only four fiscal years will be presented, the baseline year and the three most recent fiscal years.
- The University continues to update its established Excel spreadsheets for collecting and analyzing the monthly energy billing information. Efforts continue to improve the comprehensive program for collecting and analyzing monthly facilities usage and cost data. This effort is designed to improve the evaluation of variations and to assist in determining the corrective action required. The data is posted in the Facilities shared data files for review by all in the department.
- The Key Performance Indicators the University used to measure our energy program demonstrated decreases in all three categories. The performance indicator changes for energy consumption for fiscal year 2012-2013 from the previous year are as follows: (a) a decrease in total energy per square foot of 1.89 %, (b) an increase in energy per student credit hour of 19.2%, and (c) an increase in energy per FTE student of 11.9%. The increase in energy use per SCH and per FTE also coincides with decreases in SCH and FTE students of 12.9% and 7.2%, respectively.
- Fiscal year 2012-2013 saw an increase of 678 heating degree days over the previous year which was the warmest since the inception of this report. We average 2,430 heating degree days per year over the past ten years, so the past year was more indicative of the normal heating season weather pattern.
- A breakdown by energy source for the usage and cost data per square foot for the total campus for the baseline fiscal year 2002-2003 and fiscal years 2010-2011 thru 2012-2013 is shown in Appendices 1 thru 4A.

Energy Supply Management:

- Most of the University facilities are on the time of day electrical rate schedule, which is the preferred rate at this time. The University continues to evaluate all accounts for the rates providing the greatest savings.
- Natural gas is the primary energy source for the central steam plant boilers, with number 2 fuel oil as a secondary fuel source. Competitive pricing is solicited each month for natural gas and fuel oil in order to determine which is most economical for the current month fuel source. As the economy switches to natural gas and its demand increases, it is expected to see the price of number 2 fuel oil to become more economical due to the increase demand within the next few years.

Energy Use in Facilities:

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- All the facilities have basic control systems and newer facilities have digital computer control systems. Temperature operating ranges have been established for all our buildings and are continually being reviewed. Facilities held discussions during the year with the maintenance and engineering departments to discuss ways to improve building control systems to save energy. HVAC systems, for instance, are being cutback at night when rooms are unoccupied. The first performance contract project has installed six new DDC systems which are in almost full operation.
- Energy efficient lamp cross-reference replacement list has been established for operations to use when replacing burned out lamps.
- The University Facilities Department is continuing to develop its conservation awareness program and evaluating new buildings' design for energy savings. Buildings with DDC controls have established occupied and unoccupied schedules to reduce the energy consumption. This program has proven to be very effective with minimal building complaints.
- The University continues with Energy Saving Performance Contract for ten buildings. The construction phase of the project commenced in September. Energy conservation measures include but are not limited to: lighting upgrades, water fixture upgrades, lighting controls, additional steam trap replacements, improved heating ventilation and air conditioning control systems, and building envelope improvements.
- In June the University began steps to enter into a Phase II performance contract for most of the remaining campus buildings.
- The UNC General Administration office initiated a system wide lighting performance contract.
- All new buildings will comply with the energy and water efficiencies mandated by Senate Bill 668 (SL 2007 - 546) and will be built to, or be certified to LEED Silver standards at a minimum.

Equipment Efficiency:

- Maintenance programs are in place to insure the most efficient operation of the University boilers.
- Filter changes, coil cleaning, and inspections are performed on a regular basis to insure proper operation.
- Energy consumption and costs for individual buildings are maintained in an excel spread sheet for use in recording, charting, and analyzing building efficiencies.
- The main heating plant boilers are on a yearly tune up program every spring after the spring semester ends.
- Facilities have an ongoing program to check and repair steam traps in an effort to reduce energy and water waste. This is continued to be bolstered by the Performance Contract steam trap survey requirements.
- The University's preventative maintenance program continues to prove successful and the program is continually being expanded.

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Organization Integration:

- The Director - Sustainability has been assigned the day-to-day responsibility for the energy management program.
- Facilities HVAC technicians and Engineering continue to review the control systems of campus buildings. This review process helps to improve on the understanding of how the building control systems are functioning.
- This year we plan to improve our campus Energy Conservation and Awareness program through higher student involvement and the Campus Sustainability Committee. The University is improving its awareness programs for students. There was a student driven Green Week last spring with significant student participation in programming and response.

Water Management:

- Water use, by volume per gross square foot, in FY 2012-2013, was 34.8% less than in the baseline year 2004-2005.
- WSSU has met, continues to meet and exceed the goal of 10% reduction in water consumption in all three key performance indicators.
- Malfunctioning water level controllers were identified and repaired. Other leaking pipes were identified and repaired.

Goals & Measures

The primary goal of the Strategic Energy Plan was to reduce our total energy consumption to meet the State target of 123,330 Btu/gsf/year by 2010 (gsf = gross square feet). The University's Energy Plan continues to support Senate Bill 668 (SL 2007-546). In the past three fiscal years, the university exceeded the target. WSSU consumed 107,270 Btu/gsf in 2012-2013, 109,341 Btu/gsf in 2011-2012 and 119,344 Btu/gsf in 2010-2011. WSSU will continue in its efforts to reduce energy consumption.

Based on the growth plans of the University, the University is tracking its progress in meeting the Strategic Energy Plan through the following criteria.

- Total energy consumption per gross square foot
- Total energy consumption per student credit hour
- Total energy consumption per full time equivalent student

Trend graph for these criteria will be plotted each month and reviewed by the Director - Sustainability.

Baseline Energy Use

Winston-Salem State University's current energy usage mix in BTUs for FY 2012-2013 is 48.2% power, 51.5% natural gas and 0% # 2 fuel oil. The university established fiscal year 2002-2003 as the baseline for its energy program when the energy usage mix was

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44.7 % power, 49.6 % natural gas and 5.7% # 2 fuel oil. Since the baseline year 2002-2003, the University operates its boilers 24 hours a day, 7 days a week, to support the buildings requiring reheat in the HVAC system. Steam is also required in the cafeteria kitchen for cooking and cleaning. Continuous operation minimizes steam pipe damage caused by steam line expansion and contraction. Typically, all boilers are shut down for annual cleanouts, tune ups, and inspections for one week in May.

Year	Total Cost	Total Kbtu	Gross Sq. Ft	Kbtu / Sq. Ft	Kbtu / SCH	Kbtu / FTE
2002-2003	1,395,496	138,295,654	1,072,810	128.910	1,655	22,889
2003-2004	1,598,961	145,791,790	1,138,245	128.085	1,379	19,625
2004-2005	1,968,421	171,754,209	1,355,398	126.719	1,331	19,403
2005-2006	2,629,206	195,479,787	1,503,480	130.018	1,342	19,439
2006-2007	2,439,157	196,084,498	1,499,352	130.779	1,314	19,168
2007-2008	2,627,945	198,589,014	1,633,845	121.547	1,263	18,617
2008-2009	2,609,629	207,455,732	1,642,962	126.269	1,107	15,800
2009-2010	2,476,932	207,496,675	1,642,962	126.294	1,110	17,037
2010-2011	2,399,746	203,439,685	1,726,081	119.344	1,112	15,653
2011-2012	2,355,503	186,388,004	1,726,081	109.341	1,063	14,936
2012-2013	2,321,285	193,474,912	1,803,628	107.270	1,267	16,707

The University program for collecting energy use data continues to improve over the base year. The program is very detailed and is continually being evaluated and improved.

The energy use per square foot decreased further in the 2012-2013 year. While this is encouraging, it is ameliorated by an abnormally warm winter where less building heat was required. However, the recently accepted (June 2013) Student Activities Center (93,545 gsf) included mainly construction utility use which could not be factored out. Also, the Hill Hall (37,898 gsf) renovation is included in the above data and could not be factored out. The construction consumption of power is well less than the utility use in maintaining indoor environmental quality for occupants.

A break down for water and energy usage and cost per square foot for the total campus for the baseline fiscal year 2002-2003 (2004-2005 for water) and the last three fiscal years is presented in Appendices 1 thru 18. Appendix 19 contains the USI Strategic Energy and Water Plan Mandate.

