



2014 – 2015

Campus Annual Energy Use Report

2014 -2015 Macalester College Central Plant Energy Use Report

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Executive Summary

This report summarizes the energy and water consumed on Macalester College's campus during FY 2014 – 2015. Previous annual energy reports showed only the electricity, natural gas, and fuel oil used by the College's central plant for heating and cooling. This report shows energy consumption data for the College's central plant but also includes data for the electricity, non-heating plant natural gas, and water consumed across the entire campus.

Starting with FY 2015-2016, Macalester College has set a goal of a 3% reduction in overall energy consumption per year, with a cumulative goal of a 15% reduction in energy used in the following five year period. FY 2013-2014 was selected as the baseline period for measuring progress toward the consumption targets. In order to achieve these goals Macalester has increased its ongoing energy conservation efforts via the creation of a new energy manager position, participation in Xcel Energy's Commercial Energy Efficiency Program, implementation of additional lighting efficiency and control projects, and the deployment of other new technologies.

Since the energy used by Macalester College's central plant is highly affected by seasonal weather variations the energy consumed is presented in both an actual and weather normalized basis to provide a standardized method of measuring year-to-year progress toward the College's energy reduction goals. Electricity used for lighting, distributed mechanical equipment, and building plug loads has not been shown to be weather dependent and has not been normalized in this report. The quantity of natural gas used for heating the houses on campus is weather dependent but represents such a small percentage of the campus' overall energy consumption and cost that it has not been adjusted for weather in this report.

Macalester College utilizes electricity, natural gas, and #2 fuel oil as its primary sources of energy. Each energy source provides different amounts of energy per unit at significantly different costs. For example, the electricity consumed in FY 2014-2015 comprised only about 5% of the total energy consumed across the campus but accounted for nearly 65% of the College's total expenditures for energy.

After normalizing for seasonal weather variations, Macalester College consumed approximately 104,500,000 KBTUs of energy during FY 2014-2015, at a cost of approximately \$1,700,000. For purposes of comparison, during FY 2013-2014 the College consumed slightly less total energy (101,000,000 KBTU) but at a considerably higher cost (\$2,000,000). The higher expense in FY 2013-2014 was primarily due to the higher use of fuel oil vs. natural gas in the heating plant. In addition to the expense for energy, in FY 2014-2015 Macalester consumed approximately 40,700 CCF of water, at a cost of approximately \$240,000. (1 CCF = 100 Cubic Feet = 748 Gallons)

An energy utilization index (EUI) value can be calculated for any facility in order to allow benchmarking of its energy consumption performance against itself as well as to allow comparison with other similar facilities. The EUI value is presented in KBTUs/GSF/Year. (1 KBTU = 1,000 BTUs; GSF = Gross Square Feet). After weather normalizing the energy consumption data for the central plant, the campus EUI for FY 2014-2015 was 74.4 KBTUs/GSF/Year, which was slightly higher than the 2013 -2014 baseline year EUI of 72.0 KBTU/GSF/Year. This can be explained, at least in part, by the Joan Adams Mondale Hall of Studio Art (Art) being brought on line. The Art building is an energy intensive building due to extreme ventilation requirements.

Fuel Consumption & Cost

Campus Fuel Consumption & Cost

Approximately 102,000,000 KBTUs of natural gas and #2 fuel oil were consumed on campus during FY 2014-2015. Weather normalization of the energy consumed by the heating plant reduced the campus total to roughly 99,000,000 KBTUs. After weather normalization the fuel energy consumed in FY 2014-2015 was approximately 6,000,000 KBTUs more than the amount of energy consumed in the 2013-2014 baseline year, representing an increase of approximately 3%.

About 85% of the fuel energy consumed on campus during FY 2014-2015 was used by the central heating plant, with the balance used for space heating, water heating, and cooking applications in the various buildings and houses on campus that have individual natural gas meters. The Art building's kilns and forges are another significant consumer of natural gas on campus.

The total cost for natural gas and #2 fuel oil consumed on Macalester College's campus in FY 2014-2015 was \$591,400, which compares favorably with the previous year's cost of \$869,000.

Boiler Plant Fuel Consumption & Cost

Macalester College's central heating plant consumed approximately 86,700,000 KBTUs of natural gas & fuel for heating the campus during FY 2014-2015. For purposes of comparison, the average actual energy consumption for the boiler plant's during the previous five year period ending with FY 2013-2014 was about 80,500,000 KBTUs; ranging from a minimum of approximately 64,600,000 KBTUs in FY 2011-2012 to a maximum of about 97,000,000 in FY 2012-2013.

After weather normalization, the total energy consumed by the central heating plant in FY 2014-2015 fiscal year was adjusted to approximately 84,000,000 KBTUs, which equates to an energy utilization index (EUI) value for the facility of 64.3 KBTU/GSF/YR. The boiler plant's normalized EUI value for FY 2014-2015 was the highest value recorded in any of the previous five years. During that time period the average weather normalized EUI value for the heating plant was 62.4 KBTU/GSF/YR.

In addition to weather normalization, another common method for comparing the year-to-year performance of heating systems is to divide the energy used by the boiler plant by both the area served in gross square feet (GSF) and the monthly heating degree days (HDD). For Macalester College the best correlation between fuel energy consumption and weather data was found using 65° HDD data. Over the last five years this value has averaged about 9 KBTU/GSF/HDD; ranging from a low of 8.7 KBTU/GSF/HDD in FY 2012-2013 to a high of 9.3 KBTU/GSF/HDD in FY 2014-2015.

The cost of the natural gas and #2 fuel oil consumed by Macalester College's boiler plant in FY 2014-2015 was approximately \$518,000, which compares very favorably with the \$755,000 spent on fuel in the 2013-2014 baseline year. The higher cost for fuel in FY 2013-2014 was caused by the increased use of #2 fuel oil in that year, as mandated by Macalester College's use of an interruptible fuel rate for the heating plant. (Macalester benefits from a lower price for natural gas from Xcel year-round, provided that the heating plant switches from natural gas to fuel oil at Xcel's request during periods of extremely cold weather.) One gallon of fuel oil contains more heating energy than one Therm of gas (140,000 vs. 100,000 BTUs) but is much more expensive on cost per unit of energy basis: In FY 2013-2014 Macalester College's cost for #2 fuel oil was \$22.17/MMBTU while the cost per MMBTU for natural gas was \$5.26/MMBTU.

Electricity Consumption & Cost

Campus Electricity Consumption & Cost

Macalester College consumed approximately 12,150,000 KWH of electricity across its campus in FY 2014-2015. After adjusting the amount of electricity consumed by the chiller plant for seasonal weather variations the campus' total electricity consumption during FY 2014-2015 was about 12,250,000 KWH. For purposes of comparison the FY 2014-2015 normalized total was about 300,000 KWH less than the 2013-2014 baseline period, representing a decrease of 2.4%.

Nearly 90 % of Macalester's total electric energy was used for the electrical loads that are monitored at the campus main electric meter, such as building lighting, distributed mechanical equipment, and plug loads. Approximately 8% of the campus' total electric energy was used by the chiller plant, and the balance was used in the various campus buildings and houses that have individual electric meters.

The total cost for electricity consumed on Macalester College's campus in FY 2014-2015 was approximately \$1,106,000, which compares favorably with the previous year's cost of \$1,163,000.

Chiller Plant Electricity Consumption & Cost

During FY 2014-2015 the chiller plant's actual electricity consumption was approximately 955,000 KWH, which converts to approximately 3,260,000 KBTUs. (One KWH = 3,412 BTUs). For purposes of comparison, the chiller plant's actual energy consumption during the previous five year period ending with FY 2013-2014 fiscal year was about 1,050,000 KWH. The annual consumption during this period ranged from a minimum of approximately 800,000 KWH in FY 2009-2010 to a maximum of about 1,555,000 KWH in FY 2011-2012, when renovation of the Music Building significantly impacted the amount of energy used by the chiller plant.

As noted for the boiler plant, a linear regression model using cooling degree day (CDD) data and the campus square footage was developed to better evaluate year-to-year performance of the chiller plant. For Macalester College's chiller plant the best correlation between energy usage and weather was found using 55° CDD data.

In FY 2014-2015 the chiller plant consumed electricity at a rate of 1.2 BTU/GSF/CDD. Over the last six years this value has typically varied between 1.0 – 1.2 BTU/CDD/GSF with the exception of the outlier year of FY 2011-2012, when the value rose to 1.9 BTU/CDD/GSF.

After weather normalization the chiller plant consumed approximately 3,500,000 KBTUs of electrical energy in FY 2014-2015, resulting in an energy utilization index (EUI) value for the chiller plant of 2.7 KBTU/GSF/Yr. This value is significantly higher than the 3,000,000 KBTUs consumed and EUI value of 2.3 KBTU/GSF/Yr achieved during the 2013-2014 baseline year. Presumably at least part of this increase is attributable to the new Art building coming on line in 2014.

The cost of the electricity consumed by Macalester College's chiller plant in FY 2014-2015 was about \$142,000. For purposes of comparison, the average amount spent annually during the previous 5 year period was approximately \$128,000. The average price paid per KWH of electricity (including demand charges and all other fees) for the chiller plant in FY 2014-2015 was \$0.149/KWH. For comparison, the average price paid over the previous 5 year period was \$0.124/KWH; ranging from a minimum of \$0.108 in FY 2009-2010 to a maximum of \$0.162/KWH in FY 2013-2014.

Water Consumption & Cost

During FY 2014-2015 Macalester College consumed over 40, 000 CCF of water, or approximately 30,100,000 gallons (1 CCF = 100 Cubic Feet = 748 gallons). This quantity of water would fill 30 swimming pools that are each 267 feet long by 50 feet wide to a depth of 10 feet. The total amount of water consumed during FY 2014-2015 was nearly identical to the amount consumed during FY 2013-2014, although there was variation on a monthly basis. Note: some of the College's smaller buildings are billed for water & sewer on a quarterly basis, so the amount of water shown in the graphs and data tables for the months of February, May, August, & November are larger than they would be if the all of Macalester's buildings were billed on a monthly basis.

Macalester College's total water & sewer charges in both FY 2013-2014 and FY 2014-2015 were approximately \$240,000, which represents 12% of the College's total expenditures for electricity, fuel, and water/sewer. After dropping slightly from FY 2013-2014 to FY 2014-2015, the cost per CCF of water has risen significantly in FY 2015-2016. When all of the costs & fees shown on the College's water bills are aggregated and divided by the volume of water consumed, the cost for water & sewer services has risen from an average of \$5.91/CCF during the previous two year period to \$7.01/CCF for the current year (to date), representing an increase of more than 18%.

Energy Conservation Initiatives & Projects

As noted in the Executive Summary, starting with FY 2015-2016 Macalester College has set a goal of reducing the energy consumed across campus by 3% each year compared to FY 2013-2014. In order to reach that goal Macalester is participating in Xcel Energy's Commercial Energy Efficiency Program. Under the first phase of that agreement several of the College's largest energy consuming buildings were audited by Michaels Energy in December 2015 to identify energy conservation opportunities (ECOs) and calculate their associated estimated savings and implementation cost. Michaels Energy completed their study in March 2016 and determined that Macalester College should be able to reduce the energy consumed in the Leonard Center, Olin-Rice, and Campus Center by nearly 1,400,000 KWH and reduce the College's annual expenditures for electricity by approximately \$87,000 if all of the ECOs that they identified are implemented. Their recommendations include building automation system recommissioning opportunities, lighting efficiency and controls retrofit projects, and mechanical equipment upgrade projects. Those recommendations will be implemented as resources are available.

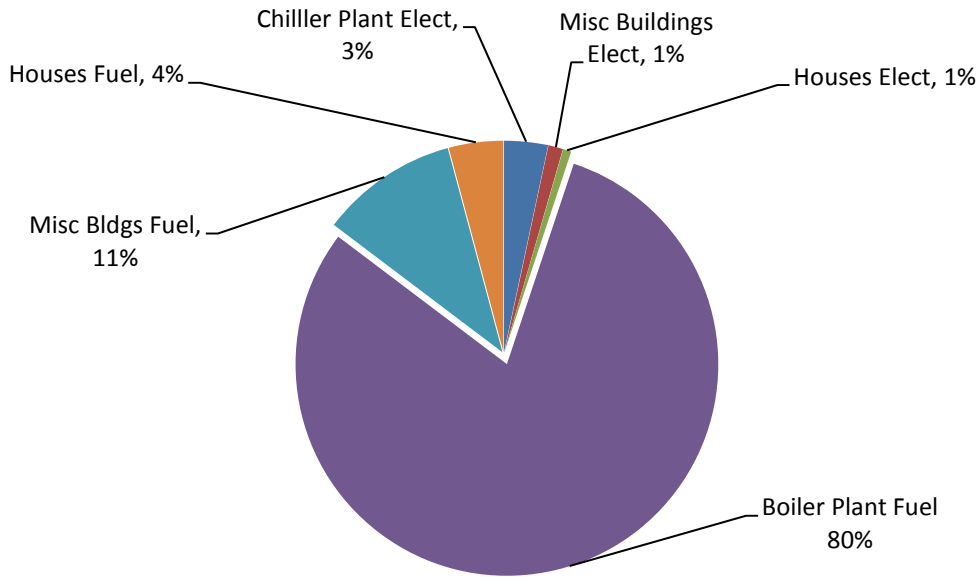
In addition to the projects that will be implemented via the College's partnership with Xcel Energy, in 2016 Macalester College will also be implementing a trial run of BuildPulse software. The software collects trend data from the Trane building automation software and is intended to help system operators identify malfunctioning HVAC equipment as well as opportunities to reduce energy consumption via operational changes, such as schedule and set point adjustments.

Finally, Macalester is heavily engaged in converting the current lighting systems from a combination of fluorescent, incandescent, and high pressure sodium to LED technology. These conversions hold the potential to reduce overall electrical consumption by 10 to 15%.