Planned Actions & Projects

Projects:

Completed Projects 2012-2013:

- Completion of the LEED-Silver certified Donald J. Reaves Student Activities Center.

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- New building automation controls installed in six buildings
- Completed the evaluation of three geothermal test wells for application on campus.

Planned/Current Projects:

- Energy Savings Performance contracting on ten campus buildings. Energy conservation measures include upgrading light fixtures, installing lighting controls, replacing steam traps, building envelope improvements, new building automation systems, water fixture improvements,
- Initiated the process for conducting a Phase II of Energy Savings Performance contracting.
- Participating with the UNC General Administration office in a system wide lighting Energy Savings Performance contract.

Completed Actions:

- Conducted annual building cutbacks during the Christmas break to conserve energy.
- Geothermal test well boring and evaluation.

Planned Actions:

- Develop a maintenance program for the replacement of motors with premium efficiency motors.
- Building shutdowns during extended holidays and the summer break.
- Consolidating resident students to empty one residence hall when possible.
- Exploring grant fund opportunities for solar photovoltaic installations.
- Working with residence life personnel to focus on sustainable activities in residence halls.

Savings Opportunity Assessment:

- The University continues to make improvements to its program for collecting and analyzing monthly energy billing information, and compiling a comprehensive database to allow tracking of energy usage for the campus.
- Facilities Operations and Facilities Design & Construction together have established HVAC control temperature settings for the building in accordance with the 2012 North Carolina Energy Conservation Code: a minimum of 75 degrees Fahrenheit for cooling and a maximum of 72 degrees Fahrenheit for heating.
- Facilities Engineering, now Facilities Design & Construction, continues to improve the capability to track energy use in each building on campus.
- Review the energy rate schedules to evaluate the most economical rate schedule for each energy service at the University.
- Develop a maintenance program for the replacement of motorized equipment, which is subject to be replaced, with premium efficiency motors.

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Budget:

The Facilities Management Department will continue to use its existing budget to focus on no/low cost initiatives to improve the University on-going energy conservation efforts. Some budget has become available for energy related projects. In addition, with current energy savings projects, the avoided costs will allow for funding of future energy saving projects. Performance contracting allows addressing important maintenance issues while minimizing or even benefiting the overall cost to the university.

Energy Mandate:

Energy and energy management must be recognized as a controllable operating expense wherein savings can result in funding being available for other program needs. If the energy management program is to be successful, all members of the Winston-Salem State University Community, Students, Faculty, and Staff, have important roles to play. Energy cost reduction must become a vital part of the University Strategic Energy Plan. This plan must support the energy reductions required in Senate Bill 668 (SL 2007-546).

As integral part of this Energy Strategic Plan the University has established an Energy and Water Mandate for Winston-Salem State University. The Utility Saving Initiative Strategic Energy and Water Plan Mandate is presented in Appendix 19.

Appendices:

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Appendix 1

Baseline Energy Map FY 2002-2003

Total Campus Energy

	KWH	Dtherm	Gallons	Kbtu	Usage %	Cost	%Cost%
Electricity	18,099,871			61,756,760	44.7	\$ 897,101	64.3
Gas		68,615		68,615,000	49.6	\$ 454,600	32.6
Fuel oil #2			56,876	7,906,033	5.7	\$ 43,795	3.1
Totals	18,099,871	68,615	56,876	138,277,793		\$ 1,395,496	

Energy cost per units

Electricity	0.0496 \$/kwh
Gas	6.625 \$/dtherm
Fuel oil #2	0.7700 \$/gal

Energy Consumption

Electricity	16.87 kwh/sf	Total SF	1,072,810
Gas	0.0640 dtherm/sf		
Fuel Oil #2	0.0530 gal/sf		
Total energy	128.893 kbtu/sf		

Total Energy Consumption per Student C.H.	1,654 kbtu/sch	Student credit hours	83,584
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Total Energy Consumption per FTE	22886 kbtu/fte	FTE Students	6,042
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KWH = kilowatt hours

Dtherm = deca therm = 10 therms, 1 therm = 100,000 BTUs

KBTU = one thousand BTUs (British Thermal Units)

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Appendix 2

Energy Map - Fiscal Year 2010-2011 vs Baseline Year 2002-2003

%Change = Percent Change from FY 02-03

Total Campus Energy

	KWH	Dtherm	Gallons	Kbtu	Usage %	Cost	Cost %	Usage % Change	Cost %Change
Electricity	28,739,128			98,057,905	48.2%	1,713,791	71.4%	58.8%	91.0%
Gas		104,846		104,845,550	51.5%	675,979	28.2%	52.8%	48.7%
Fuel Oil # 2			3,858	536,280	0.3%	9,975	0.4%	-93.2%	-77.2%
Totals	28,739,128	104,846	3,858	203,439,685		2,399,746		47.1%	72.0%

Energy Cost Per Units

			% Change
Electricity	0.0596	\$/kwh	20.31%
Gas	6.447	\$/dtherm	-2.69%
Fuel Oil # 2	2.5856	\$/gal	235.79%

Energy Consumption per SF

			% Change			% Change
Electricity	16.859	kwh/sf	-0.07 %	Total SF	1,704,649	58.90%
Gas	.0615	dtherm/sf	-3.83%	Cost / SF	1.408	8.22%
Fuel Oil # 2	.0023	gal/sf	-95.73%			
Total Energy	119.344	kbtu/sf	-7.41%			

Energy Consumption per Student Credit Hour

			% Change			% Change
	1,112	kbtu/sch	-32.76%	Student Credit Hours	182,887	118.81%

Energy Consumption per FTE

			% Change			% Change
	15,653	kbtu/fte	-31.61%	Student FTE	12,997	115.12%

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Appendix 2 (continued)

Energy Map - Fiscal Year 2010-2011 with Comparison to Baseline Year 2002-2003

Student enrollment has increased significantly from the baseline year. Compared to the baseline year, student credit hours for fiscal year 2011-2012 have increased 118.81%, and full time equivalent student hours have increased 115.12%.

The University has increased its square footage by 58.9% since the baseline year of 2002-2003.

Natural gas usage and cost have increased 52.8% and 48.7%, respectively. Power usage and cost have increased by 58.8% and 91.0%, respectively.

The three key performance criteria by which we track our progress in the Strategic Energy Plan versus the baseline year are as follows:

Total energy consumption per square foot decreased 7.41 %.

Total consumption per student credit hour decreased 32.76%.

Total energy consumption per full time equivalent student decreased 31.61%.

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Appendix 3

Energy Map - Fiscal Year 2011-2012 with Comparison to Baseline Year 2002-2003

%Change = Percent Change from FY 02-03

Total Campus Energy									
	KWH	Dtherm	Gallons	Kbtu	Usage %	Cost	Cost %	Usage % Change	Cost %Change
Electricity	27,953,108			95,376,004	51.2%	\$1,819,817	77.3%	54.4%	102.9%
Gas		91,012		91,012,000	48.8%	\$535,686	22.7%	32.6%	17.8%
Fuel Oil # 2			0	0	0.0%	0	0.0%	0.00%	0.00%
Totals	27,953,108	91,012	0	186,388,004		\$2,355,203		34.8%	68.8%
Energy Cost Per Unit									
			% Change						
Electricity	0.0651	\$/kwh	31.35%						
Gas	5.886	\$/dtherm	-11.16%						
Fuel Oil # 2	0.0000	\$/gal	N/A						
Energy Consumption per SF									
			% Change				% Change		
Electricity	16.40	kwh/sf	-2.81%		Total SF*	1,704,649	58.9%		
Gas	.0534	dtherm/sf	-16.52%		Cost / SF	1.382	6.23 %		
Fuel Oil # 2	0.000	gal/sf	N/A						
Total Energy	109.341	kbtu/sf	-15.17%						
Total Energy Consumption per Student C.H.									
			% Change				% Change		
	1,063	kbtu/sch	-35.72%		Student Credit Hours	175,262	109.68%		
Total Energy Consumption per FTE									
			% Change				% Change		
	14,963	kbtu/fte	-34.74%		Student FTE	12,479	106.54%		

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Appendix 3 (continued)

Energy Map - Fiscal Year 2011-2012 with Comparison to Baseline Year 2002-2003

Student enrollment has increased significantly from the baseline year. Compared to the baseline year, student credit hours for fiscal year 2011-2012 are 109.68% higher, and full time equivalent student hours are 106.54% higher.

The University has increased its square footage by 58.9% since the baseline year of 2002-2003.

Natural gas usage and cost have increased 32.6% and 17.8%, respectively. Power usage and cost have increased by 54.4% and 102.9%, respectively.

The three criteria we use to track our progress in meeting our Strategic Energy Plan versus the baseline year are as follows:

Total energy consumption per gross square foot decreased 15.17 %.

Total consumption per student credit hour decreased 35.72%.

Total energy consumption per full time equivalent student decreased 34.74%.

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Appendix 4

Energy Map - Fiscal Year 2012-2013 with Comparison to Baseline Year 2002-2003

%Change = Percent Change from FY 02-03

Total Campus Energy						Usage	Cost		
	KWH	Dtherm	Gallons	Kbtu	Usage %	Cost	Cost %	% Change	%Change
Electricity	26,475,326			90,333,812	46.7%	\$1,726,417	74.4%	46.3%	92.4%
Gas		103,141		103,141,100	53.3%	\$594,868	25.6%	50.3%	30.9%
Fuel Oil # 2			0	0	0.0%	0	0.0%	0.00%	0.00%
Totals	26,475,326	103,141	0	193,474,912		\$2,231,285		39.9%	66.3%
Energy Cost Per Unit			%						
			Change						
Electricity	0.0652	\$/kwh	31.56%						
Gas	5.768	\$/dtherm	-12.95%						
Fuel Oil # 2	0.0000	\$/gal	N/A						
Energy Consumption per SF			%						
			Change						
Electricity	14.68	kwh/sf	-13.00%	Total SF*	1,803,628	68.12%			
Gas	.0572	dtherm/sf	-10.59%	Cost / SF	1.287	-1.06 %			
Fuel Oil # 2	0.000	gal/sf	N/A						
Total Energy	107.270	kbtu/sf	-16.78%						
Total Energy Consumption per Student C.H.			%						
			Change						
	1,267	kbtu/sch	-23.40%	Student	152,672	82.66%			
				Credit Hours					
Total Energy Consumption per FTE			%						
			Change						
	16,707	kbtu/fte	-27.00%	FTE Student	11,581	91.67%			

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Appendix 3 (continued)

Energy Map - Fiscal Year 2012-2013 with Comparison to Baseline Year 2002-2003

Student enrollment has increased significantly from the baseline year. Compared to the baseline year, student credit hours for fiscal year 2012-2013 are 82.66% higher, and full time equivalent student hours are 91.67% higher.

The University has increased its square footage by 68.12% since the baseline year of 2002-2003.

Natural gas usage and cost have increased 50.3% and 30.9%, respectively. Power usage and cost have increased by 46.3% and 92.4%, respectively.

The three criteria we use to track our progress in meeting our Strategic Energy Plan versus the baseline year are as follows:

Total energy consumption per gross square foot decreased 16.78 %.

Total consumption per student credit hour decreased 23.40%.

Total energy consumption per full time equivalent student decreased 27.00%.

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Appendix 4A

Energy Map - Fiscal Year 2012-2013 with Comparison to Fiscal Year 2011-2012

%Change = Percent Change from FY 11-12

Total Campus Energy

	KWH	Dtherm	Gallons	Kbtu	Usage %	Cost	Cost %	Usage % Change	Cost %Change
Electricity	26,475,326			90,333,812	46.7%	\$1,726,417	74.4%	-5.29%	-5.13%
Gas		103,141		103,141,100	53.3%	\$594,868	25.6%	13.33%	11.05%
Fuel Oil # 2			0	0	0.0%	0	0.0%	NA	NA
Totals	26,475,326	103,141	0	193,474,912		\$2,231,285		3.8%	-1.45%

Energy Cost Per Units

			% Change
Electricity	0.0652	\$/kwh	0.16%
Gas	5.758	\$/dtherm	-2.01%
Fuel Oil # 2	0.0000	\$/gal	N/A

Energy Consumption per SF

			% Change			% Change
Electricity	14.68	kwh/sf	-10.48%	Total SF	1,803,628	5.81%
Gas	.0572	dtherm/sf	7.11%	Cost / SF	1.382	-6.86%
Fuel Oil # 2	0.000	gal/sf	NA			
Total Energy	107.270	kbtu/sf	-1.89%			

Energy Consumption per Student Credit Hour

			% Change			% Change
	1,267	kbtu/sch	19.16%	Student Credit Hours	152,672	-12.89%

Energy Consumption per Full Time Equivalent Student

			% Change			% Change
	16,707	kbtu/fte	11.85%	Student FTE Total	11,581	-7.20%

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Appendix 4A (continued)

Energy Map - Fiscal Year 2012-2013 with Comparison to Fiscal Year 2011-2012

Student enrollment has decreased from the 2011-2012 year. Student credit hours for fiscal year 2012-2013 have decreased 12.89%, and full time equivalent student hours have increased 7.20%. This marks two consecutive years of decreases in SCH and FTE.

The University has increased its square footage by 5.81% during the past year.

Natural gas usage and cost have increased 13.33% and 11.05%, respectively, from the prior year. Power usage has decreased 5.29%. Power cost has decreased by 5.13%.

The three key performance criteria by which we track our progress in the Strategic Energy Plan versus the baseline year are as follows:

Total energy consumption per square foot decreased 1.89 %. This reduction was due, in part, from a smaller student base. Energy reduction is also evidenced through the energy conservation measures of the performance contract.

Total consumption per student credit hour increased 19.16% with a 12.89% decrease in student credit hours but a cooler winter.

Total energy consumption per full time equivalent student increased 11.85% despite a 7.20% decrease in full time equivalent students.

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Appendix 5

Water Map Fiscal Year 2004-2005 (Baseline Year)

	KGallons		Cost		Usage % Change	Cost %Change
Campus Water - Total	77,822		240,716			
Consumption per GSF	0.057	kgal/gsf	% Change	Total GSF	1,355,398	% Change in GSF N/A
<hr/>						
Consumption per SCH	0.6030	kgal/sch	% Change	Student Credit Hours	129,048	% Change in SCH N/A
<hr/>						
Consumption per FTE	8.79	kgal/fte	% Change	Student FTE 2 semesters	8,852	% Change in FTE N/A

The University will use this year as its baseline for water usage due to availability of records.
Kgal = 1000 gallons

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Appendix 6

Water Map Fiscal Year 2010-2011

%Change = Percent Change from FY 09-10

	Kgallons		Cost	Usage % Change	Cost %Change	
Campus Water - Total	70,683		372,230	14.18%	22.64%	
Consumption per GSF	0.041	kgal/gsf	% Change 8.68%	Total GSF	1,704,649	% Change in GSF 5.06%
<hr/>						
Consumption per SCH	0.386	kgal/sch	% Change 16.71%	Student Credit Hours	182,887	% Change in SCH -2.17 %
<hr/>						
Consumption per FTE	5.438	kgal/fte	% Change 7.00	FTE Students Year Round	12,997	% Change in FTE 6.71%

Fiscal Year 2010-2011 Water changes with Comparison to Fiscal Year 2009-2010

Total gross square feet increased 5.1%.
 Student credit hours decreased 2.17%
 Full time equivalent students increased 6.71%.
 Water usage per gross square foot increased 8.7%
 Water usage per SCH increased 16.7%
 Water usage per FTE increased 7.0%
 Water cost increased by 22.6%
 Water cost does not include storm water fees of \$16,832.