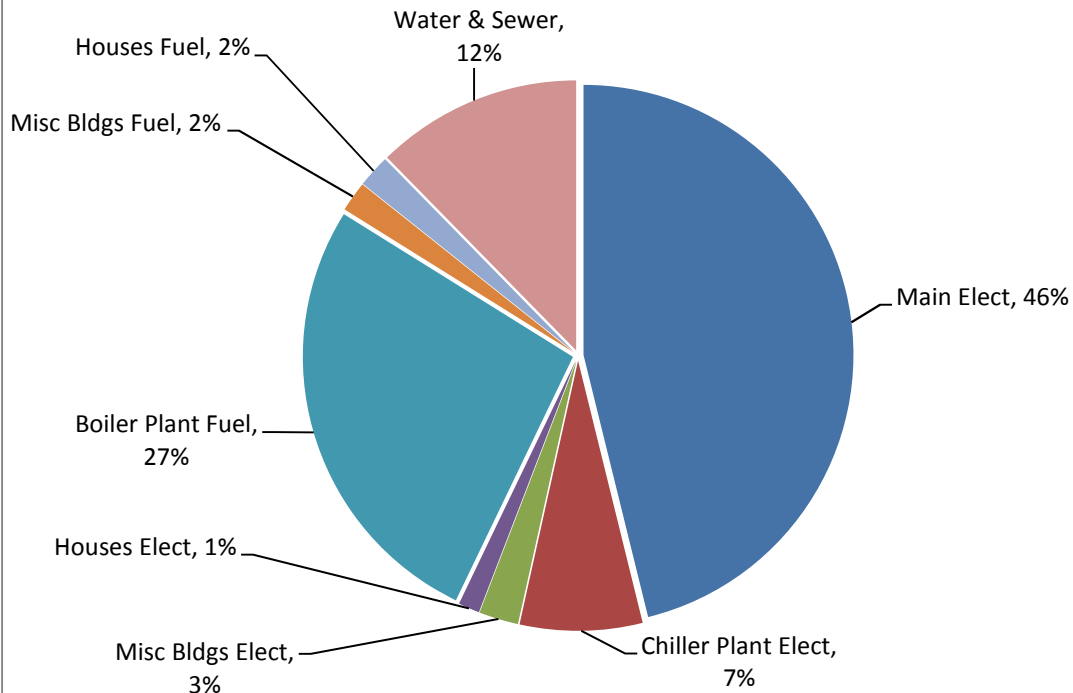
Energy Consumption & Cost Graphs

Campus Total Energy Consumption & Cost Graphs

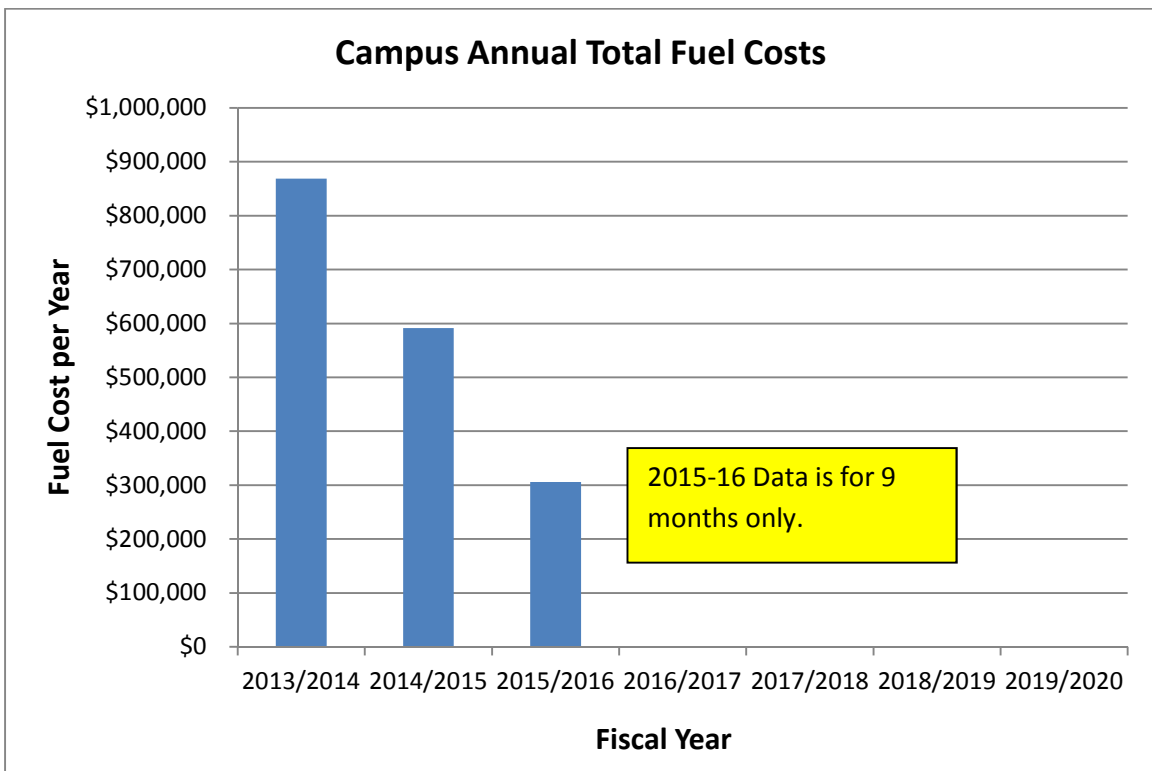
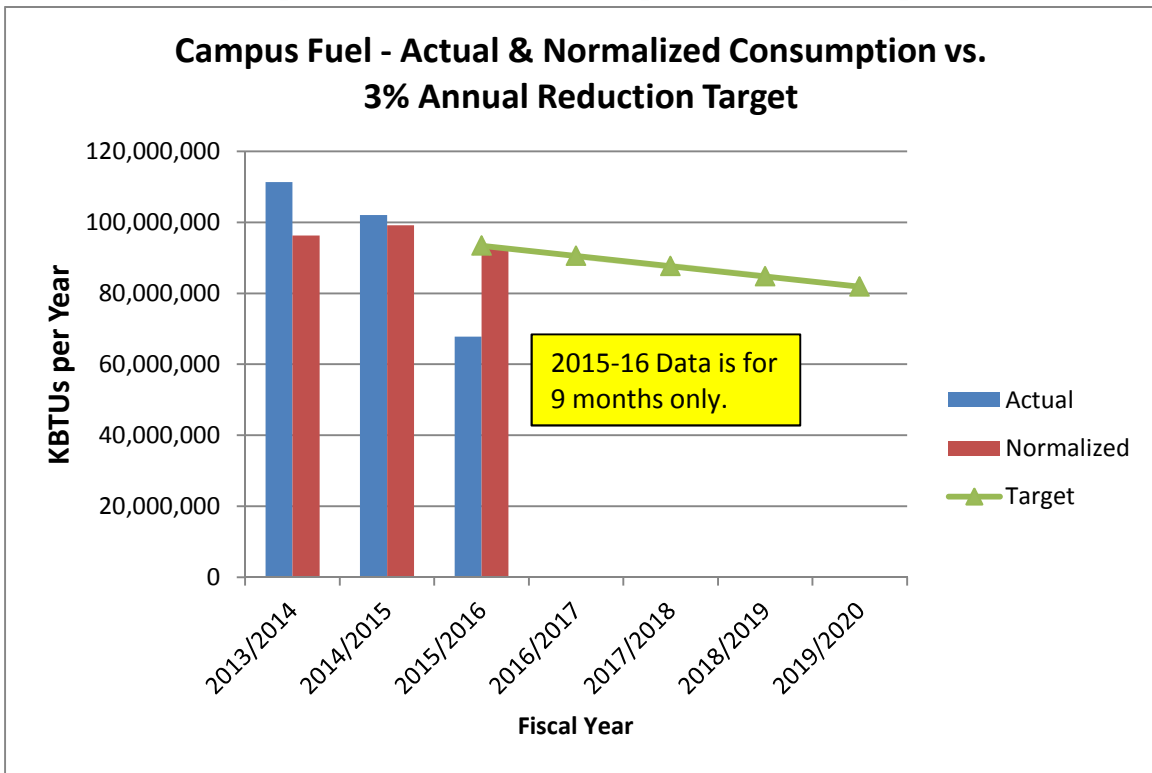
2014-2015 Campus Energy Utilization Breakout - KBTUs



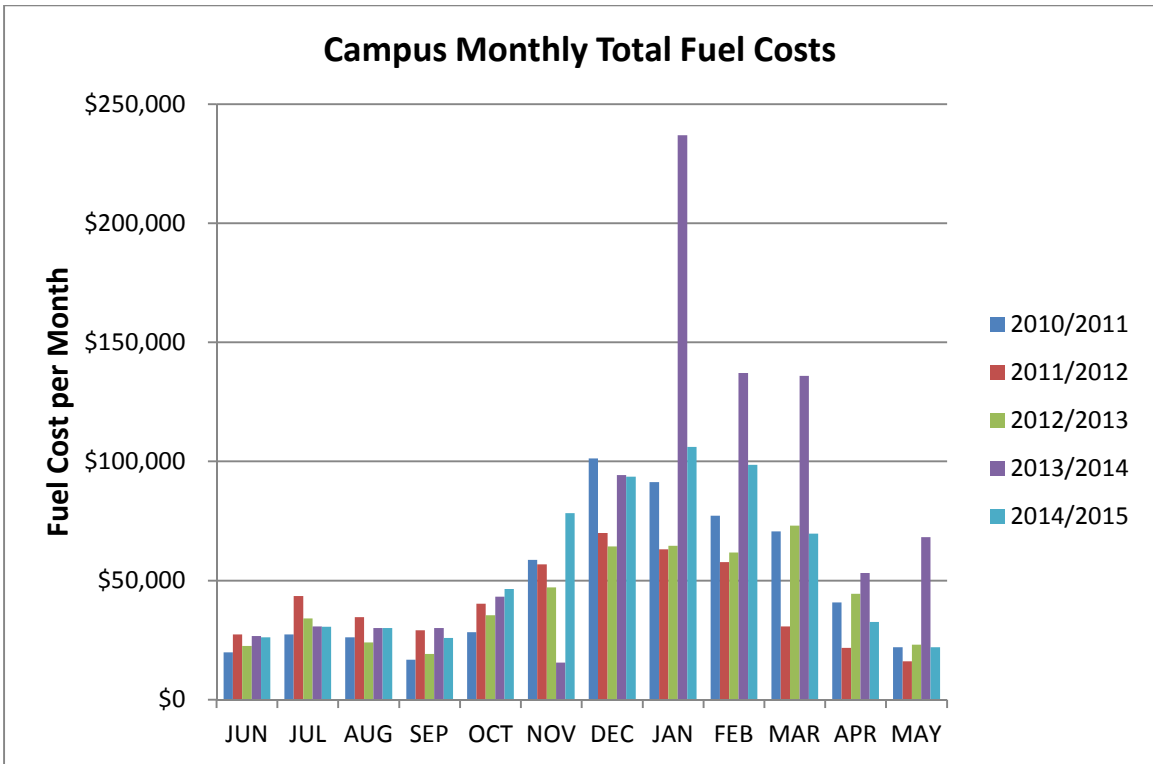
2014-2015 Campus Energy & Water Cost Breakout



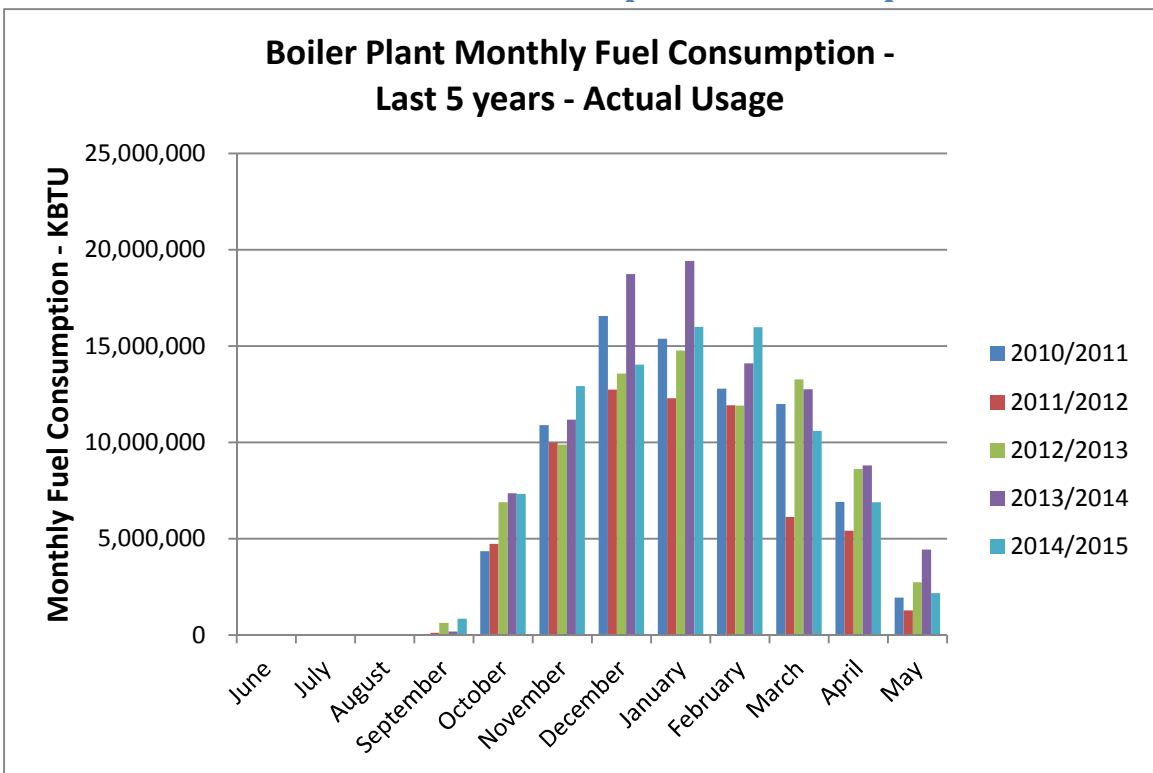
Campus Total Fuel Consumption & Cost Graphs

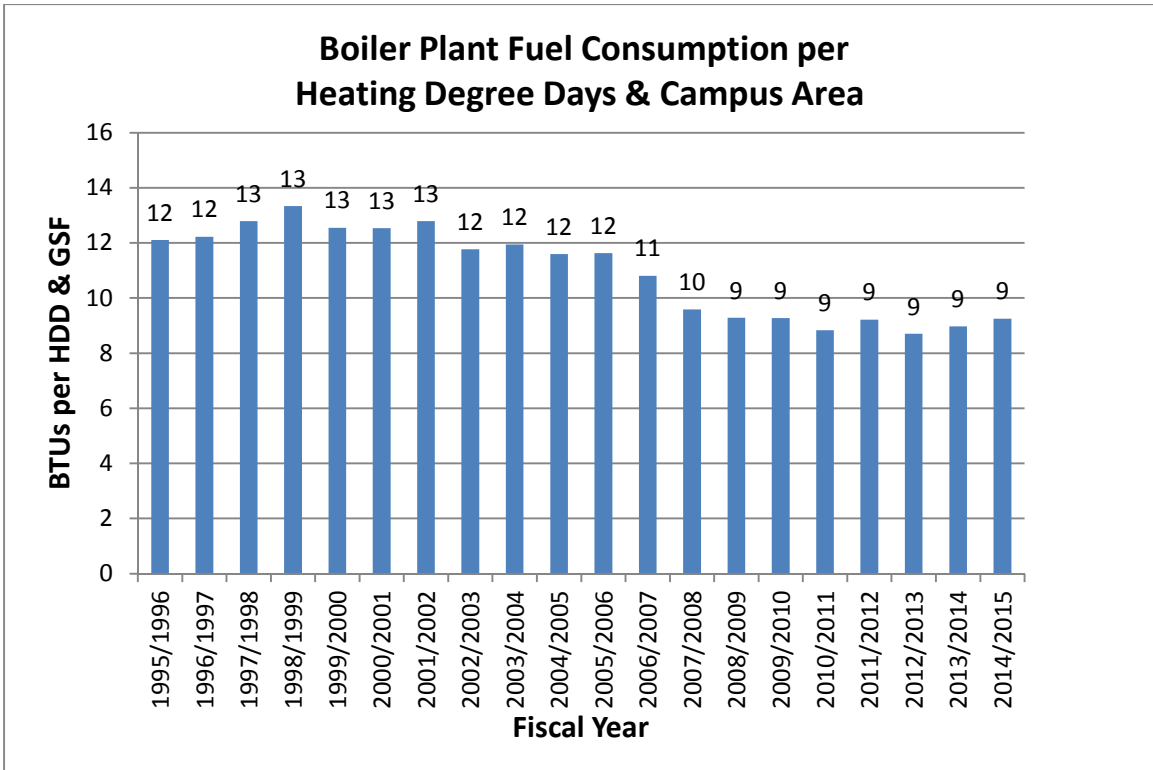
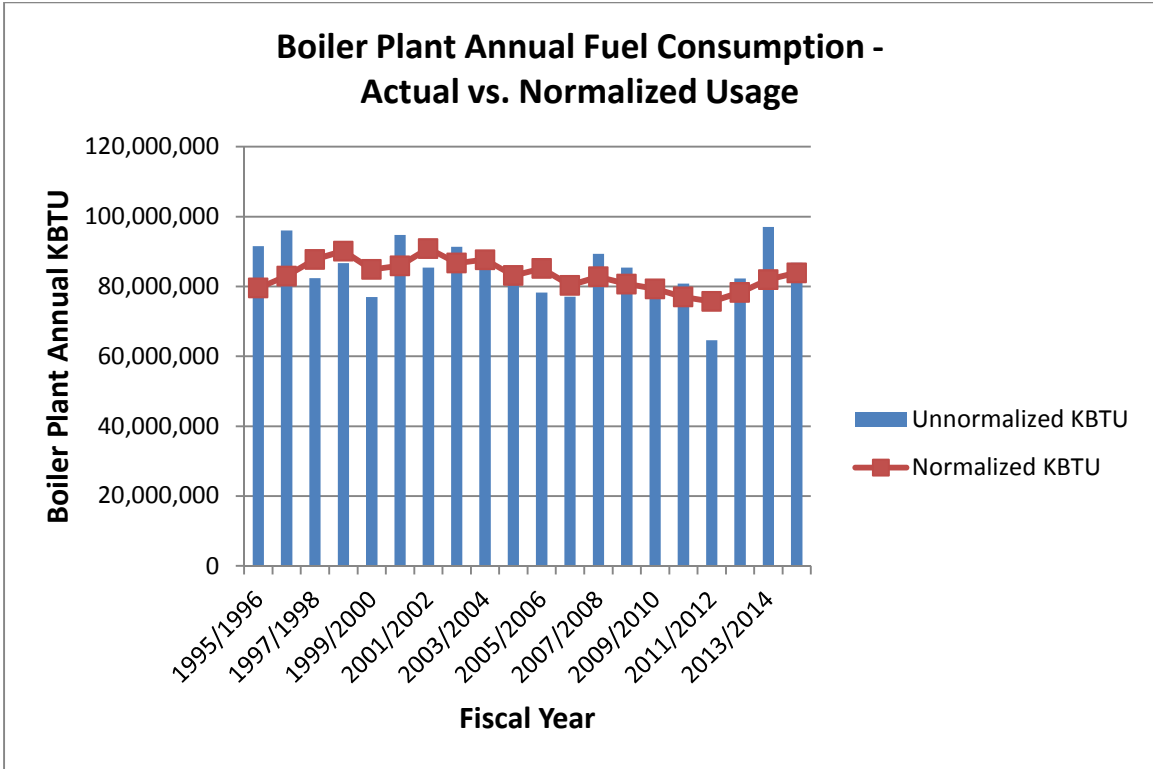