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Appendix 7

Water Map Fiscal Year 2011-2012

%Change = Percent Change from FY 10-11

	KGallons		Cost	Usage % Change	Cost %Change	
Campus Water - Total	64,208		373,140	-9.17%	0.24%	
Consumption per SF	0.038	kgal/gsf	% Change -9.17%	Total GSF	1,704,649	% Change in GSF 0.0%
<hr/>						
Consumption per SCH	0.366	kgal/sch	% Change -5.22%	Student Credit Hours	175,262	% Change in SCH -4.17 %
<hr/>						
Consumption per FTE	5.145	kgal/fte	% Change -5.39%	FTE Students Year Round	12,479	% Change in FTE -3.99%

Fiscal Year 2011-2012 Water changes with Comparison to Fiscal Year 2010-2011

Total gross square feet increased 0%.
 Student credit hours decreased 4.17%
 Full time equivalent students decreased 3.99%.
 Total water use and water usage per gross square foot decreased 9.17%
 Water usage per SCH decreased 5.22%
 Water usage per FTE decreased 5.39%
 Water cost increased by 0.24%
 Water cost does not include storm water fees of \$17,141.

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Water Map Fiscal Year 2012-2013

%Change = Percent Change from FY 11-12

	KGallons		Cost	Usage % Change	Cost %Change	
Campus Water - Total	69,802		437,994	8.71%	17.38%	
Consumption per GSF	0.039	kgal/gsf	% Change 2.75%	Total GSF	1,803,628	% Change in GSF 5.81%
<hr/>						
Consumption per SCH	0.457	kgal/sch	% Change 24.80%	Student Credit Hours	152,678	% Change in SCH -12.89%
<hr/>						
Consumption per FTE	6.027	kgal/fte	% Change 17.14%	FTE Students Year Round	11,581	% Change in FTE -7.20%

Fiscal Year 2012-2013 Water changes with Comparison to Fiscal Year 2011-2012

Total gross square feet increased 5.81% due to bringing the Donald J. Reaves Student Activity Center on line in June.

Student credit hours decreased 12.89%

Full time equivalent students decreased 7.20%.

Water usage per gross square foot increased 2.75%

Water usage per SCH increased 24.80%

Water usage per FTE increased 17.14%

Water cost increased by 17.38%

Winston-Salem State University

Appendix 9

Water Map - Fiscal Year 2012-2013 versus Baseline Year 2004-2005

%Change = Percent Change from FY 04-05

	Kgallons		Cost	Usage % Change	Cost %Change	
Campus Water - Total	69,802		437,994	8.71%	17.38%	
Water Consumption per SF	0.039	kgal/gsf	% Change -34.77%	Total GSF	1,803,628	% Change in GSF 68.12%
Water Consumption per SCH	0.457	kgal/sch	% Change -28.43%	Student Credit Hours	152,678	% Change in SCH 82.66%
Water Consumption per FTE	6.027	kgal/fte	% Change -33.70%	Student FTE Year round	11,581	% Change in FTE 91.67%

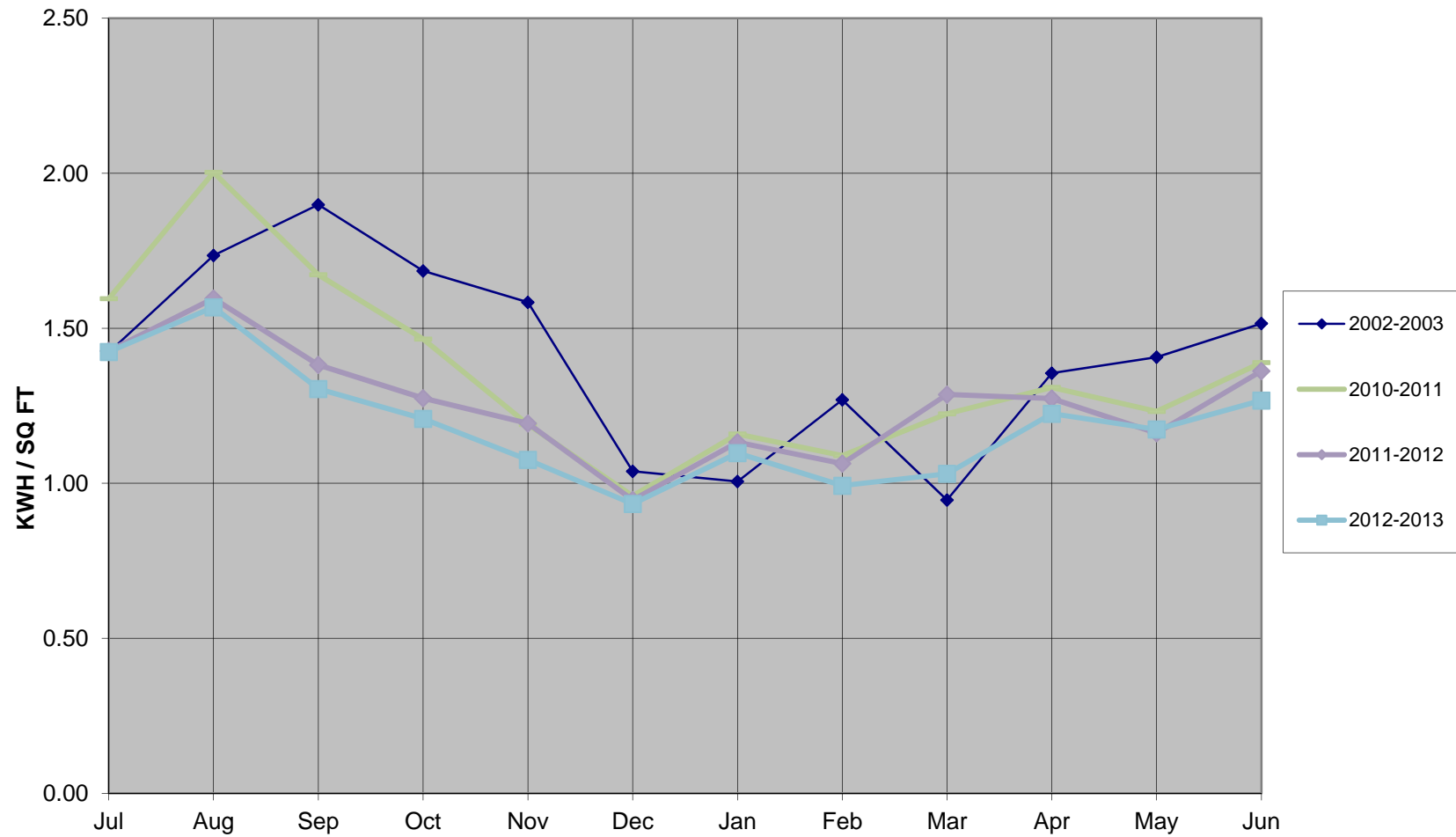
Fiscal year 2012-2013 Water with Comparison to Baseline year 2004-2005

Total gross square footage increased 68.12%
 Student credit hours increased 82.66%
 Full time equivalent students increased 91.67%.
 Water usage per square foot decreased 34.77%
 Water usage per SCH decreased 28.43%
 Water usage per FTE decreased 33.70%
 Water cost increased by 17.38%.

By all three key performance indicators, the University has continued to exceed the goal of ten percent reduction in water use over the base year.