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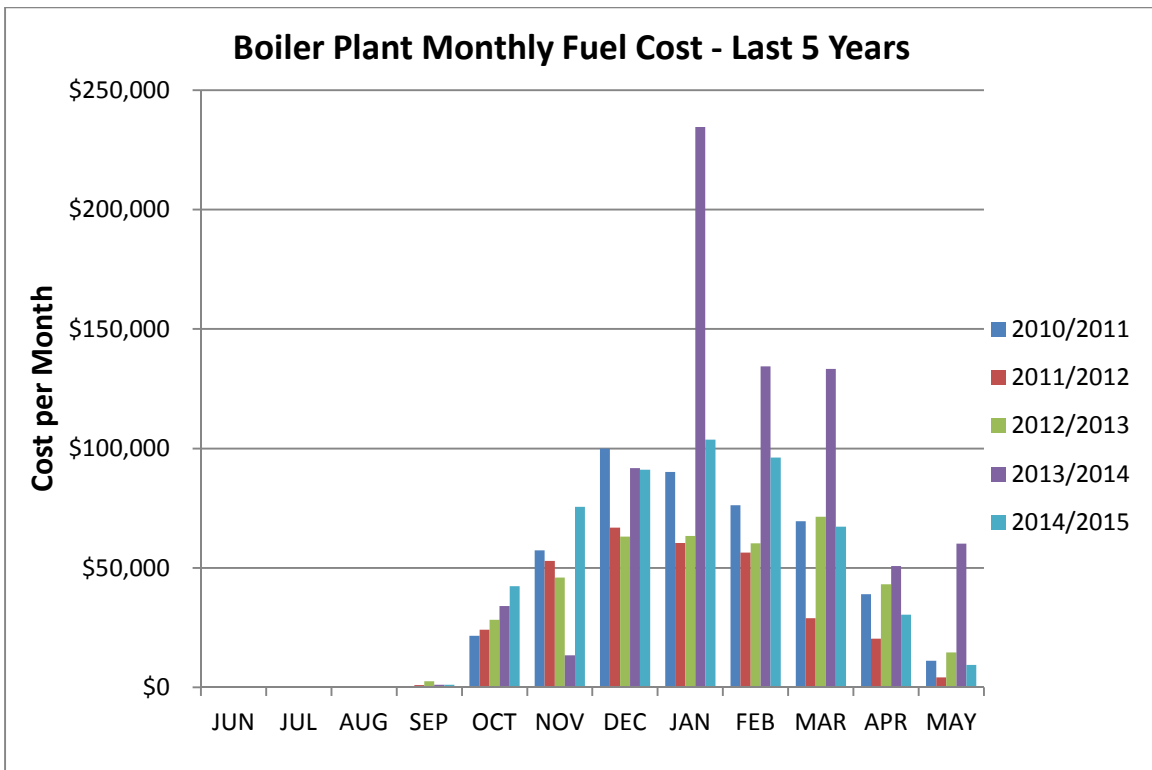
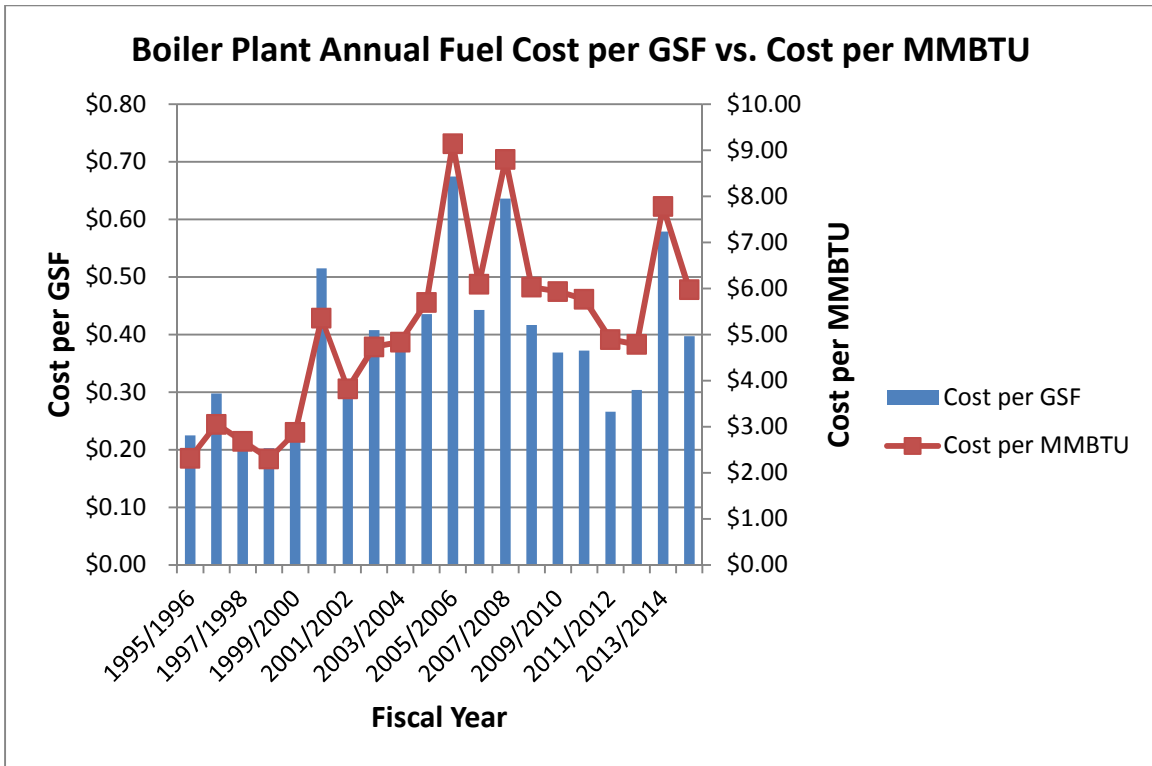


Boiler Plant Fuel Consumption & Cost Graphs

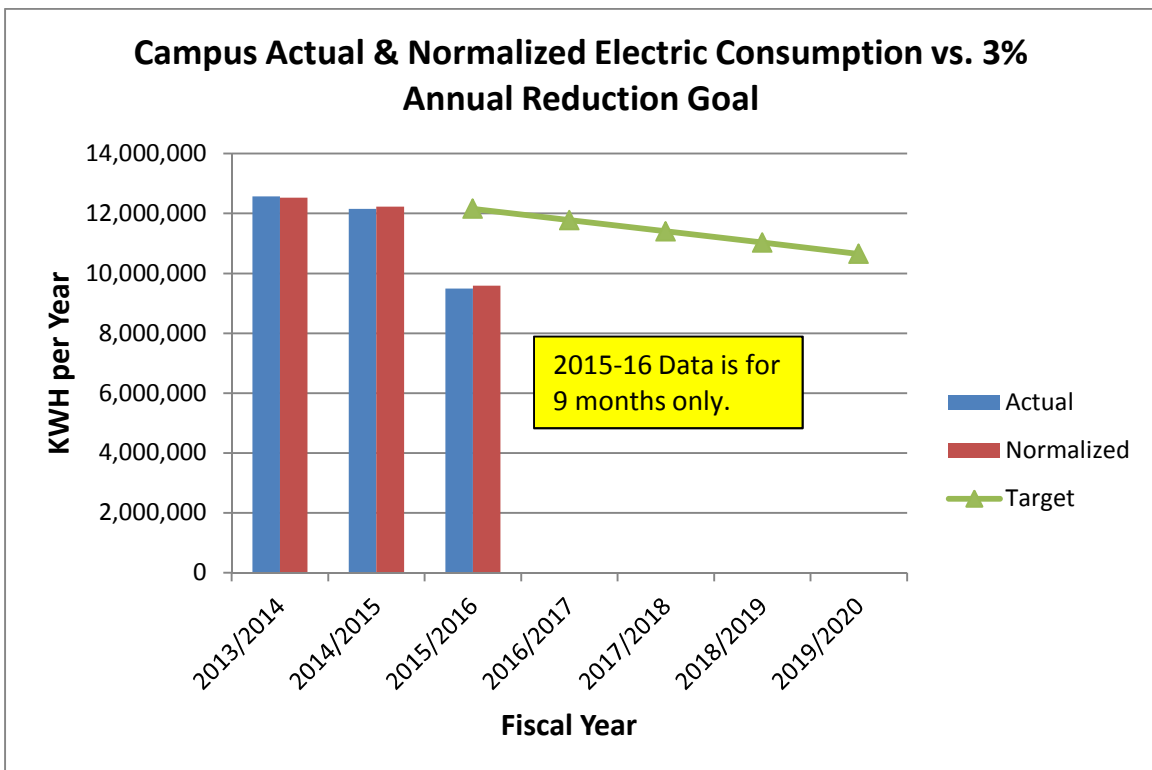
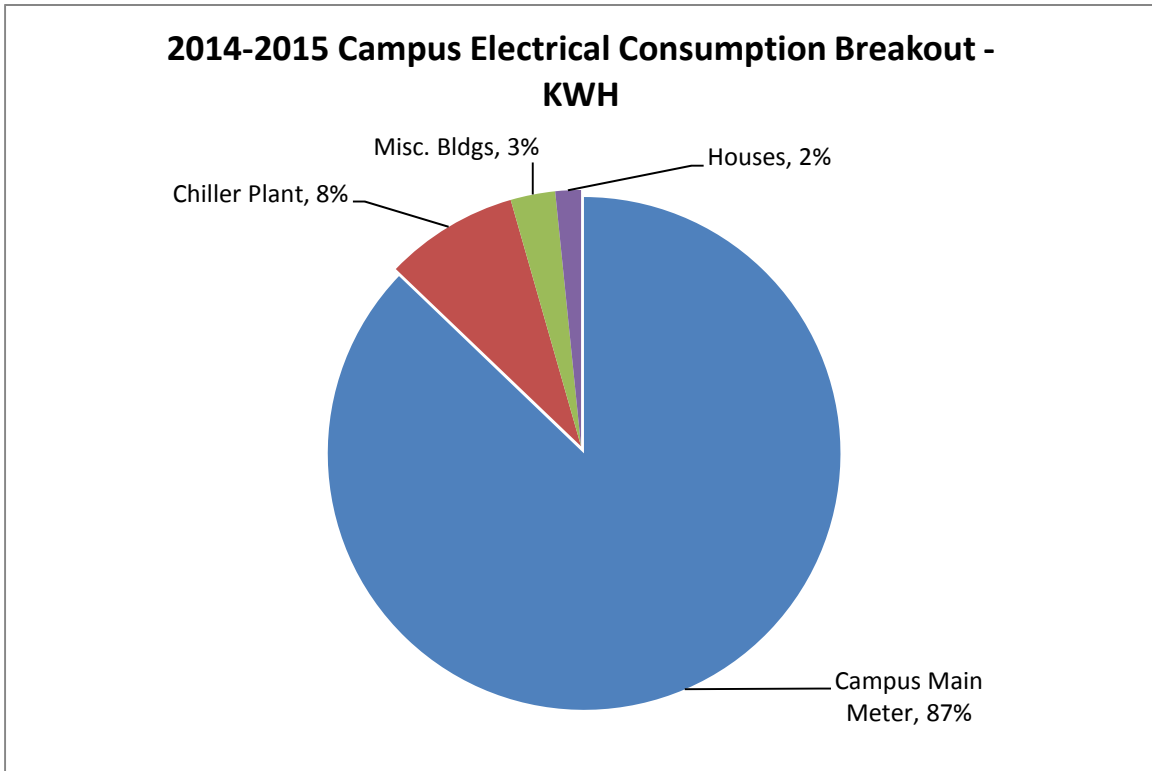




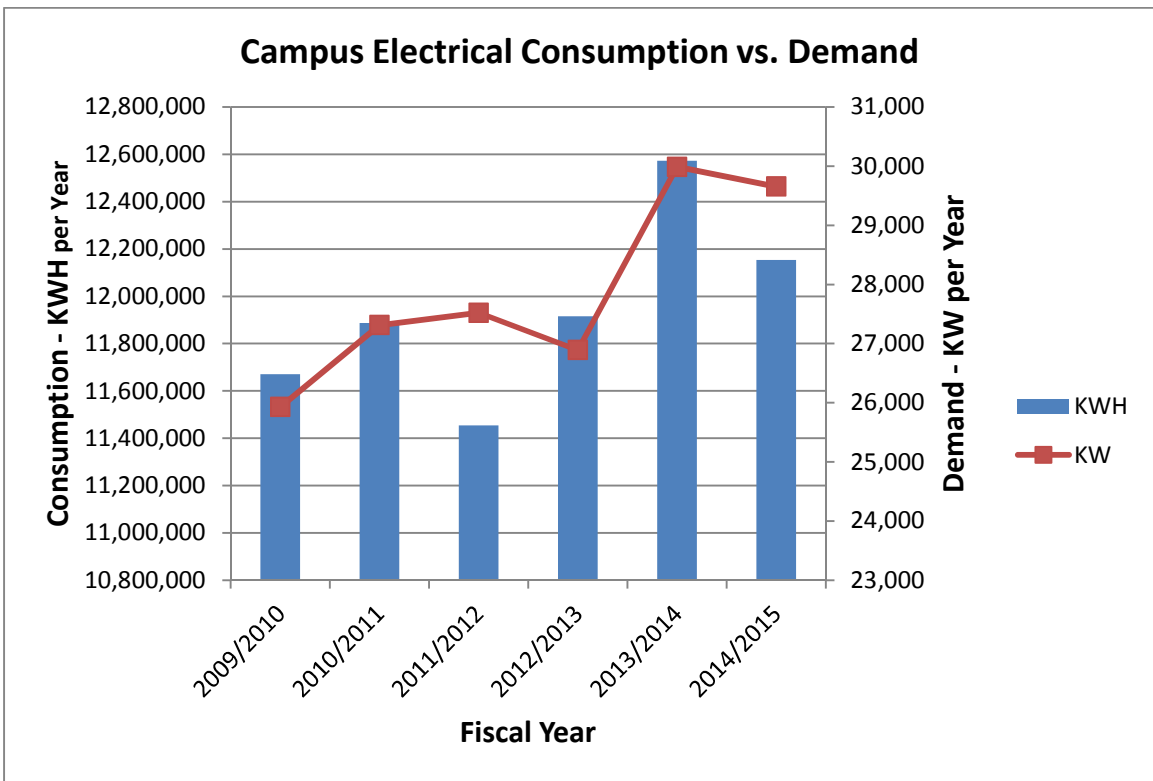
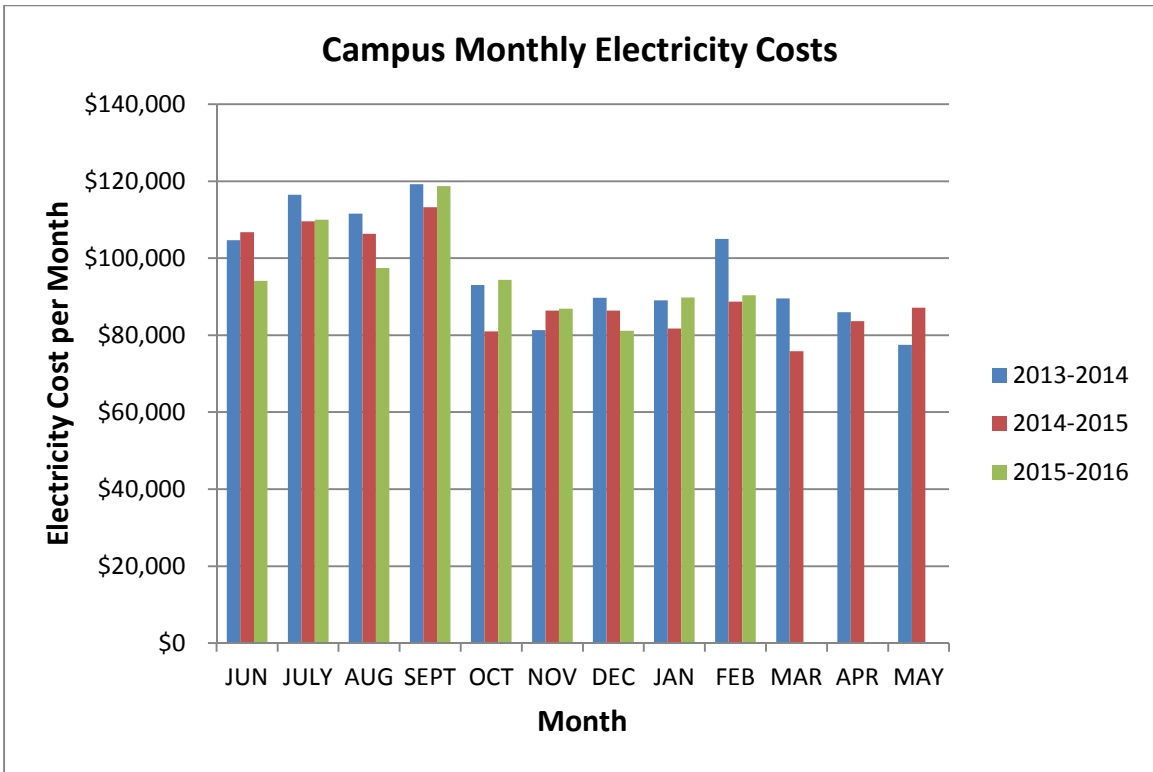
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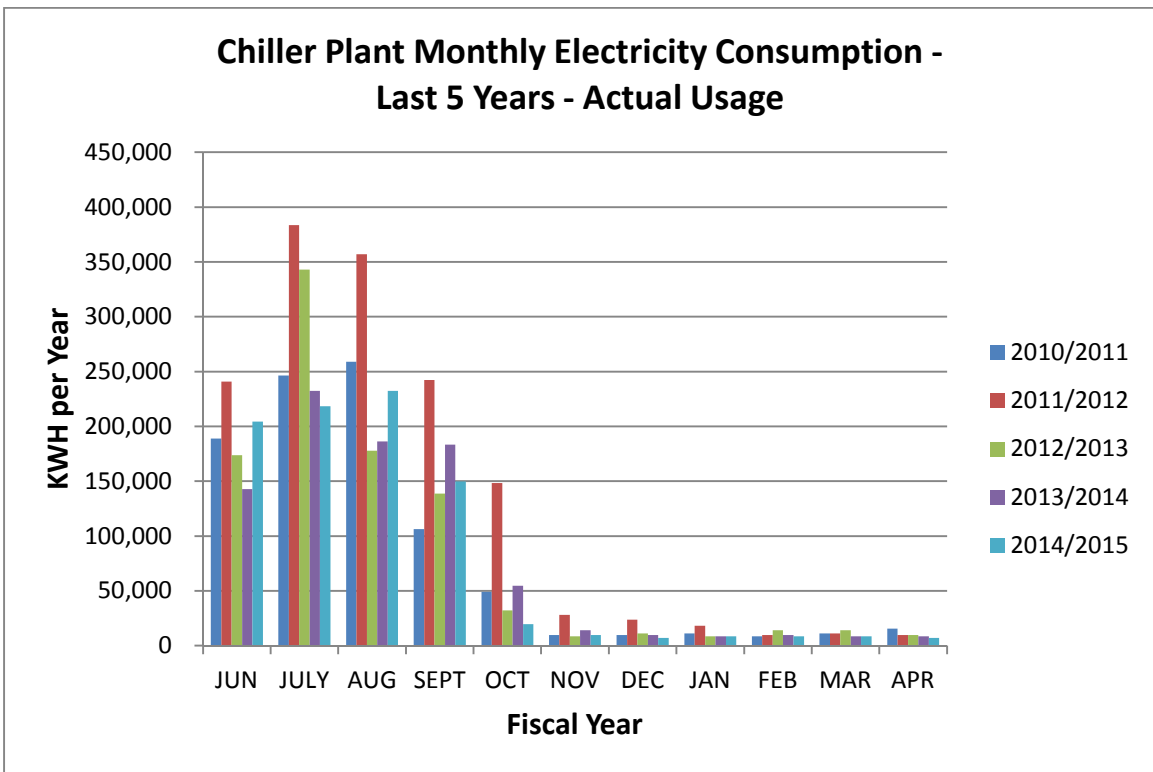
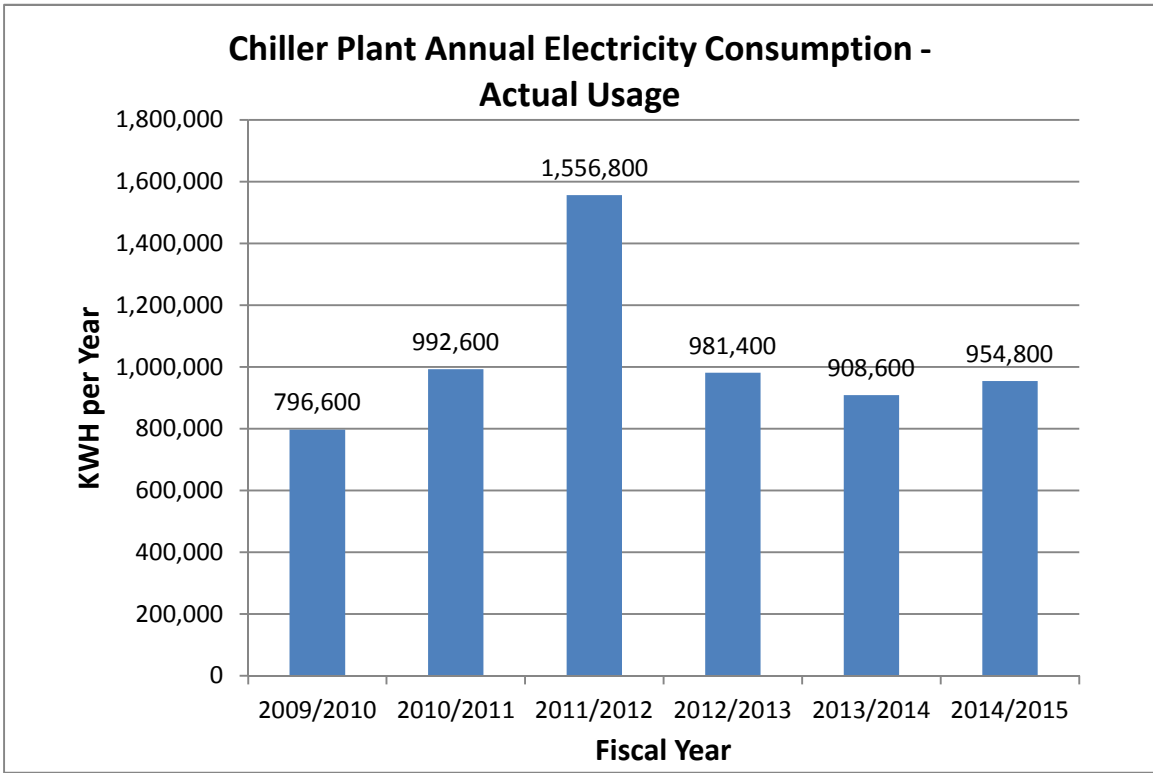
Campus Electricity Consumption & Cost Graphs

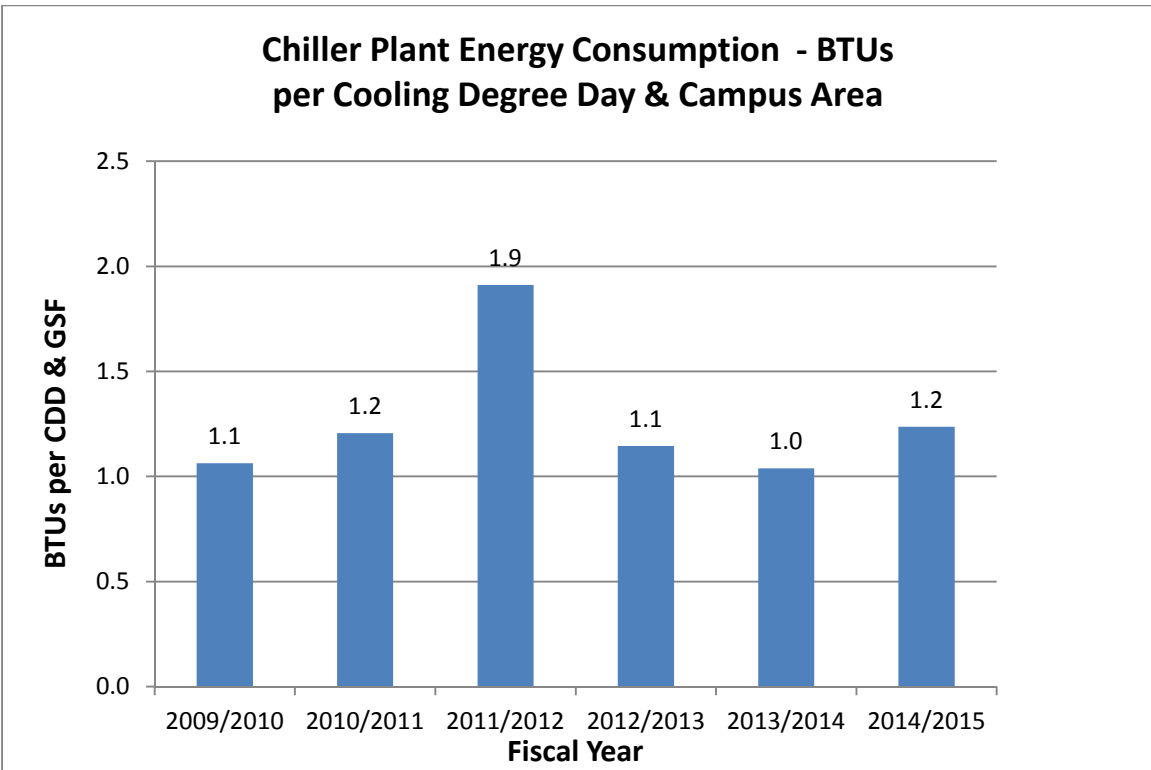
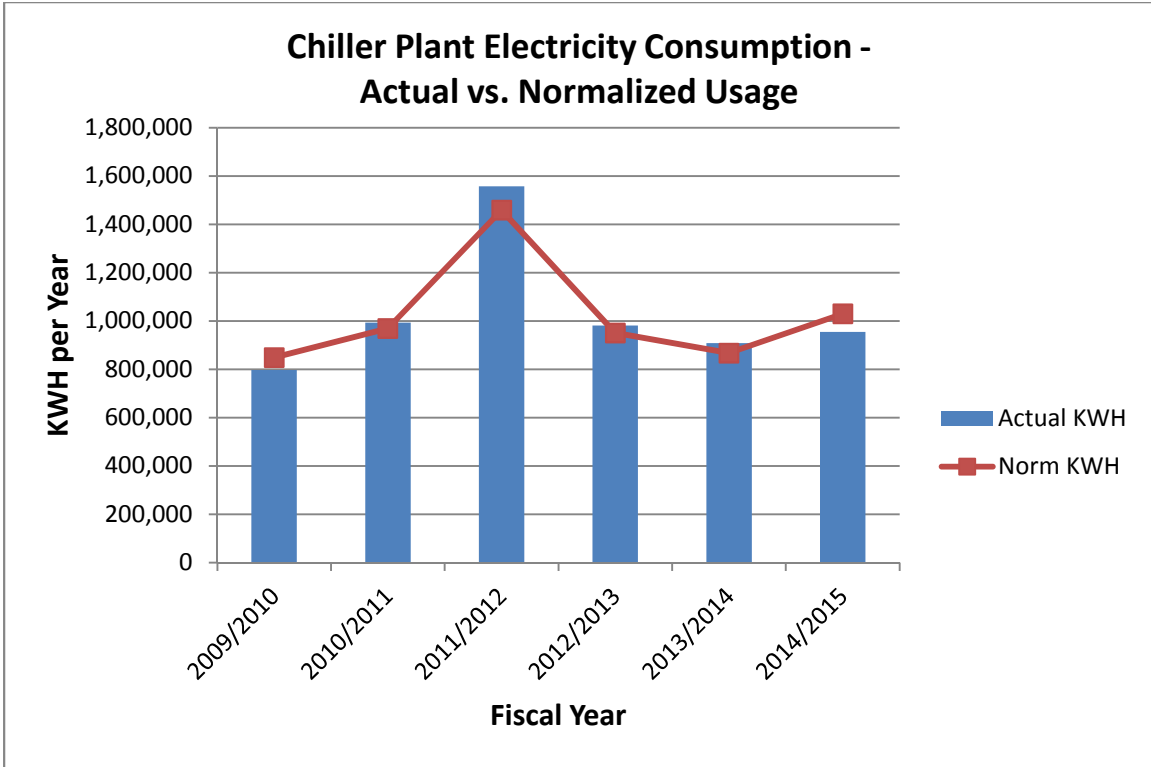


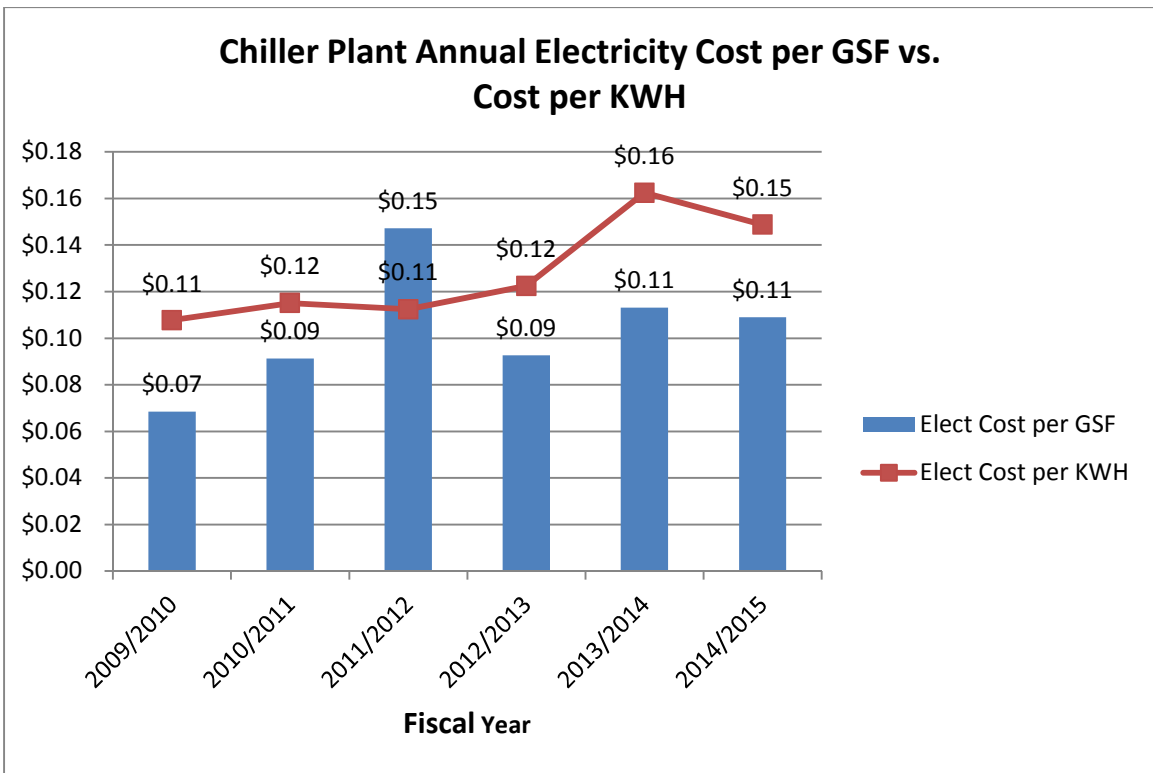
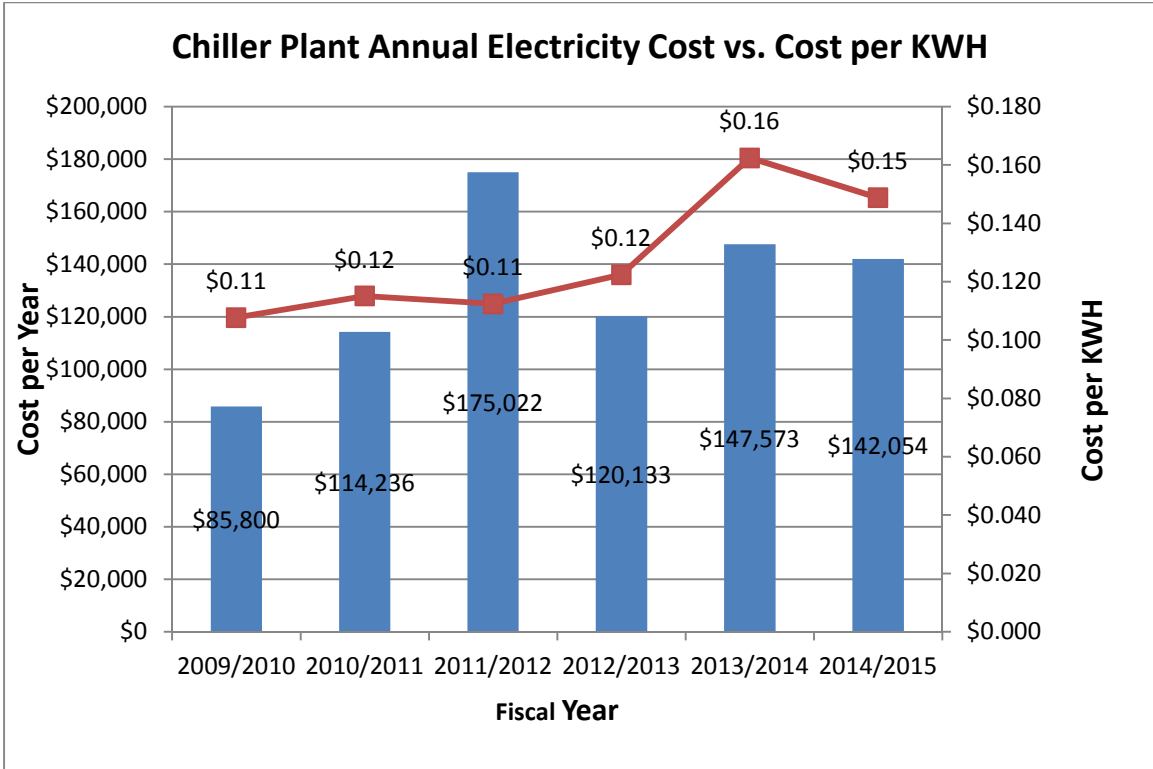
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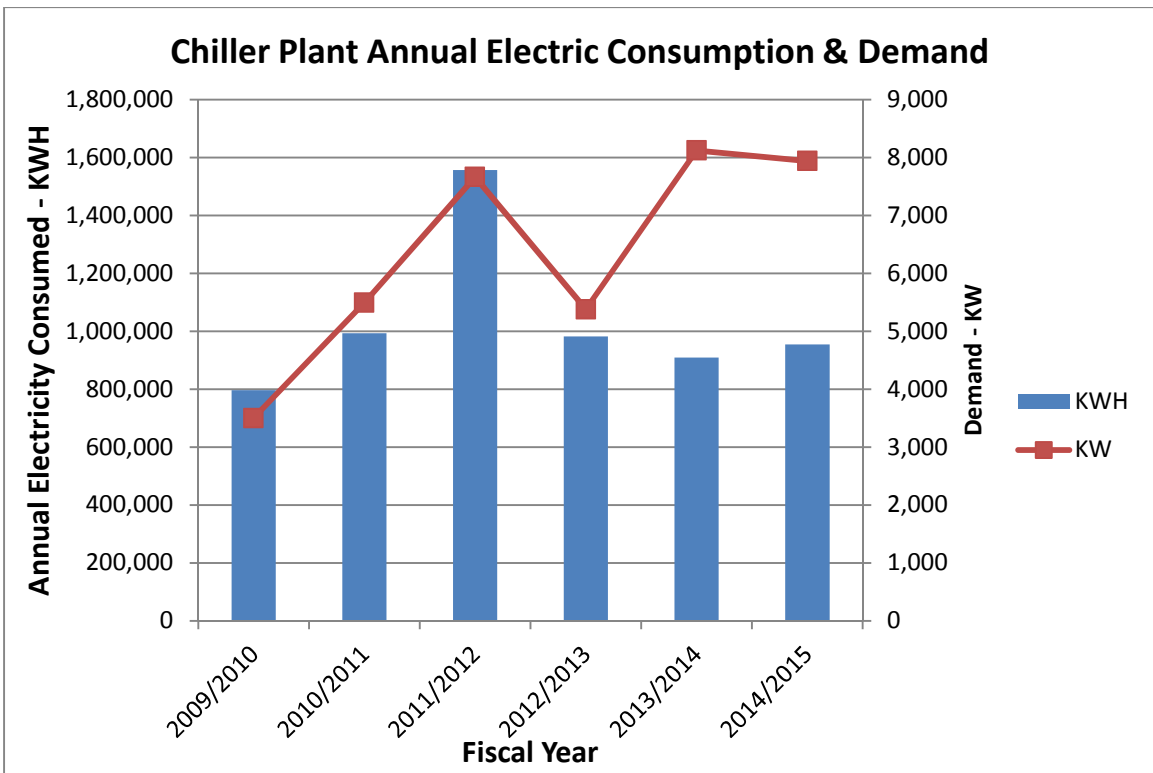
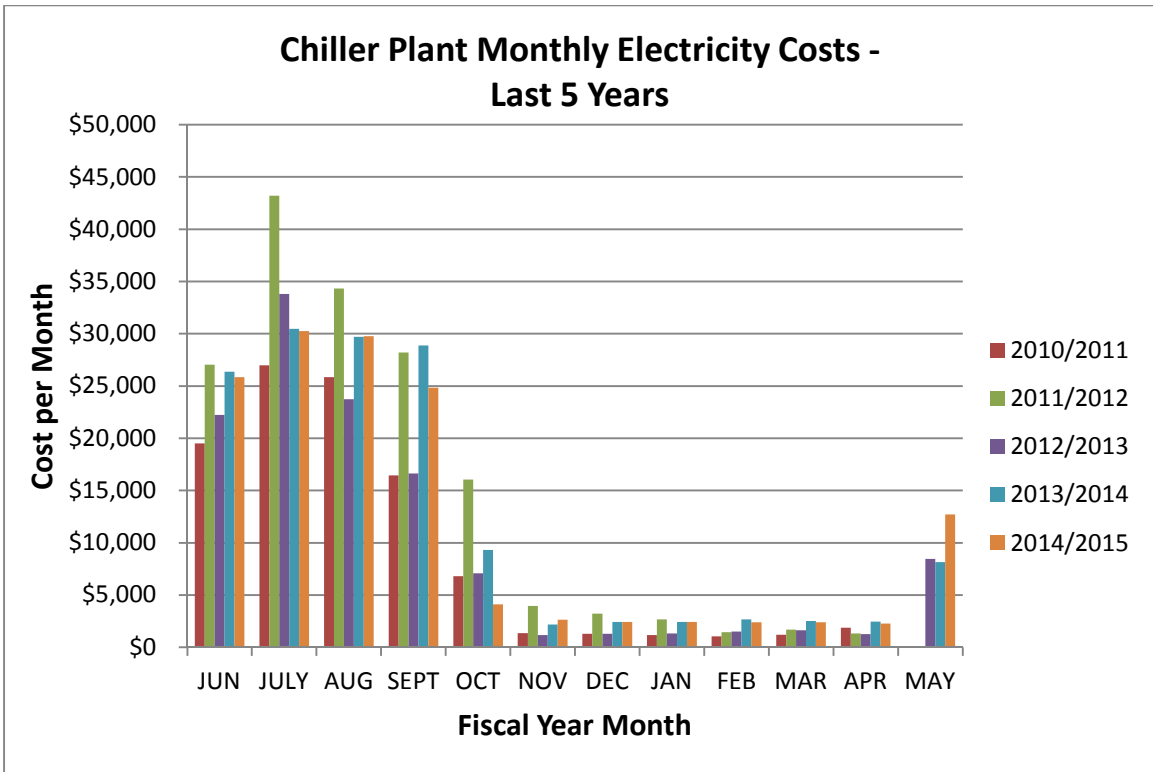