Winston-Salem State University

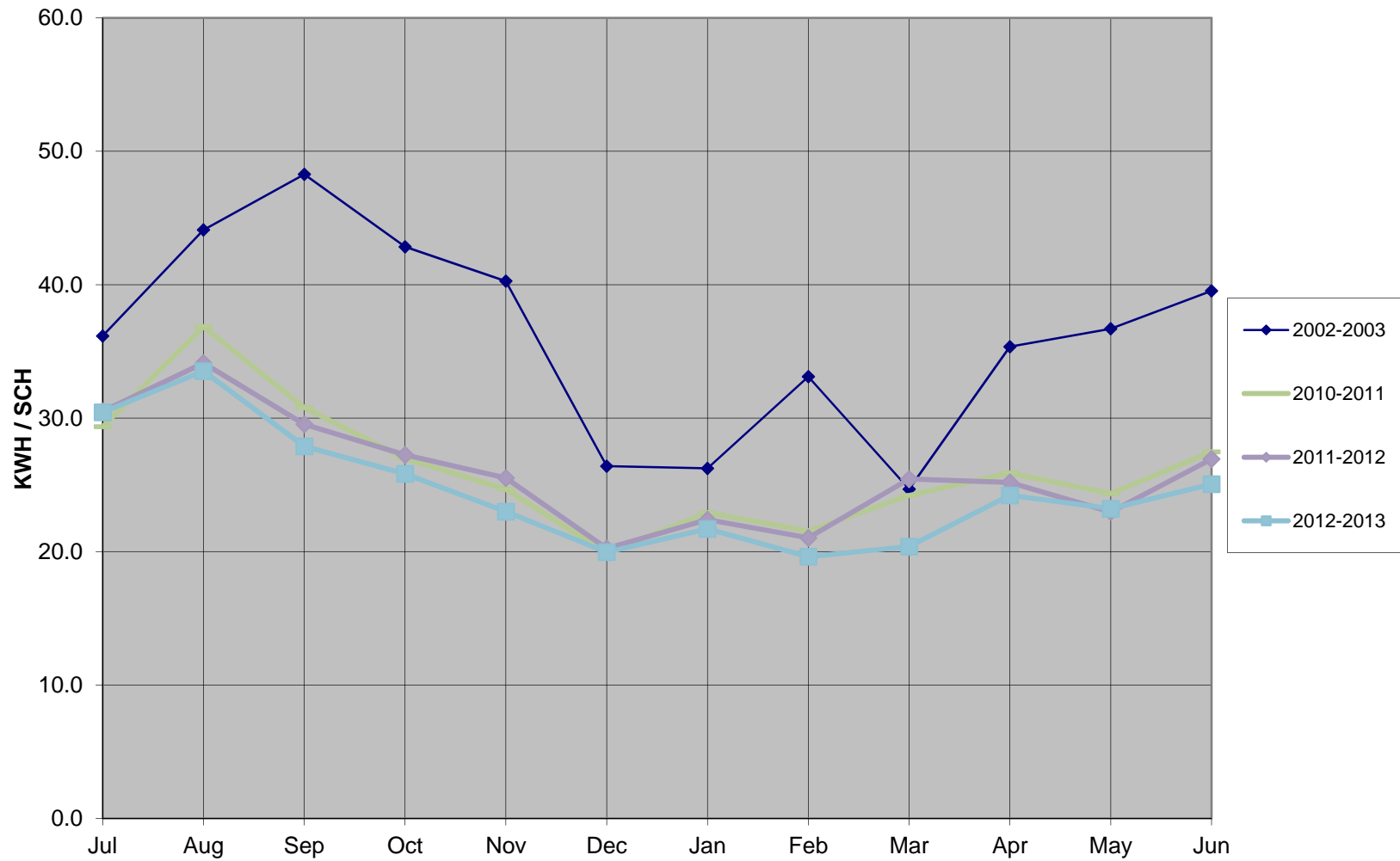
WSSU POWER USAGE SUMMARY PER SQUARE FOOT