Chiller Plant Electricity Consumption & Cost Graphs

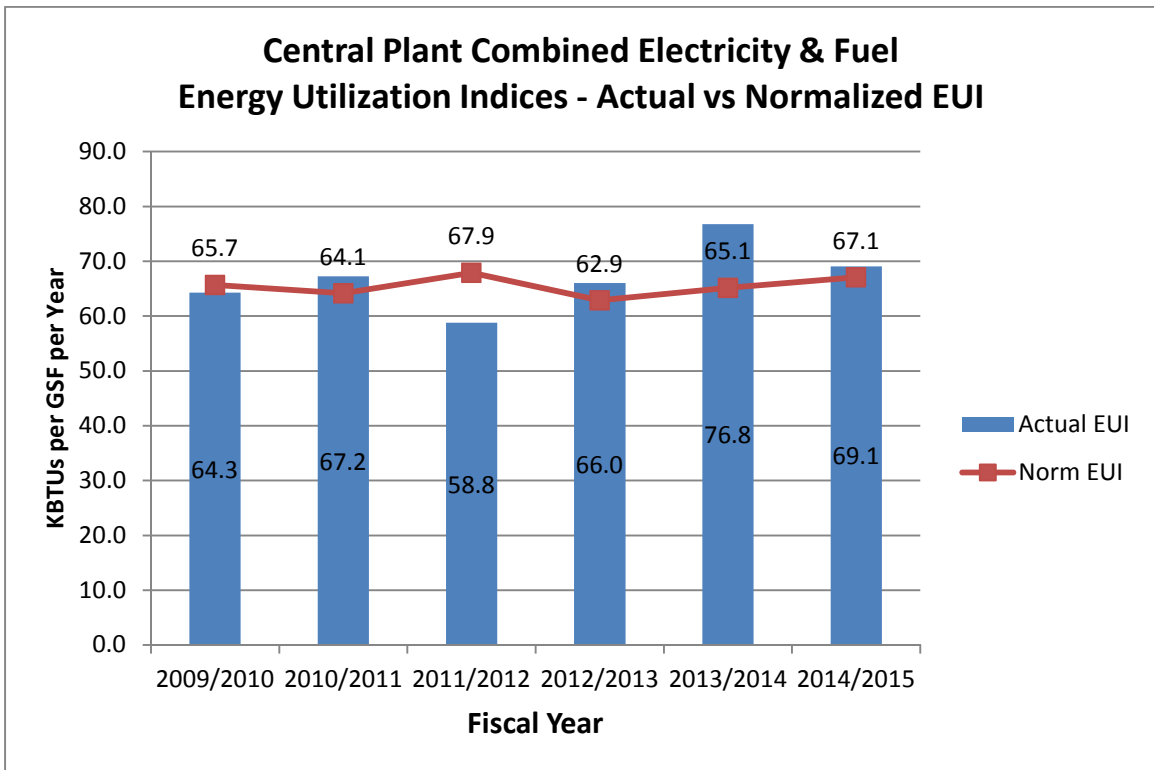
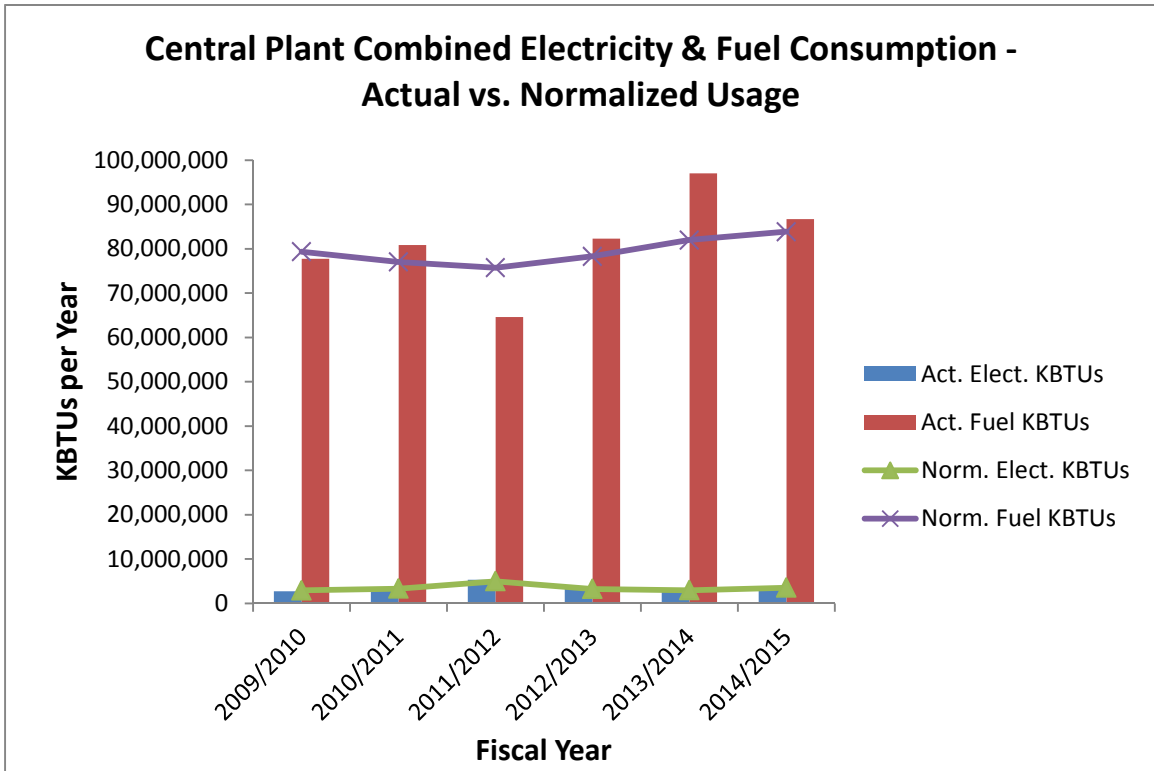




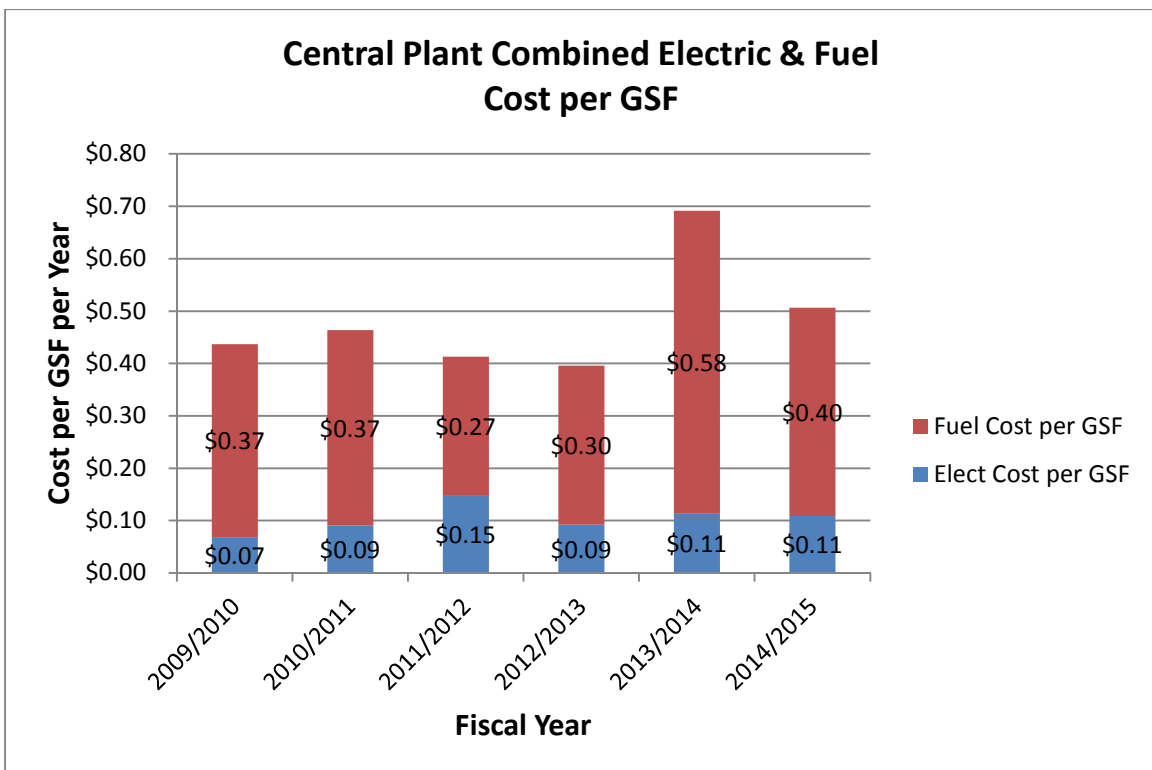
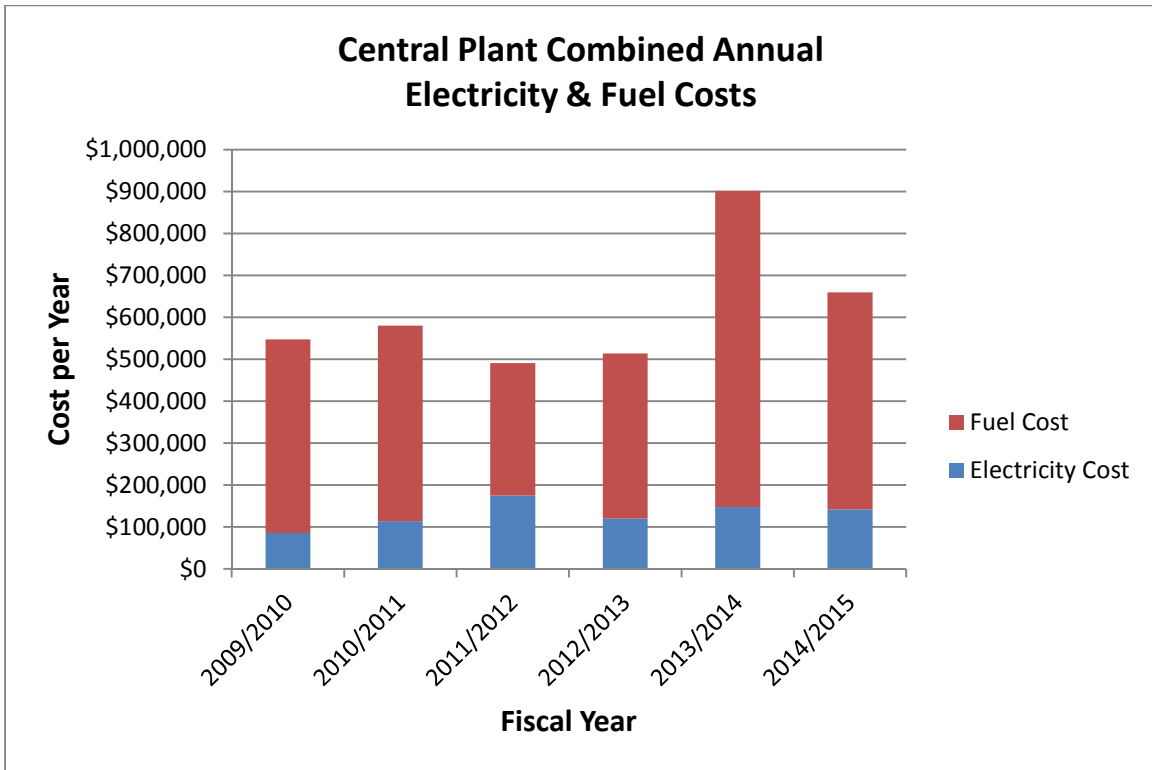


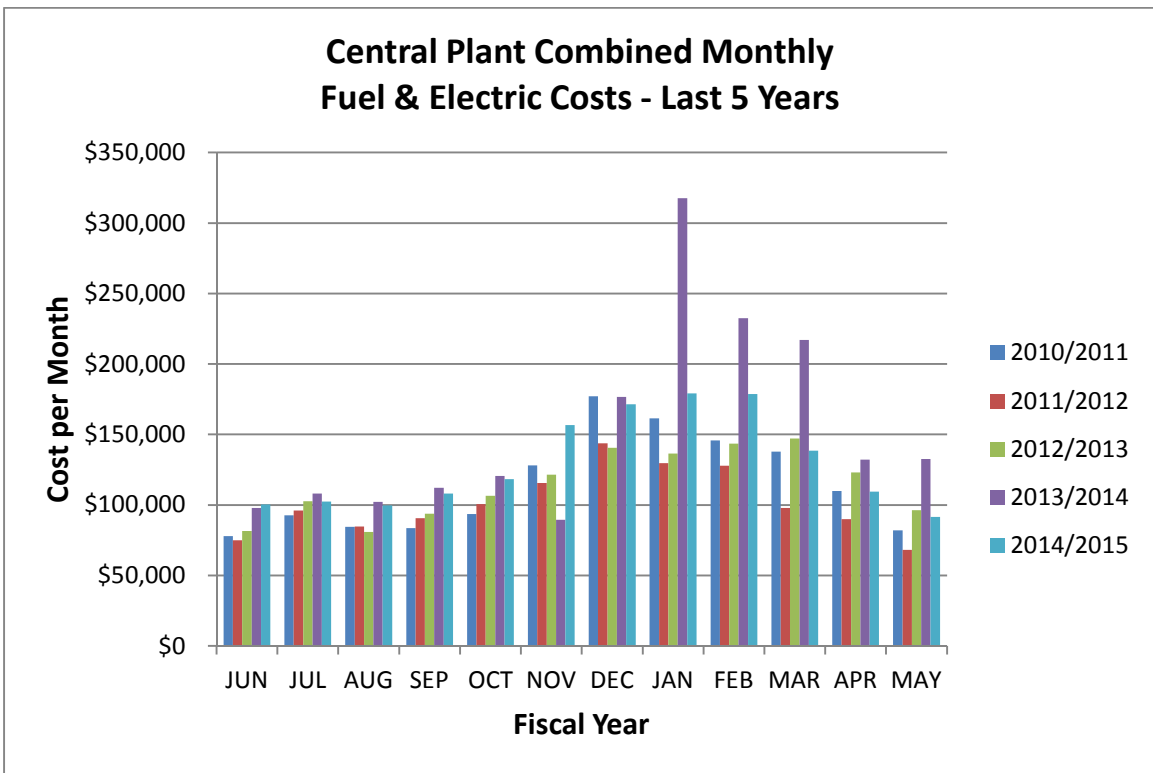
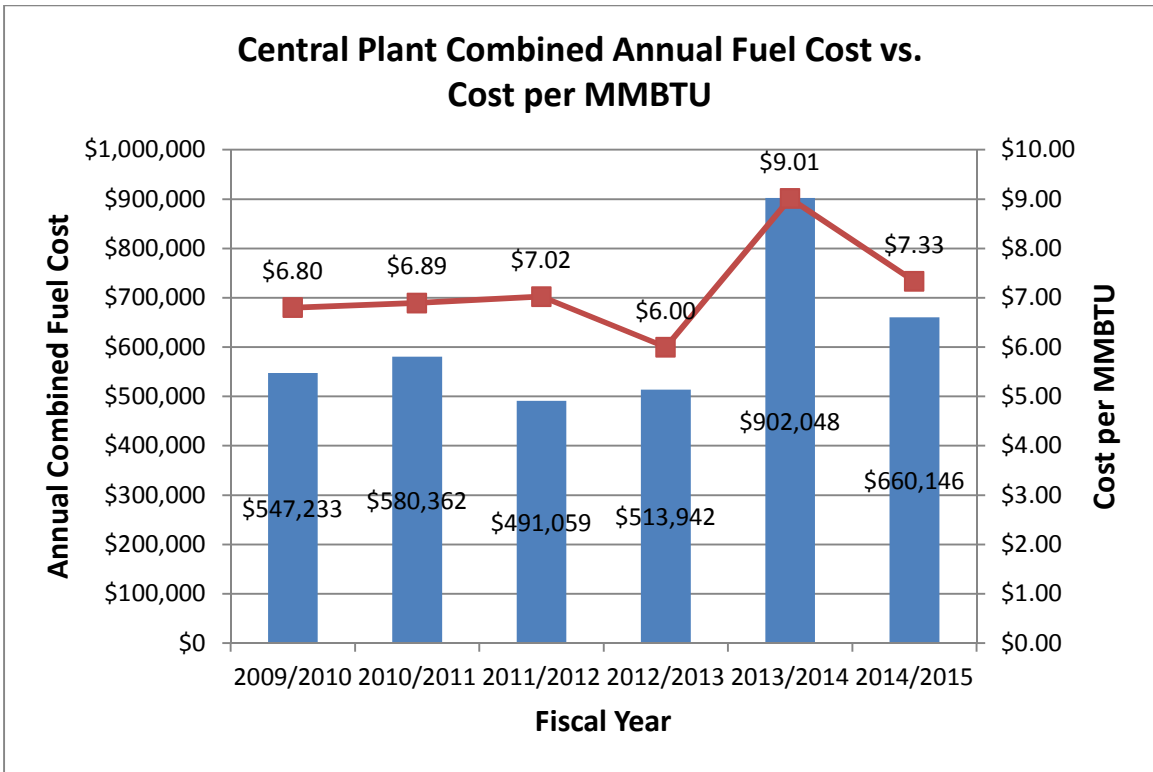


Central Plant Combined Energy Consumption & Cost Graphs

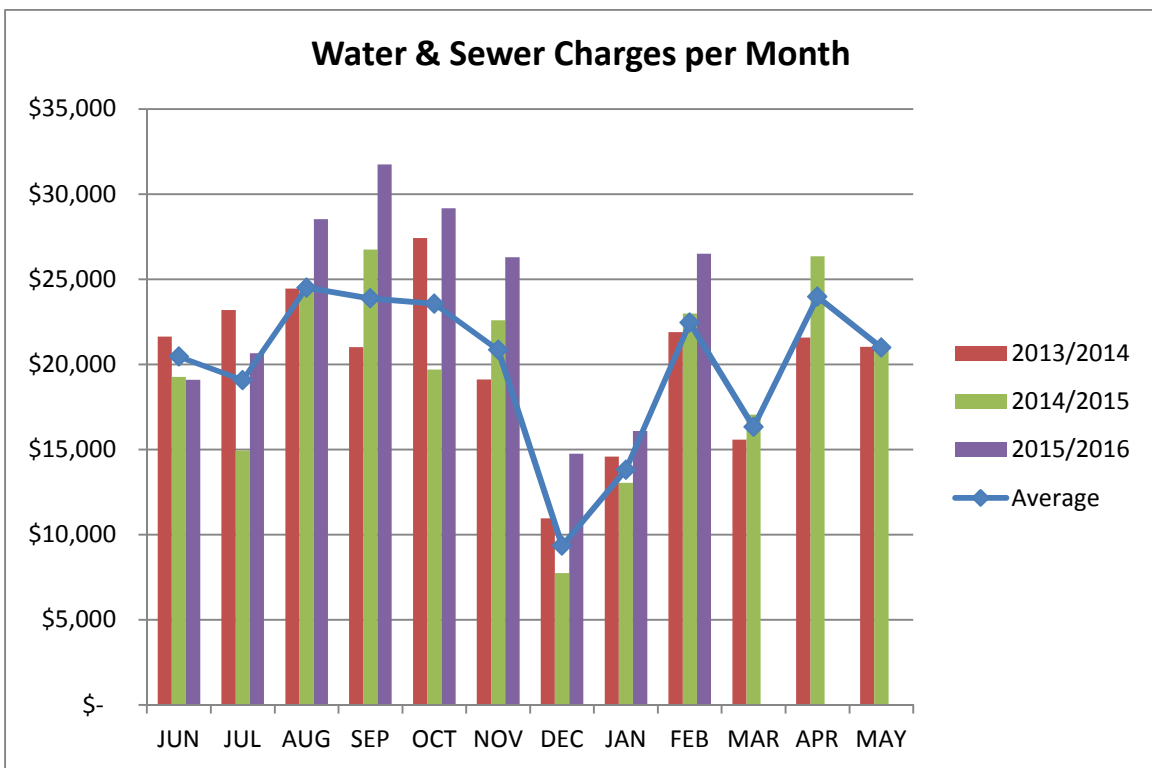
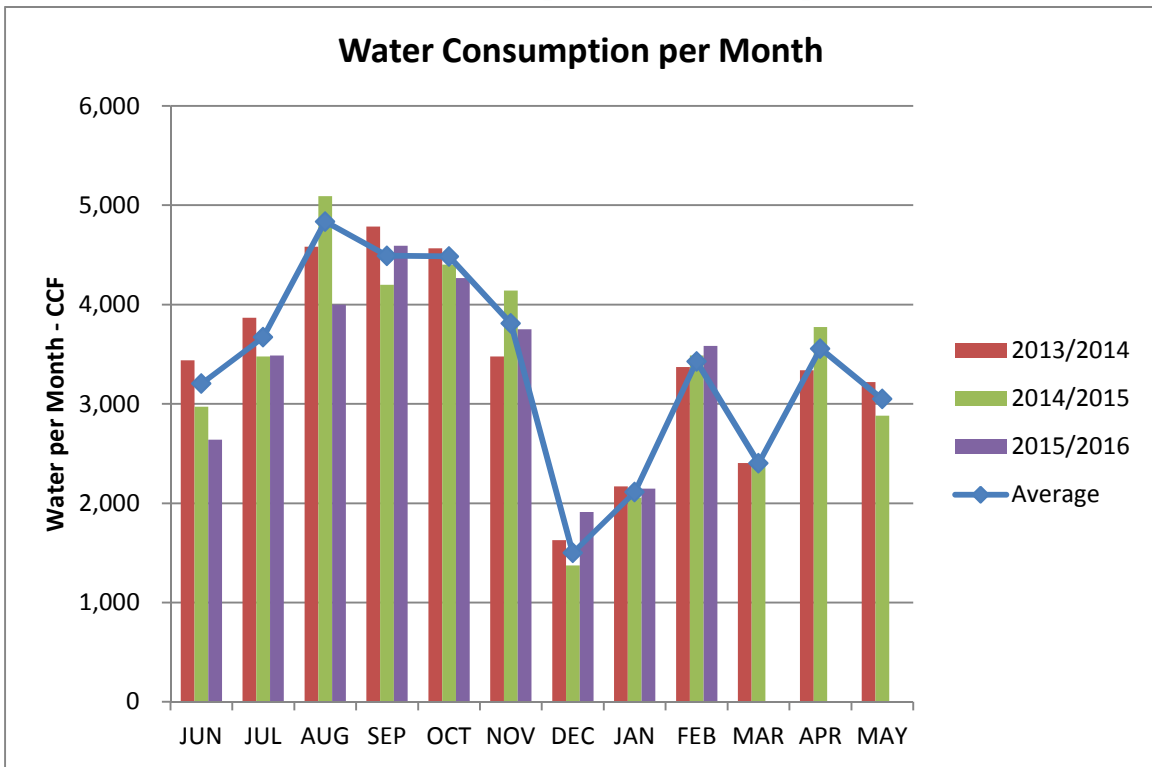


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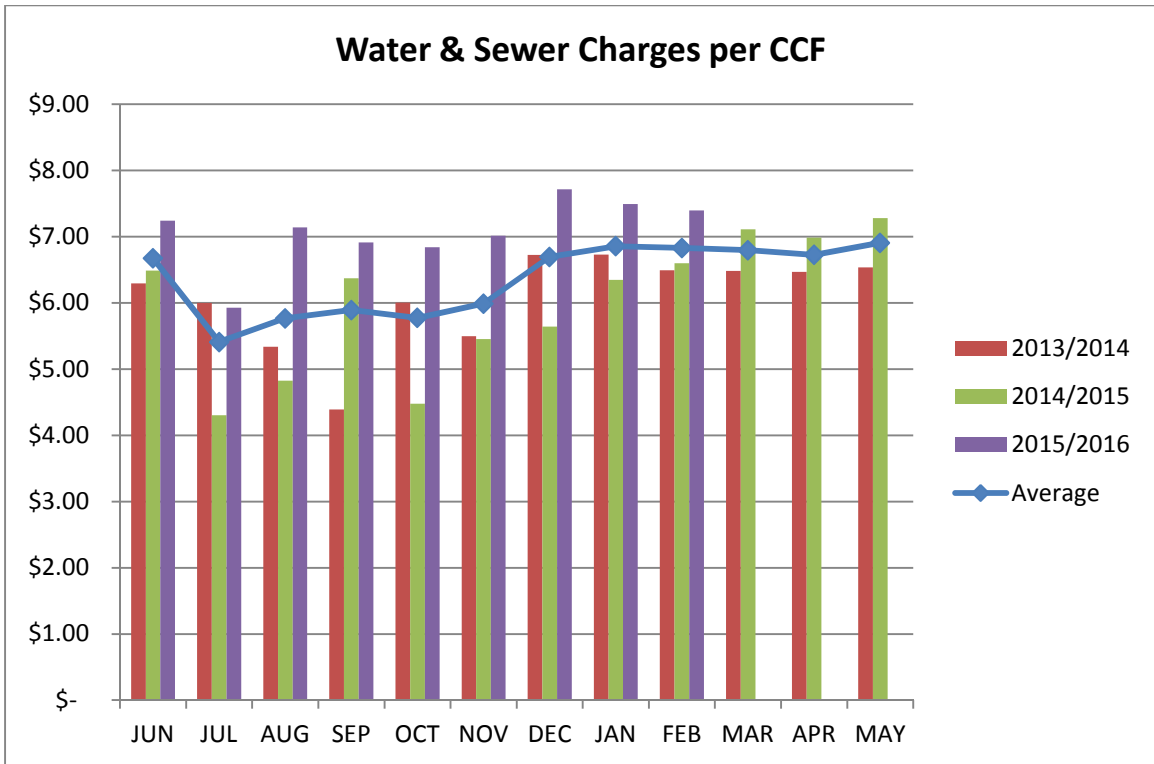




Water Consumption & Cost Graphs



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Appendix 1: Campus Square Footage Data

Macalester College - 2014/15 Annual Energy Report												
Historical Gross Square Footage Served by Central Plant												
	Notes	Year Built	Year Renov.	Year Demo.	Served by Central Plant?	Gross Sq.Ft	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	
ACADEMIC BUILDINGS												
Camegie Hall	3	1909	1990		Yes	33,905	33,905	33,905	33,905	33,905	33,905	
Fine Arts Center - Art & Chiller Plant	18, 21, 22, 23	1962	Jun 09		Yes	47,535	47,535	47,535	47,535	54,260	54,260	
Fine Art Center - Core (Demo Jan 2011)	19	1962		Jan 11	Yes	19,140	19,140					
Fine Arts Center - Commons (included in Mus)	19	1962	2012		Yes	26,181			32,027	32,027	32,027	
Fine Arts Center - Humanities	4	1962	1992		Yes	55,735	55,735	55,735	55,735	55,735	55,735	
Fine Arts Center - Music (Demo Jan 2011)	19	1962	2012	Jan 11	Yes	44,272	44,272					
Fine Arts Center - Music	19	1962	2012		Yes	68,581			76,440	76,440	76,440	
Fine Arts Center - Theater		1962			Yes	39,677	39,677	39,677	39,677	39,677	39,677	
Old Main	5	1885	1993		Yes	28,007	28,007	28,007	28,007	28,007	28,007	
Olin/Rice Halls	6, 7	1963/1969	1997		Yes	172,020	172,020	172,020	172,020	172,020	172,020	
Ordway Biology Station		1967			No	5,072	5,072	5,072	5,072	5,072	5,072	
Academic Buildings Square Footage							445,363	381,951	490,418	497,143	497,143	
Academic Buildings Square Footage Served by Central Boiler & Chiller Plants							440,291	376,879	485,346	492,071	492,071	
45 N. Snelling			2010		No	5,772	5,772	5,772	5,772			
77 Macalester			1995		Yes	11,944	11,944	11,944	11,944	11,944	11,944	
1550 Summit Ave		1950	1970		No	61,108						
Alumni House		1926	2011		Yes	7,109	7,109	7,109	7,109	7,109	7,109	
Campus Center	10	2001			Yes	76,065	76,065	76,065	76,065	76,065	76,065	
Kagin Commons	10, 11	1962	2001		Yes	41,377	41,377	41,377	41,377	41,377	41,377	
Lampert Building					No	28,999	28,999	28,999	28,999	28,999	28,999	
Leonard Center - Athletic + Recreation Center	16	Aug 08			Yes	174,617	174,617	174,617	174,617	174,617	174,617	
Markim Hall - Institute for Global Citizenship	17	Jun 09			Yes	16,585	16,585	16,585	16,585	16,585	16,585	
President's House (1635 Summit)	12	1910	2003/2006		No	3,976	3,976	3,976	3,976	3,976	3,976	
Summit House (1576 Summit)		1914	2002		No	7,320	7,320	7,320	7,320	7,320	7,320	
Wallace Library	1	1988			Yes	86,910	86,910	86,910	86,910	86,910	86,910	
Weyerhaeuser Chapel		1967			Yes	17,682	17,682	17,682	17,682	17,682	17,682	
Weyerhaeuser Hall	2	1941	1989		Yes	31,144	31,144	31,144	31,144	31,144	31,144	
Student Union	9			Sumr 99	No							
1750 Summit Ave (Sold 2003/04)	12			2003	No							
Fieldhouse				Fall 06	No							
Winton Health Center	15			Jun 08	No	3,431						
Administrative Bldg Square Footage							509,500	509,500	509,500	503,728	503,728	
Administrative Bldg Square Footage Served by Central Boiler & Chiller Plants							463,433	463,433	463,433	463,433	463,433	
RESIDENCE HALLS												
30 Macalester			1997		Yes	9,062	9,062	9,062	9,062	9,062	9,062	
37 Macalester (Cultural House)		?	1984/2000		Yes	6,924	6,924	6,924	6,924	6,924	6,924	
Bigelow Hall		1946	1992		Yes	37,890	37,890	37,890	37,890	37,890	37,890	
George Draper Dayton Hall (GDD)	8	1997			Yes	42,423	42,423	42,423	42,423	42,423	42,423	
Doty Hall		1962	2001		Yes	43,474	43,474	43,474	43,474	43,474	43,474	
Dupre Hall		1962	1994/2002		Yes	65,459	65,459	65,459	65,459	65,459	65,459	
Grand Cambridge Apartments		2000			No	17,409	17,409	17,409	17,409	17,409	17,409	
Kirk Hall		1926	1993		Yes	53,515	53,515	53,515	53,515	53,515	53,515	
Stadium (Veggie Co-op)		1964	2001		No	18,305	18,305	18,305	18,305	18,305	18,305	
Turck Hall	13	1956	2004		Yes	40,377	40,377	40,377	40,377	40,377	40,377	
Wallace Hall		1906	2003		Yes	49,328	49,328	49,328	49,328	49,328	49,328	
Dayton Hall	9			Sumr 99	No							
Residence Hall Square Footage							384,166	384,166	384,166	384,166	384,166	
Residence Hall Square Footage Served by Central Boiler & Chiller Plants							348,452	348,452	348,452	348,452	348,452	
SUB-TOTAL SQUARE FOOTAGE							1,252,176	1,188,764	1,297,231	1,303,956	1,303,956	
HOUSES												
Houses Square Footage							20,110	20,110	20,110	20,110	20,110	
Houses Square Footage Served by Central Boiler & Chiller Plants							0	0	0	0	0	
TOTAL SQUARE FOOTAGE							1,252,176	1,188,764	1,297,231	1,303,956	1,303,956	
	1	2	3	4	5	6	7	30	31	32	33	34
Academic Buildings Square Footage								445,363	381,951	490,418	497,143	497,143
Administrative Bldg Square Footage								509,500	509,500	509,500	503,728	503,728
Residence Hall Square Footage								384,166	384,166	384,166	384,166	384,166
Houses Square Footage								20,110	20,110	20,110	20,110	20,110
Total Gross Sq Ft								1,359,139	1,295,727	1,404,194	1,405,147	1,405,147
	1	2	3	4	5	6	7	30	31	32	33	34
Academic Buildings Square Footage Served by Central Boiler & Chiller Plants								440,291	376,879	485,346	492,071	492,071
Administrative Bldg Square Footage Served by Central Boiler & Chiller Plants								463,433	463,433	463,433	463,433	463,433
Residence Hall Square Footage Served by Central Boiler & Chiller Plants								348,452	348,452	348,452	348,452	348,452
Houses Square Footage Served by Central Boiler & Chiller Plants								-	-	-	-	-
Total Gross Sq Ft Served by Central Boiler & Chiller Plants								1,252,176	1,188,764	1,297,231	1,303,956	1,303,956