Appendix 10

Winston-Salem State University

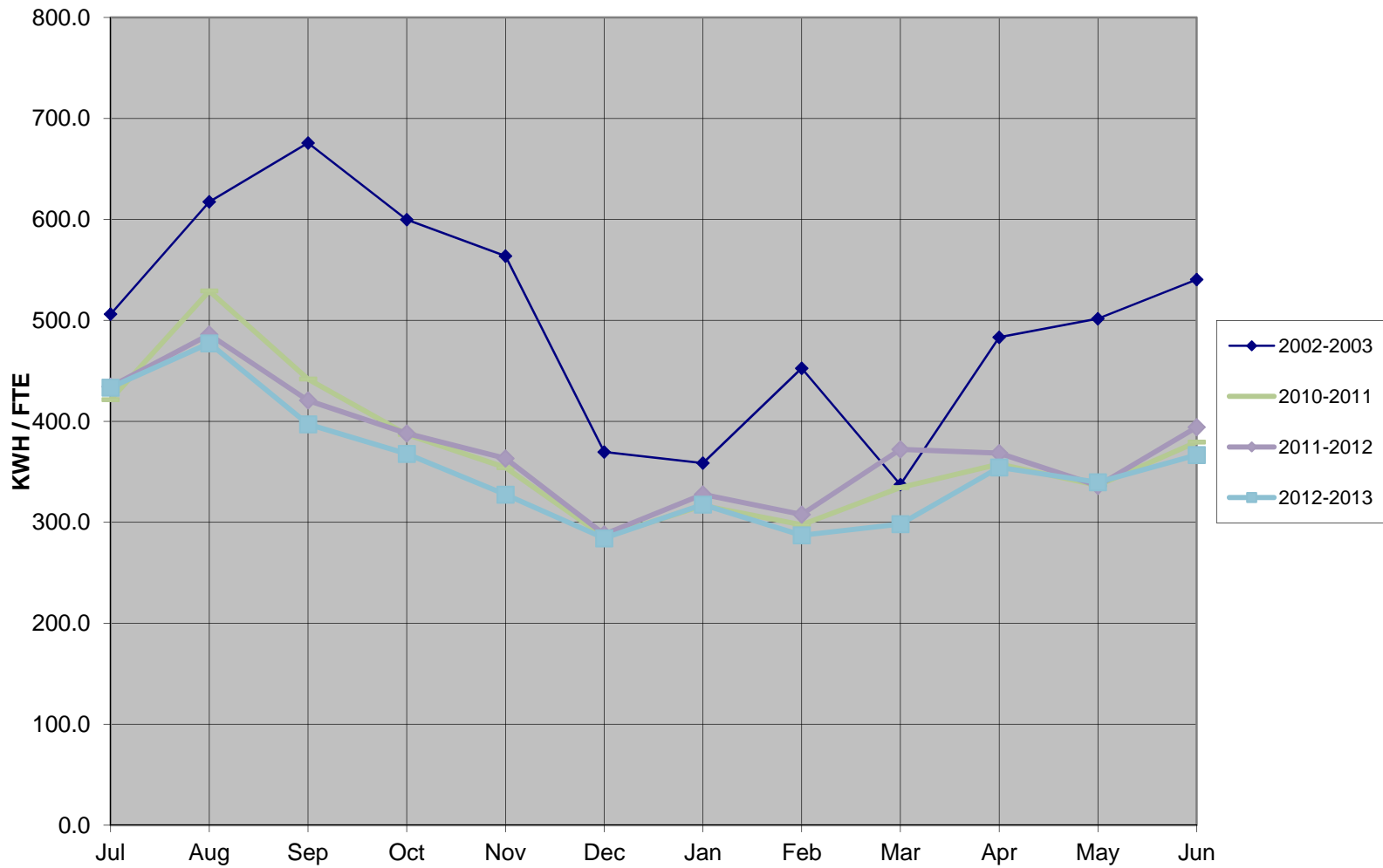
WSSU POWER USAGE SUMMARY PER STUDENT CREDIT HOUR



Appendix 11

Winston-Salem State University

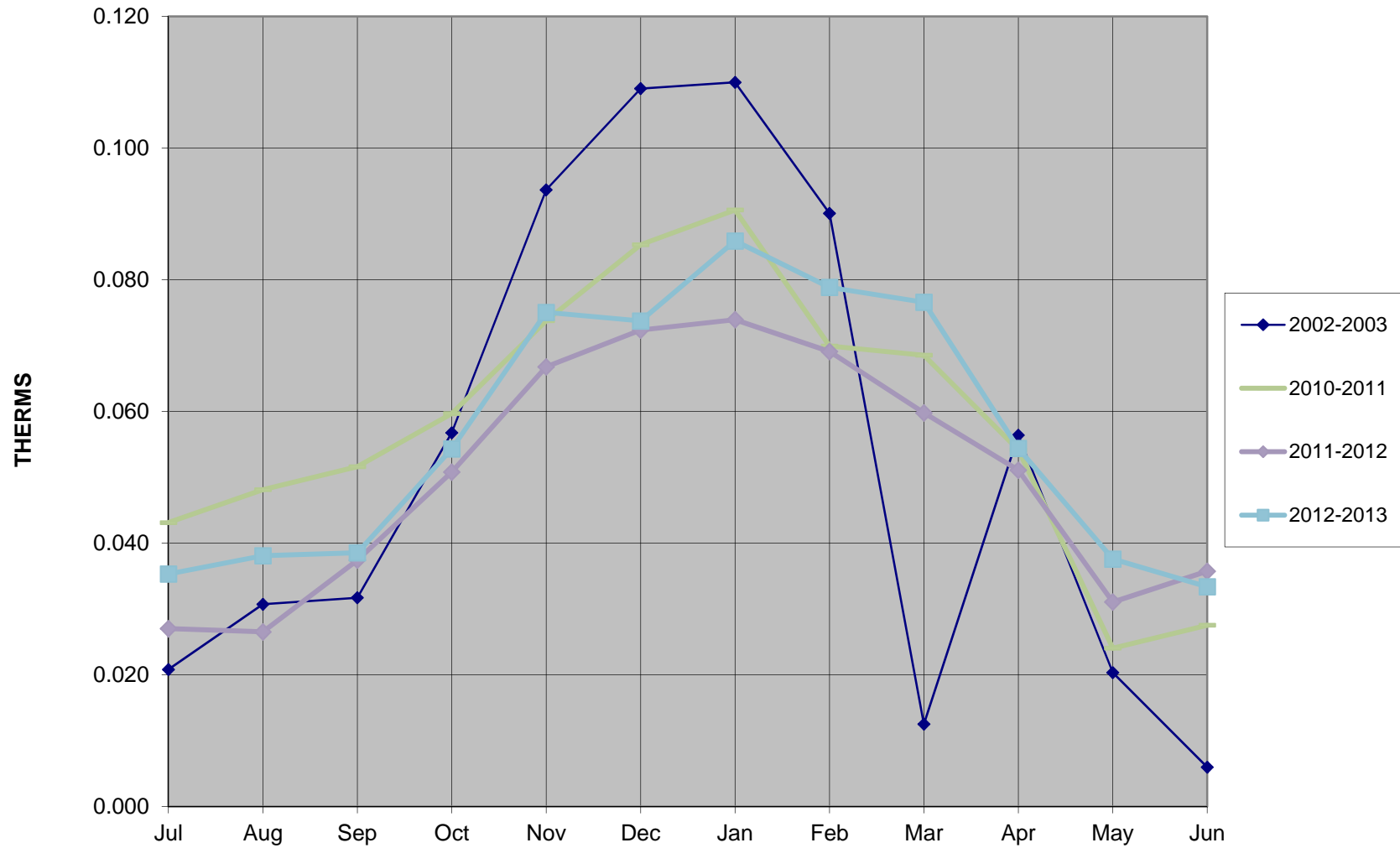
WSSU POWER USAGE SUMMARY PER FULL TIME EQUIVALENT STUDENT



Appendix 12

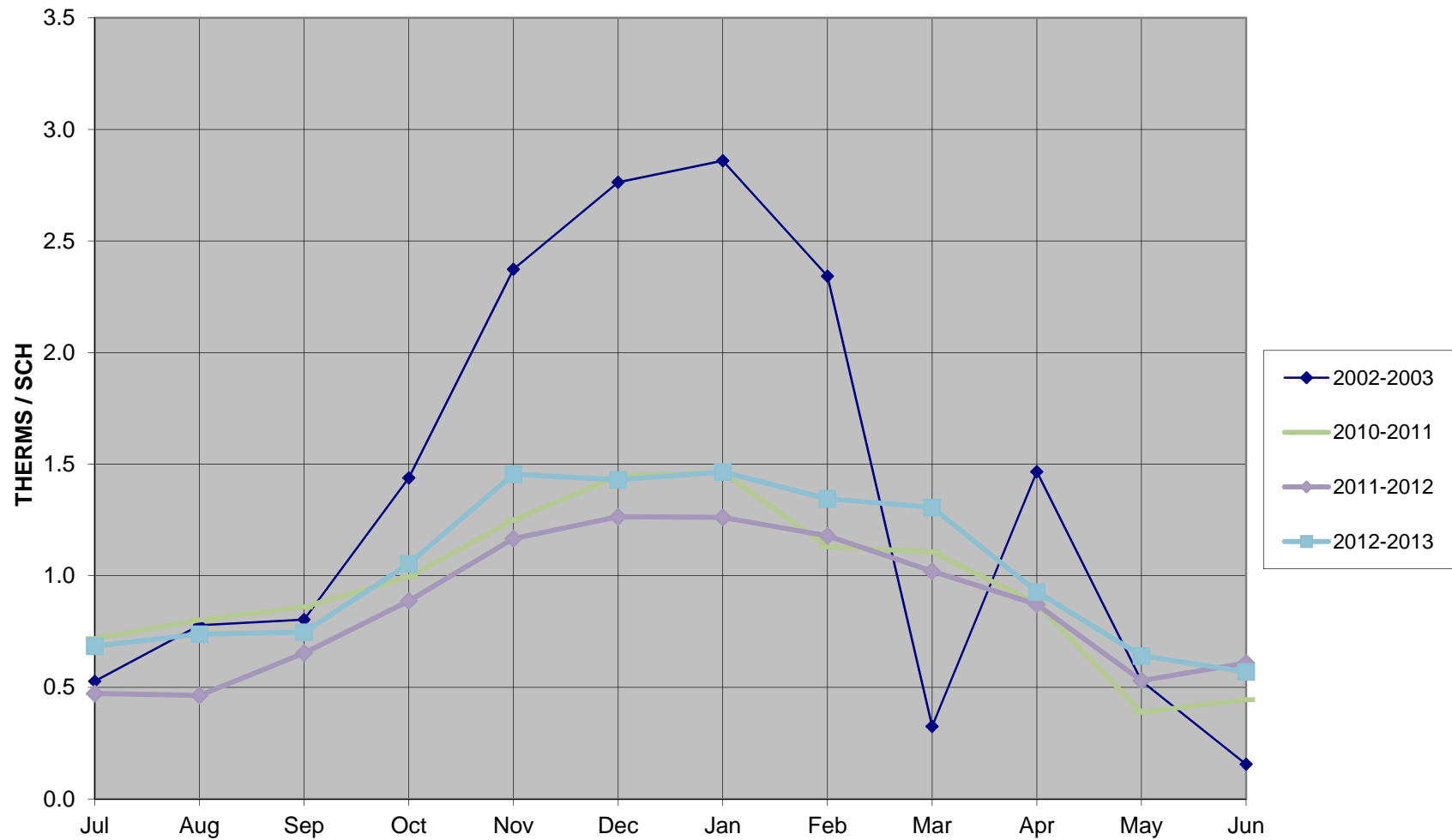
Winston-Salem State University

WSSU GAS USAGE SUMMARY PER SQUARE FOOT



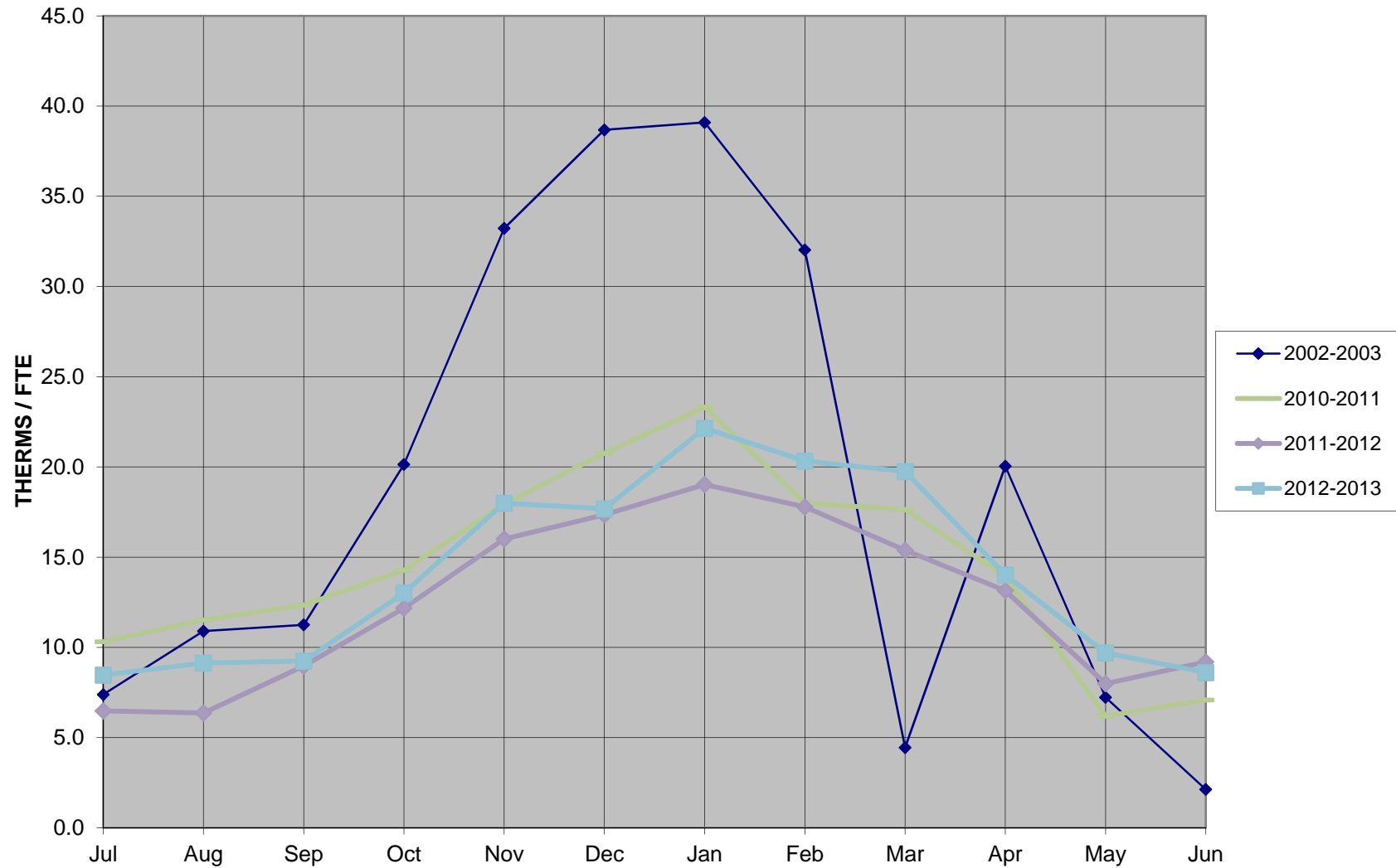
Winston-Salem State University

WSSU GAS USAGE SUMMARY PER STUDENT CREDIT HOUR



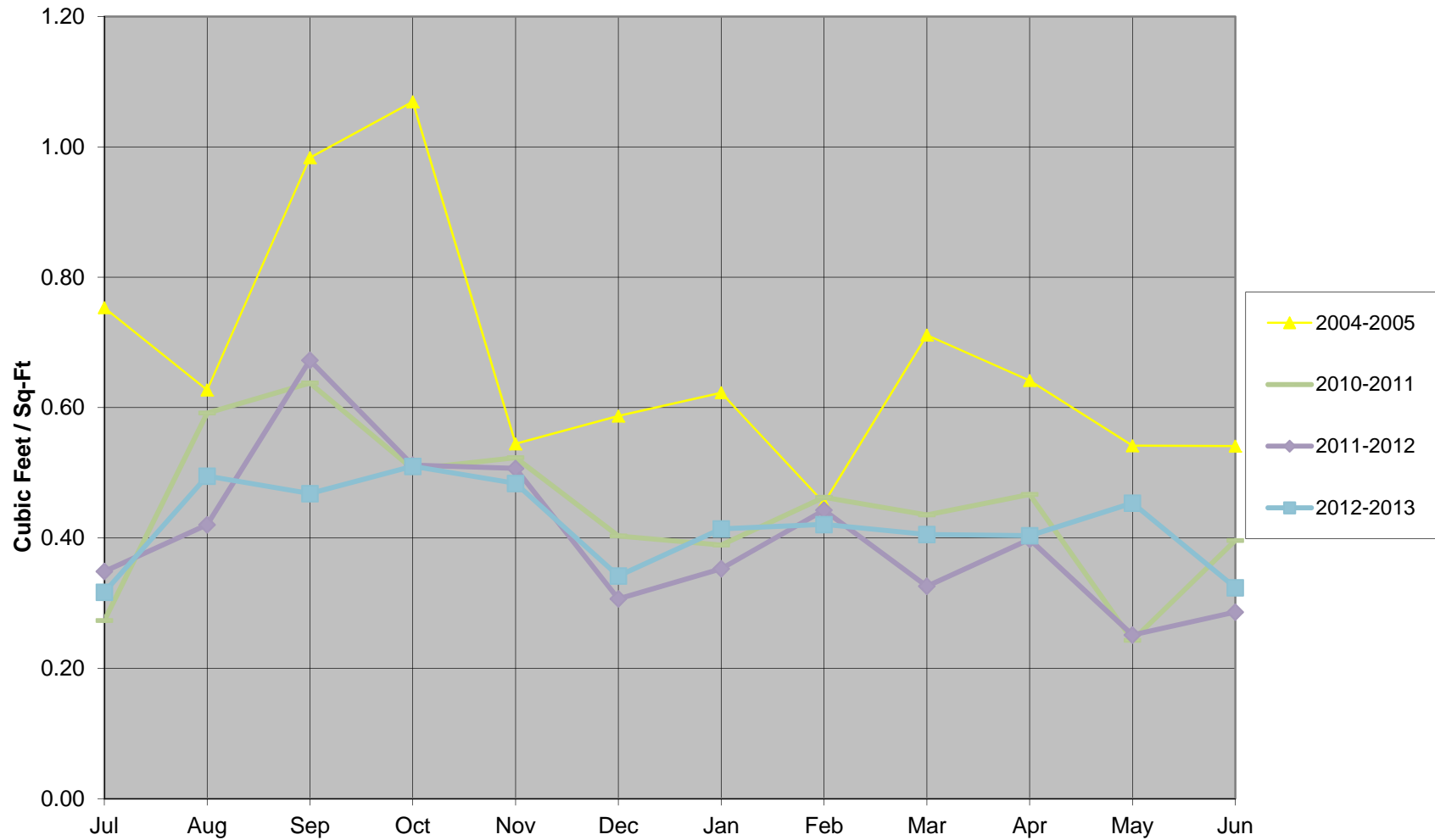
Winston-Salem State University

WSSU GAS USAGE SUMMARY PER FULL TIME EQUIVALENT STUDENT



Winston-Salem State University

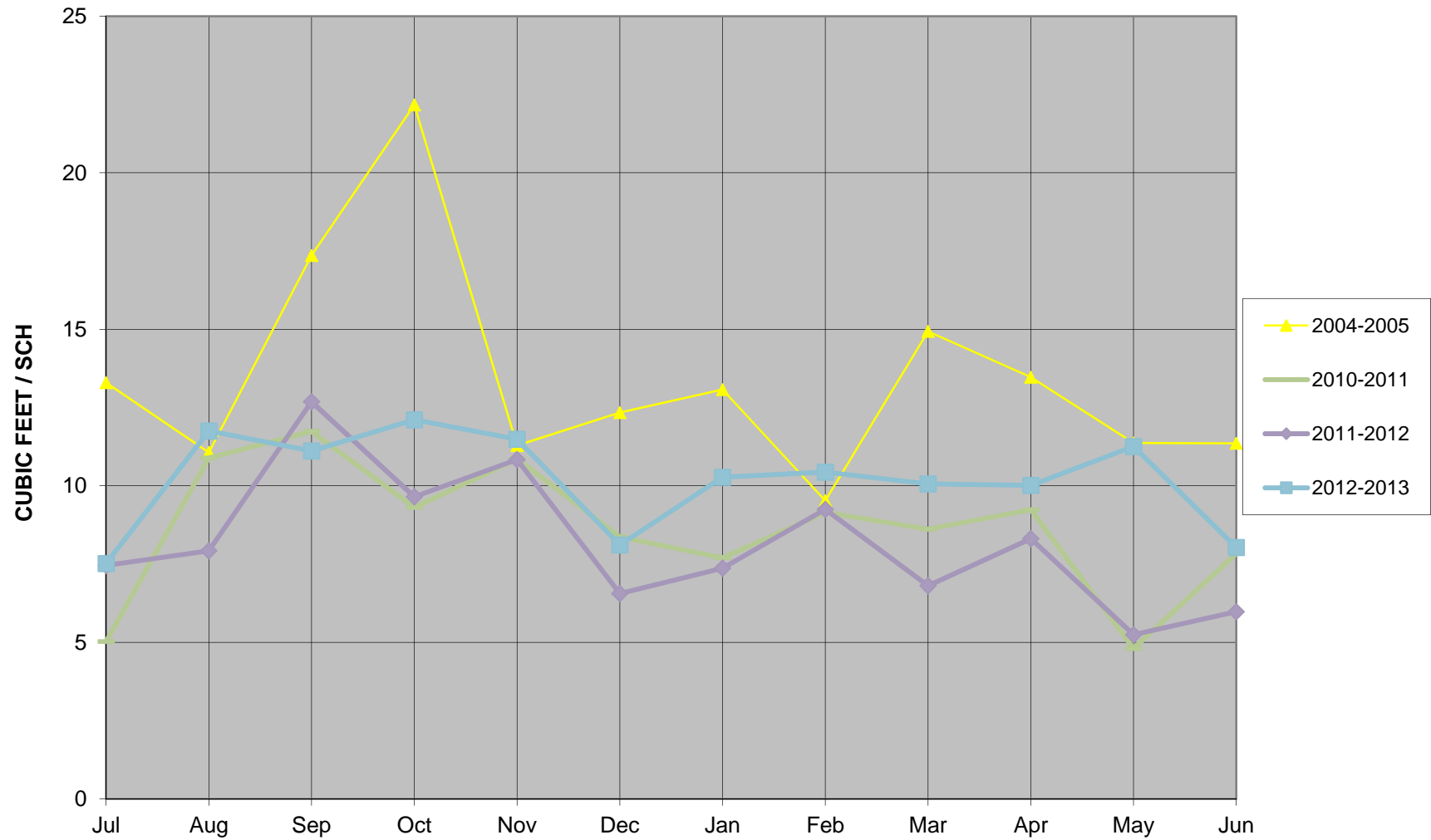
WSSU Water Usage Summary Per Square Foot



Appendix 16

Winston-Salem State University

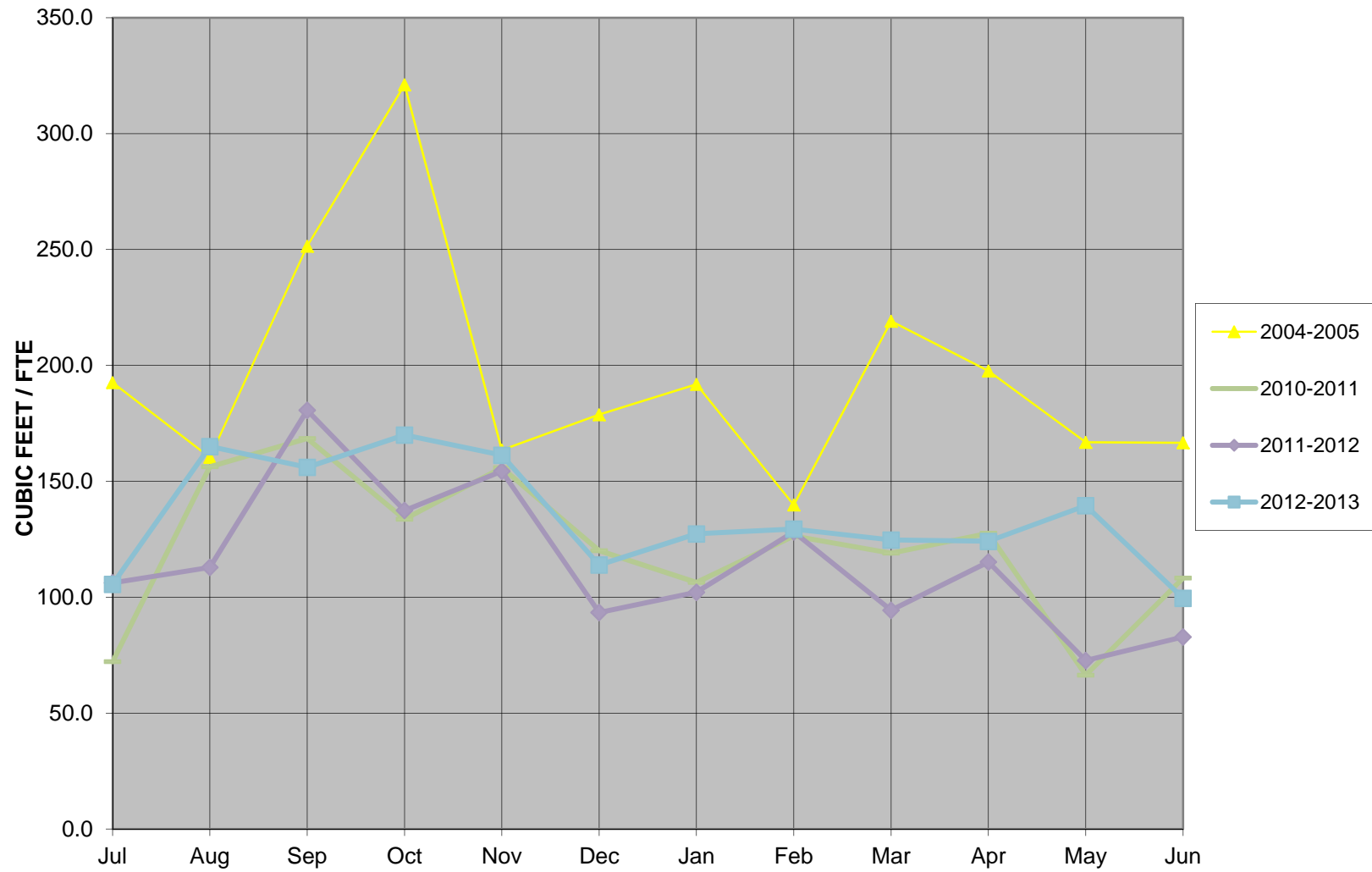
WATER USAGE SUMMARY PER STUDENT CREDIT HOUR



Appendix 17

Winston-Salem State University

WATER USAGE SUMMARY PER FULL TIME EQUIVALENT STUDENT



Winston-Salem State University

Utility Savings Initiative Strategic Energy and Water Plan Mandate