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Appendix 2: Energy Project Data

Year	Type	Building/Campus Area	Description	Status	Estimated Elect. Savings (KWH)	Estimated Demand Savings (KW)	Estimated Fuel Savings (Therms)	Estimated Water Savings (CCF)	Cost	Xcel Rebate	Closing Date
2011	VFD	Boiler Plant	40 HP VFD For Boiler #3 Controls	Complete	24,990	6.882				\$ 3,000	2/7/2011
	Boiler Tune-up	Boiler Plant	2011 Boiler Tune-up - #1 & #2	Complete			29,414			\$ 423	3/1/2011
	Lighting Retrofit		17w LED Lamp Retrofit	Complete	12,179	2.913				\$ 1,050	12/13/2011
	Lighting Controls		Occupancy Sensors	Complete	39,536	5.408				\$ 2,675	12/20/2011
	Pipe Insulation		Pipe Insulation Ph 2 - Steam & Condensate	Complete			4,311			\$ 924	12/29/2011
2012	Recommissioning		VFD's - RCx Recommendations (12) 1-8DJEE	Complete	42,932	11.824				\$ 7,450	5/11/2012
	Lighting Retrofit	Residence Halls	T12 to T8 Lighting in Res Halls	Complete	38,538	9.217				\$ 2,876	11/28/2012
	Lighting Retrofit	Fine Arts Center	EDA Macalester Fine Arts Center - Ph I (E) 1-6I6LQ	Complete	180,038	46				\$ 13,800	12/7/2012
		Fine Arts Center	EDA Fine Arts Center - Ph I (G) 1-6I7AR	Complete			7,590			\$ 3,036	12/7/2012
	Recommissioning		RCx Elec Measures Ph I (ECO's 2, 3, 9, 15, 22 & 23) 1-8K34J	Complete	174,645	20.490				\$ 92	12/12/2012
	Recommissioning		RCx Gas Measures Ph I (ECO's 3, 8, 9, 11, 22, 23, & 32) 1-8K370	Complete			25,990			\$ 213	12/12/12
2013	Lighting Retrofit	Carnegie	18PAR38 LED Lamps @ Carnegie	Complete	3,203	0.766				\$ 120	5/6/2013
	Lighting Retrofit		T12 to T8 Lighting w/ Low watt lamps	Complete	28,482	6.811				\$ 1,882	5/8/2013
	VFD's & Motors	Boiler Plant	Boiler Plant VFD's & Motors - 6 pumps & 1 fan	Complete	164,439	34.261				\$ 19,700	12/18/2013
2014	Boiler Burner	Boiler Plant	Modulating Burner w/O2 Trim	Complete			66,969			\$ 12,000	2/4/2014
	Lighting Retrofit	Music	MR16 LED Retro in Music	Complete	14,737	3.525				\$ 1,200	4/7/2014
		Music	EDA Fine Arts - Ph II (G)	Complete			3,550			\$ 1,775	6/9/2014
		Fine Arts Center	EDA Fine Arts Ctr - Ph II (E)	Complete	139,905	42.000				\$ 22,936	6/9/2014
	Lighting Retrofit	Leonard Center	Leonard Ctr Cust Low Watt T5 w/ Ballast Ltg	Complete	27,907	6.544				\$ 2,617	9/29/2014
	Lighting Retrofit	Various	Dupre & Various LED's	Complete	7,516	1.716				\$ 809	10/24/2014
	Lighting Retrofit	Various	Weyer/Stadium & Chiller Plant LED's	Complete	3,373	0.770				\$ 437	10/24/2014
	Lighting Retrofit	Art	Art Gallery LED's	Complete	16,690	3.992				\$ 1,845	10/24/2014
	Lighting Retrofit	Alumni House	Alumni House Custom LED	Complete	24,520	6.529				\$ 1,033	10/27/2014
	Lighting Retrofit	Various	Various Gallery & Chapel LED's	Complete	13,274	3.175				\$ 1,080	10/28/2014
	Lighting Retrofit	Alumni House	Alumni House LED Ltg	Complete	6,586	1.575				\$ 360	10/28/2014
	Lighting Retrofit	Campus Center	Campus Center MR16 LED's	Complete	15,465	2.860				\$ 133	10/31/2014
	Lighting Retrofit	Leonard Center	Racquet Ball Court HID	Complete	3,381	0.809				\$ 768	11/10/2014
	Lighting Retrofit	Residence Halls	Res Hall Cust LED Ltg	Complete	18,249	13.015				\$ 5,206	11/10/2014
2015	Lighting Retrofit	Kagin Commons	Kagin Ballroom Ltg Redesign Study	Complete							5/7/2014
	Electric Motors	Neill Hall	Neill Hall Fan Motor Upgrade	Complete	960	0.264				\$ 850	6/16/2015
	Lighting Retrofit	Fine Arts Center	Janet Wallace Fine Arts Cust LED	Complete	24,703	6.697				\$ 2,679	6/17/2015
	Lighting Retrofit	Various	Campus Wide LED Retrofit - 10w TCP	Complete	3,807	9.107				\$ 1,364	8/31/2015
	Lighting Retrofit	George Draper Dayton	GDD Cust LED Ltg	Complete	1,791	0.588				\$ 235	11/27/2015
	Lighting Retrofit	Residence Halls	Cust Res Hall Circ Fl to LED - Ph II	Complete	16,996	12.122				\$ 4,849	11/30/2015
	Recommissioning	Chapel	Energy Study EMI-18: Decommission & Disconnect Idle Transformers	Complete	32,649	3.730				TBD	12/23/2015

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Appendix 3: Energy Utilization Calculations

Campus Energy Utilization Index Calculations															3% Annual Consumption Reduction Goal		
Fiscal Year	Building Area Served by Central Boiler & Chiller Plants - GSF	Total Campus Area - GSF	Chiller Plant - Actual Electricity Usage - KBTU	Chiller Plant Normalized Electricity Usage - KBTU	Campus Buildings - Actual Electricity Usage - KBTU	Residential Buildings - Actual Electricity Usage - KBTU	Total Actual Electricity Usage - KBTU	Campus & Residential Actual + Chiller Normalized Electricity Usage - KBTU	Boiler Plant Actual Fuel Usage - KBTU	Boiler Plant Normalized Fuel Usage - KBTU	Campus Buildings Actual Fuel Use - KBTUs	Residential Buildings Actual Fuel Use - KBTUs	Total Central Plant, Campus & Res Bldgs Actual Energy Usage - KBTU	Total Normalized Central Plant + Campus & Res Bldg Actual Usage - KBTU	Annual Consumption Goal (3% Reduction)	Campus Total Actual Energy Usage EUl - KBTU/GSF/Yr	Campus Total Normalized Energy Usage EUl - KBTU/GSF/Yr
2009-2014 Ave			3,573,046	3,475,367	1,169,439	746,856	3,956,305	3,858,626	80,492,760	78,473,498	9,436,300	4,925,500	116,379,318	101,220,356	3,036,611		
1995/1996	942,486	994,387							91,539,850	79,558,663							
1996/1997	984,909	1,036,810							96,011,967	82,984,492							
1997/1998	984,909	1,036,810							82,412,800	87,749,130							
1998/1999	984,909	1,036,810							86,679,236	90,124,840							
1999/2000	984,909	1,054,219							76,959,815	84,891,479							
2000/2001	984,909	1,057,101							94,701,500	85,942,776							
2001/2002	1,060,974	1,133,166							85,425,440	90,860,798							
2002/2003	1,060,974	1,133,166							91,334,450	86,707,027							
2003/2004	1,060,974	1,133,166							87,583,070	87,688,444							
2004/2005	1,060,974	1,133,166							81,052,800	83,119,042							
2005/2006	1,060,974	1,133,166							78,282,150	85,160,944							
2006/2007	1,060,974	1,133,166							77,067,300	80,319,558							
2007/2008	1,235,591	1,307,783							89,309,140	82,751,537							
2008/2009	1,235,591	1,307,783							85,402,500	80,693,957							
2009/2010	1,252,176	1,324,368	2,717,999	2,895,526			2,717,999	2,895,526	77,752,400	79,341,794							
2010/2011	1,252,176	1,359,139	3,386,751	3,305,480			3,386,751	3,305,480	80,809,520	77,014,706							
2011/2012	1,188,764	1,295,727	5,311,802	4,975,277			5,311,802	4,975,277	64,591,000	75,731,609							
2012/2013	1,297,231	1,404,194	3,348,537	3,243,344			3,348,537	3,243,344	82,309,800	78,294,328							
2013/2014	1,303,956	1,405,147	3,100,143	2,957,207	1,169,439	746,856	5,016,438	4,873,502	97,001,080	81,985,054	9,436,300	4,925,500	116,379,318	101,220,356		82.8	72.0
2014/2015	1,303,956	1,405,147	3,257,778	3,512,264	1,170,272	674,812	5,102,861	5,357,348	86,711,760	83,840,626	11,021,100	4,361,200	107,196,921	104,580,274		76.3	74.4
2015/2016	1,303,956	1,405,147	3,366,279	3,715,622	823,728	523,677	4,713,685	5,063,028	56,405,100	81,661,287	8,463,100	2,973,900	72,555,785	98,161,315	98,183,745	51.6	69.9
2016/2017			0	0	0	0	0	0	0	0	0	0	0	0	95,147,135	#DIV/0!	#DIV/0!
2017/2018			0	0	0	0	0	0	0	0	0	0	0	0	92,110,524	#DIV/0!	#DIV/0!
2018/2019			0	0	0	0	0	0	0	0	0	0	0	0	89,073,913	#DIV/0!	#DIV/0!
2019/2020			0	0	0	0	0	0	0	0	0	0	0	0	86,037,303	#DIV/0!	#DIV/0!

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Appendix 4: Fuel, Electricity, & Water Consumption Data

Fuel Use Data

Campus Total Fuel Consumption Data										3%		Annual Consumption Reduction Goal		
Fiscal Year	Building Area Served by Central Boiler & Chiller Plants - GSF	Total Campus Area - GSF	Boiler Plant Actual Fuel Usage - KBTU	Boiler Plant Actual Fuel Usage EUI - KBTUs/GSF/Yr	Heating Degree Days - Base 65	Boiler Plant Annual Fuel BTUs per GSF per HDD (65)	Boiler Plant Expected Fuel Usage - KBTU	Boiler Plant Normalized Fuel Usage - KBTU	Boiler Plant Normalized Fuel EUI - KBTU/SF/Yr	Campus Buildings Annual Fuel Use - KBTUs	Residential Buildings Annual Fuel Use - KBTUs	Campus & Res Bldgs + Boiler Actual Fuel Usage - KBTUs	Campus & Res Bldgs + Boiler Norm. Annual Fuel Usage - KBTUs	Annual Consumption Goal (3% Reduction)
2009-2014 Average			80,492,760	64	7,097	9.0	86,866,662	78,473,498	62.4					2,890,406
1995/1996	942,486	994,387	91,539,850	97	8025.0	12.1	97,671,146	79,558,663	84.4					
1996/1997	984,909	994,387	96,011,967	97	7972.0	12.2	98,213,681	82,984,492	84.3					
1997/1998	984,909	1,036,810	82,412,800	84	6539.0	12.8	79,725,162	87,749,130	89.1					
1998/1999	984,909	1,054,219	86,679,236	88	6596.0	13.3	81,642,093	90,124,840	91.5					
1999/2000	984,909	1,057,101	76,959,815	78	6227.0	12.5	76,956,176	84,891,479	86.2					
2000/2001	984,909	1,133,166	94,701,500	96	7671.0	12.5	93,538,638	85,942,776	87.3					
2001/2002	1,060,974	1,133,166	85,425,440	81	6294.0	12.8	79,809,436	90,860,798	85.6					
2002/2003	1,060,974	1,133,166	91,334,450	86	7313.0	11.8	89,417,780	86,707,027	81.7					
2003/2004	1,060,974	1,133,166	87,583,070	83	6911.0	11.9	84,785,456	87,688,444	82.6					
2004/2005	1,060,974	1,133,166	81,052,800	76	6591.0	11.6	82,777,261	83,119,042	78.3					
2005/2006	1,060,974	1,133,166	78,282,150	74	6344.0	11.6	78,030,760	85,160,944	80.3					
2006/2007	1,060,974	1,307,783	77,067,300	73	6721.0	10.8	81,450,245	80,319,558	75.7					
2007/2008	1,235,591	1,307,783	89,309,140	72	7542.0	9.6	91,614,328	82,751,537	67.0					
2008/2009	1,235,591	1,324,368	85,402,500	69	7448.0	9.3	89,840,701	80,693,957	65.3					
2009/2010	1,252,176	1,359,139	77,752,400	62	6698.0	9.3	83,186,978	79,341,794	63.4					
2010/2011	1,252,176	1,295,727	80,809,520	65	7308.0	8.8	89,070,200	77,014,706	61.5					
2011/2012	1,188,764	1,404,194	64,591,000	54	5894.0	9.2	72,399,970	75,731,609	63.7					
2012/2013	1,297,231	1,405,147	82,309,800	63	7294.0	8.7	89,241,078	78,294,328	60.4					
2013/2014	1,303,956	1,405,147	97,001,080	74	8289.0	9.0	100,435,084	81,985,054	62.9	9,436,300	4,925,500	111,362,880	96,346,854	
2014/2015	1,303,956	1,405,147	86,711,760	66	7196.0	9.2	87,794,447	83,840,626	64.3	11,021,100	4,361,200	102,094,060	99,222,926	
2015/2016	1,303,956	1,405,147	56,405,100	43	3617.0	12.0	58,633,486	81,661,287	62.6	8,463,100	2,973,900	67,842,100	93,098,287	93,456,448
2016/2017		0	0							0	0	0	0	90,566,042
2017/2018			0							0	0	0	0	87,675,637
2018/2019			0							0	0	0	0	84,785,231
2019/2020			0							0	0	0	0	81,894,826

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Heating Plant Monthly Fuel Consumption - KBTUS														
KBTUs	June	July	August	September	October	November	December	January	February	March	April	May	Total	Data Source
1995/1996	0	0	0	2,249,900	7,187,400	12,496,700	13,706,650	16,049,250	14,292,000	13,114,750	9,072,200	3,371,000	91,539,850	Ed Cook Rpt
1996/1997	0	0	0	0	8,136,700	15,131,400	17,210,567	14,592,600	14,592,600	13,176,300	7,953,100	5,218,700	96,011,967	Ed Cook Rpt
1997/1998	0	0	0	0	6,058,000	13,793,300	14,767,600	15,811,200	11,056,800	12,650,600	6,649,800	1,625,500	82,412,800	Ed Cook Rpt
1998/1999	0	0	0	901,400	7,039,200	11,084,400	15,061,736	18,574,200	12,758,000	11,700,800	7,595,200	1,964,300	86,679,236	Ed Cook Rpt
1999/2000	0	0	0	220,900	6,917,400	8,867,600	13,369,310	16,118,600	12,526,905	9,955,900	7,720,300	1,262,900	76,959,815	Ed Cook Rpt
2000/2001	0	0	0	468,000	6,354,800	12,605,900	19,682,500	15,766,350	15,803,900	13,307,450	8,176,900	2,535,700	94,701,500	Ed Cook Rpt
2001/2002	0	0	0	1,235,500	7,924,900	8,564,900	13,862,100	14,639,200	12,479,600	13,693,100	8,851,440	4,174,700	85,425,440	2001/02 Rpt
2002/2003	0	0	0	1,319,000	9,450,000	11,736,000	13,188,150	16,308,500	15,462,200	11,278,600	9,711,000	2,881,000	91,334,450	2002/03 Rpt
2003/2004	0	1,000	0	1,741,000	7,002,000	11,820,000	14,072,250	16,840,950	15,059,820	11,792,050	6,984,000	2,270,000	87,583,070	2003/04 Rpt
2004/2005	12,000	0	0	4,000	6,286,000	8,603,800	16,086,050	17,237,150	12,070,350	12,927,450	6,362,000	1,464,000	81,052,800	2004/05 Rpt
2005/2006	0	0	0	1,367,000	9,351,000	13,070,000	12,505,000	10,872,250	13,390,150	11,956,750	4,408,000	1,362,000	78,282,150	2005/06 Rpt
2006/2007	3,100	0	0	2,489,000	7,475,000	10,568,000	10,780,450	14,485,700	14,988,550	9,382,500	6,122,000	773,000	77,067,300	2006/07 Rpt
2007/2008	0	0	0	3,000	5,230,000	11,601,000	15,981,350	18,672,980	15,561,160	12,772,650	7,696,000	1,791,000	89,309,140	2007/08 Rpt
2008/2009	0	0	0	500,000	6,302,000	11,238,000	14,653,650	17,987,700	14,500,150	10,639,000	7,541,000	2,041,000	85,402,500	2008/09 Rpt
2009/2010	0	0	0	240,000	8,037,000	8,082,000	15,343,850	16,905,550	13,229,000	8,946,000	4,614,000	2,355,000	100,909,100	2009/10 Rpt
2010/2011	0	0	0	0	4,343,000	10,898,520	16,562,800	15,381,200	12,788,000	12,000,000	6,904,000	1,932,000	80,809,520	2010/11 Rpt
2011/2012	0	0	0	119,000	4,726,000	9,983,000	12,738,000	12,291,000	11,934,000	6,124,000	5,408,000	1,268,000	64,591,000	2011/12 Rpt
2012/2013	0	0	0	622,000	6,898,000	9,891,000	13,579,000	14,777,000	11,905,700	13,268,100	8,624,000	2,745,000	82,309,800	2012/13 Rpt
2013/2014	0	0	0	182,300	7,355,900	11,187,600	18,748,200	19,426,140	14,110,460	12,760,040	8,797,100	4,433,340	97,001,080	2013/14 Util Wkbbk
2014/2015	1,000	0	0	134,400	7,330,400	12,928,800	14,034,800	16,623,560	15,988,300	10,595,500	6,899,600	2,175,400	86,711,760	2014/15 Util Wkbbk
2015/2016	0	0	0	661,600	5,665,300	8,613,200	13,282,100	14,764,700	13,418,200	0	0	0	56,405,100	2015/16 Util Wkbbk
2016/2017													0	
2017/2018													0	
2018/2019													0	
2019/2020													0	