- Winston-Salem State University recognizes that energy and water consumption can be managed to our benefit. Energy and water management is a responsibility of the staff, students, and faculty at the University, guided and supported by the Energy Manager.
- Winston-Salem State University will implement a Strategic Energy & Water Plan. The Vice Chancellor - Finance and Administration is responsible for the success of the Program at the University.
- This plan outlines the activities and expenditures required to reduce energy and water consumption to achieve the goals of the program.
- The Department Heads/Chancellor's staff will review progress and results quarterly, and will support staff attendance at training in energy and water management at least quarterly.

Strategic Energy & Water Plan Mandate - Goals

The University's goal is to reduce annual Total Energy Consumption to meet the State Target of 123,330 Btu/gsf/yr, which we have accomplished for the third year in a row. We have reduced water consumption by well over 10% from the baseline fiscal year 2004-2005 (HB 1215, SL 2002-167) and will continue to do so. The University plan will support the energy reductions required in Senate Bill 668 (SL 2007-546).

Strategic Energy & Water Plan Mandate - Measures

Our tracking measures will be the following Key Performance Indicators (KPI):

Total Energy Consumption per gross square foot

Total Water Consumption per gross square foot

Total Energy Consumption per student credit hour

Total Water Consumption per student credit hour

Total Energy Consumption per FTE student

Total Water Consumption per FTE student

Strategic Energy & Water Plan Mandate Commitment

I have read and support the Strategic Energy & Water Plan for Winston-Salem State University

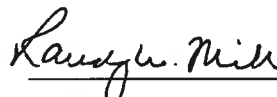
Implemented this 30th day of September, 2013.



Director - Design & Construction



Associate VC - Facilities



VC Finance and Admin.



Chancellor

The Energy Mandate serves as a Memorandum of Agreement to support Strategic Energy Planning for State Government

Director-Division of Environmental Assistance and Customer Service

Date