Campus Buildings Monthly Fuel Consumption - KBTUS														
KBTUs	June	July	August	September	October	November	December	January	February	March	April	May	Total	Data Source
2013/2014	1,095,100	1,009,800	598,100	1,308,600	616,000	517,200	808,300	828,500	842,700	660,400	493,000	658,600	9,436,300	2013/14 Util Wkbbk
2014/2015	1,455,700	1,508,500	1,395,100	1,733,000	672,800	549,900	641,000	613,100	838,300	557,800	385,600	670,300	11,021,100	2014/15 Util Wkbbk
2015/2016	1,551,800	1,327,300	1,220,100	1,629,200	396,600	404,600	559,300	664,500	709,700	0	0	0	8,463,100	2015/16 Util Wkbbk
2016/2017													0	
2017/2018													0	
2018/2019													0	
2019/2020													0	

Residential Buildings Monthly Fuel Consumption - KBTUs														
KBTUs	June	July	August	September	October	November	December	January	February	March	April	May	Total	Data Source
2013/2014	171,700	153,500	155,800	341,900	392,400	427,600	748,200	738,100	713,800	547,900	315,300	219,300	4,925,500	2013/14 Util Wkbbk
2014/2015	143,200	150,200	138,200	367,900	443,600	463,400	605,700	621,100	609,600	344,600	273,100	200,600	4,361,200	2014/15 Util Wkbbk
2015/2016	146,800	123,700	132,000	306,400	286,800	353,100	456,200	606,400	562,500	0	0	0	2,973,900	2015/16 Util Wkbbk
2016/2017													0	
2017/2018													0	
2018/2019													0	
2019/2020													0	

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Electricity Consumption Data

Campus Total Electric Consumption Data - KWH									3% Annual Reduction Target					
Fiscal Year	Total Campus Area - GSF	Campus Main Xcel Meter - Actual Electricity Usage - KWH	Chiller Plant - Actual Electricity Usage - KWH	Chiller Plant - Normalized Electricity Usage - KWH	Campus Buildings - Actual Electricity Usage - KWH	Residential Buildings - Actual Electricity Usage - KWH	Total Actual Electricity Usage - KWH	Campus & Residential Actual + Chiller Normalized Electricity Usage - KWH	Difference in Total Consumption vs 2013/2014	Annual Consumption Goal (3% Reduction) - KWH	Campus Main Xcel Meter Demand - KW per Year	Chiller Xcel Meter Demand - KW per Year	Total Campus Main & Chiller Xcel Meters Demand - KW per Year	Campus Main & Chiller Plant Xcel Meter Demand - Watts per GSF
2009-14 Ave		10,740,740	1,047,200	1,018,572	342,743	218,891	11,900,267	11,871,639		375,931	21,533	6,348.5	27,882	20.4
1995/1996	994,387	10,836,825					10,836,825	10,836,825						
1996/1997	994,387	11,918,661					11,918,661	11,918,661						
1997/1998	1,036,810	12,837,018					12,837,018	12,837,018						
1998/1999	1,036,810	12,940,725					12,940,725	12,940,725						
1999/2000	1,054,219	12,148,875					12,148,875	12,148,875						
2000/2001	1,057,101	11,583,294					11,583,294	11,583,294						
2001/2002	1,133,166	12,739,200					12,739,200	12,739,200						
2002/2003	1,133,166	13,257,600					13,257,600	13,257,600						
2003/2004	1,133,166	12,969,600					12,969,600	12,969,600						
2004/2005	1,133,166	12,944,171					12,944,171	12,944,171						
2005/2006	1,133,166	13,058,757					13,058,757	13,058,757						
2006/2007	1,133,166	12,399,200					12,399,200	12,399,200						
2007/2008	1,307,783	10,787,257					10,787,257	10,787,257						
2008/2009	1,307,783	12,367,600					12,367,600	12,367,600						
2009/2010	1,324,368	10,874,200	796,600	848,630			11,670,800	11,722,830			22,429	3,499	25,928	19.6
2010/2011	1,359,139	10,894,800	992,600	968,781			11,887,400	11,863,581			21,820	5,492	27,312	20.1
2011/2012	1,295,727	9,897,300	1,556,800	1,458,170			11,454,100	11,355,470			19,858	7,662	27,520	21.2
2012/2013	1,404,194	10,934,700	981,400	950,570			11,916,100	11,885,270			21,513	5,377	26,890	19.1
2013/2014	1,405,147	11,102,700	908,600	866,708	342,743	218,891	12,572,934	12,531,042	0.0%		21,864	8,122	29,986	21.3
2014/2015	1,405,147	10,657,500	954,800	1,029,386	342,987	197,776	12,153,063	12,227,649	-2.4%		21,716	7,939	29,655	21.1
2015/2016	1,405,147	8,108,100	986,600	1,088,987	241,421	153,481	9,489,602	9,591,989	-23.5%	12,155,111	15,948	7,408	23,356	16.6
2016/2017	1,405,147	0	0	0	0	0	0	0		11,779,179				
2017/2018		0	0	0	0	0	0	0		11,403,248				
2018/2019		0	0	0	0	0	0	0		11,027,317				
2019/2020		0	0	0	0	0	0	0		10,651,386				

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Chiller Plant Electricity Consumption Data														
Fiscal Year	Building Area Served by Central Boiler & Chiller Plants - GSF	Chiller Plant - Actual Electricity Usage - KWH	Chiller Plant - Actual Electricity Usage - KBTU	Chiller Plant Actual Electricity EUI - KBTUs/GSF/Yr	Annual Cooling Degree Days - Base 55	Chiller Plant Annual Electricity BTUs per GSF per CDD (55)	Chiller Plant - Expected Electricity Usage - KWH	Chiller Plant - Expected Electricity Usage - KBTU	Chiller Plant - Expected Electricity EUI - KBTUs/GSF/Yr	Chiller Plant - Normalized Electricity Usage - KWH	Chiller plant - Normalized Electricity Usage - KBTU	Chiller Plant - Electricity EUI - Normalized - KBTU/GSF/YR	Chiller Plant Demand - KW per Year	Chiller Plant Demand - Watts per GSF
2009-14 Ave		1,031,800	3,520,502	2.8	2,198	1.3	884,919	3,019,343	2.4	1,020,374	3,481,516	2.8	6,348	5.0
1995/1996	942,486				2054									
1996/1997	984,909				1721									
1997/1998	984,909				2042									
1998/1999	984,909				2002									
1999/2000	984,909				2026									
2000/2001	984,909				2017									
2001/2002	1,060,974				2111									
2002/2003	1,060,974				2215									
2003/2004	1,060,974				2170									
2004/2005	1,060,974				1871									
2005/2006	1,060,974				2553									
2006/2007	1,060,974				2450									
2007/2008	1,235,591				2285									
2008/2009	1,235,591				2192									
2009/2010	1,252,176	796,600	2,717,999	2.2	2043	1.1	825,268	2,815,816	2.2	848,630	2,895,526	2.3	3,499	2.8
2010/2011	1,252,176	992,600	3,386,751	2.7	2243	1.2	900,787	3,073,485	2.5	968,781	3,305,480	2.6	5,492	4.4
2011/2012	1,188,764	1,556,800	5,311,802	4.5	2338	1.9	938,638	3,202,631	2.7	1,458,170	4,975,277	4.2	7,662	6.4
2012/2013	1,297,231	981,400	3,348,537	2.6	2254	1.1	907,685	3,097,023	2.4	950,570	3,243,344	2.5	5,377	4.1
2013/2014	1,303,956	908,600	3,100,143	2.4	2290	1.0	921,665	3,144,723	2.4	866,708	2,957,207	2.3	8,122	6.2
2014/2015	1,303,956	954,800	3,257,778	2.5	2021	1.2	815,469	2,782,381	2.1	1,029,386	3,512,264	2.7	7,939	6.1
2015/2016	1,303,956	986,600	3,366,279	2.6	1969	1.3	796,511	2,717,696	2.1	1,088,987	3,715,622	2.8	7,408	5.7
2016/2017														
2017/2018														
2018/2019														
2019/2020														

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Electricity - Total Demand - Campus Main & Chiller Plant Meters - KW														
KW	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTAL	Data Source
1991/1992	1,940	1,940	2,040	2,112	1,800	1,704	1,704	1,704	1,656	1,704	1,704	2,112	22,120	
1992/1993	1,968	1,920	1,968	2,112	2,040	1,824	1,800	1,704	1,776	1,752	1,776	1,992	22,632	
1993/1994	1,968	1,944	2,112	1,920	1,920	1,752	1,752	1,752	1,872	1,776	1,776	1,944	22,488	
1994/1995														
1995/1996	1,992	2,088	2,088	1,992	1,608	1,776	1,776	1,776	1,776	1,920	1,920	1,992	22,704	
1996/1997	2,064	2,136	2,184	2,280	1,968	2,112	1,968	1,968	1,896	1,920	2,256	1,896	24,648	
1997/1998	2,232	2,280	2,040	2,592	2,592	2,256	2,040	1,872	1,992	2,016	2,208	2,328	26,448	
1998/1999	2,376	2,208	2,280	2,448	2,208	2,208	1,920	1,824	2,040	2,016	2,256	2,328	26,112	
1999/2000														
2000/2001														
2001/2002	2,230	2,230	2,230	2,230	2,001	2,136	2,105	2,093	2,133	2,081	2,500	1,970	25,939	2001/02 Rpt
2002/2003	2,711	2,653	2,330	2,778	2,477	2,136	2,208	2,112	2,196	2,134	2,712	2,292	28,739	2002/03 Rpt
2003/2004	2,429	2,526	2,626	2,759	2,833	2,208	2,112	2,136	2,127	2,098	2,237	2,189	28,280	2003/04 Rpt
2004/2005	2,228	2,298	2,077	2,494	2,500	2,133	2,092	1,937	2,349	2,161	2,500	2,340	27,109	2004/05 Rpt
2005/2006	2,500	2,500	2,500	2,393	2,439	2,163	2,141	2,009	2,103	2,088	2,339	1,992	27,167	2005/06 Rpt
2006/2007	2,280	3,024	2,568	2,232	2,520	2,400	2,016	1,752	1,920	1,800	1,752	1,751	26,015	2006/07 Rpt
2007/2008	1,941	2,308	2,352	1,776	1,571	1,939	1,809	1,633	1,739	1,851	1,823	1,764	22,506	2007/08 Rpt
2008/2009	1,980	2,681	2,717	2,587	2,247	2,163	1,890	1,953	1,974	1,911	1,981	2,151	26,235	2008/09 Rpt
2009/2010	1,711	2,570	2,044	2,356	2,425	2,100	2,044	2,042	2,069	2,025	2,158	2,384	25,928	2009/10 Rpt
2010/2011	2,468	2,706	2,535	2,818	2,464	2,156	2,081	1,928	1,996	1,868	1,869	2,423	27,312	2010/11 Rpt
2011/2012	2,304	3,106	2,325	2,684	2,621	2,117	2,031	1,961	1,946	1,964	1,916	2,545	27,520	2011/12 Rpt
2012/2013	2,632	2,858	2,588	2,391	2,446	1,966	1,916	1,844	1,992	1,902	1,977	2,378	26,890	2012/13 Rpt
2013/2014	2,835	2,804	2,990	3,029	2,464	2,499	2,205	2,271	2,415	1,938	2,331	2,205	29,986	Utility Wkbk
2014/2015	2,589	2,839	2,688	2,842	2,562	2,478	2,163	2,268	2,352	2,331	2,093	2,450	29,655	Utility Wkbk
2015/2016	2,561	2,793	2,590	3,064	2,499	2,688	2,373	2,352	2,436	0	0	0	23,356	Utility Wkbk
2017/2018	0	0	0	0	0	0	0	0	0	0	0	0		
2018/2019	0	0	0	0	0	0	0	0	0	0	0	0		
2019/2020	0	0	0	0	0	0	0	0	0	0	0	0		

Electricity - Demand - Chiller Plant Meter - KW														
KW	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTAL	Data Source
09/10 Chiller	0	943	427	501	367	126	112	131	116	135	163	478	3,499	2009/10 Rpt
10/11 Chiller	842	1,052	963	949	490	98	86	59	64	62	105	722	5,492	2010/11 Rpt
11/12 Chiller	1,059	1,713	1,094	1,109	857	290	204	176	98	116	89	857	7,662	2011/12 Rpt
12/13 Chiller	1,054	1,136	1,091	648	535	76	68	80	60	75	66	488	5,377	2012/13 Rpt
13/14 Chiller	1,197	1,046	1,217	1,181	616	504	420	423	504	90	420	504	8,122	Utility Wkbk
14/15 Chiller	888	1,157	1,050	994	630	504	504	504	504	504	56	644	7,939	Utility Wkbk
15/16 Chiller	1,007	1,176	1,069	1,174	630	588	588	588	588				7,408	Utility Wkbk
16/17 Chiller													0	
17/18 Chiller													0	
18/19 Chiller													0	
19/20 Chiller													0	

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Electricity - Demand - Campus Main Meter - KW														
KW	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTAL	Data Source
09/10 Main	1,711	1,627	1,617	1,855	2,058	1,974	1,932	1,911	1,953	1,890	1,995	1,906	22,429	2009/10 Rpt
10/11 Main	1,626	1,654	1,572	1,869	1,974	2,058	1,995	1,869	1,932	1,806	1,764	1,701	21,820	2010/11 Rpt
11/12 Main	1,245	1,393	1,231	1,575	1,764	1,827	1,827	1,785	1,848	1,848	1,827	1,688	19,858	2011/12 Rpt
12/13 Main	1,578	1,722	1,497	1,743	1,911	1,890	1,848	1,764	1,932	1,827	1,911	1,890	21,513	2012/13 Rpt
13/14 Main	1,638	1,758	1,773	1,848	1,848	1,995	1,785	1,848	1,911	1,848	1,911	1,701	21,864	Utility Wkbk
14/15 Main	1,701	1,682	1,638	1,848	1,932	1,974	1,659	1,764	1,848	1,827	2,037	1,806	21,716	Utility Wkbk
15/16 Main	1,554	1,617	1,521	1,890	1,869	2,100	1,785	1,764	1,848				15,948	Utility Wkbk
15/17 Main													0	
17/18 Main													0	
18/19 Main													0	
19/20 Main													0	

Water Consumption Data

Total Monthly Water Consumption - Campus & Residential Buildings - CCF														
	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	Total	Data Source
<i>Average</i>	3,205	3,671	4,837	4,492	4,485	3,810	1,501	2,112	3,429	2,402	3,557	3,050	40,549	
2013/2014	3,439	3,866	4,581	4,784	4,567	3,478	1,629	2,168	3,372	2,405	3,339	3,219	40,847	2013/14 Util Wkbk
2014/2015	2,971	3,476	5,092	4,199	4,403	4,142	1,373	2,056	3,486	2,399	3,774	2,880	40,251	2014/15 Util Wkbk
2015/2016	2,639	3,488	3,998	4,591	4,266	3,750	1,913	2,148	3,583	0	0	0	30,376	2015/16 Util Wkbk
2016/2017	0	0	0	0	0	0	0	0	0	0	0	0	0	
2017/2018	0	0	0	0	0	0	0	0	0	0	0	0	0	
2018/2019	0	0	0	0	0	0	0	0	0	0	0	0	0	
2019/2020	0	0	0	0	0	0	0	0	0	0	0	0	0	

Campus Buildings Monthly Water Consumption - CCF														
	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	Total	Data Source
<i>Average</i>	2,683	3,128	3,722	2,714	2,467	1,751	804	1,107	1,585	1,123	1,752	1,747	24,579	
2013/2014	2,724	3,196	3,445	2,956	2,387	1,612	876	1,113	1,587	1,112	1,549	1,882	24,439	2013/14 Util Wkbk
2014/2015	2,641	3,060	3,999	2,472	2,546	1,889	731	1,100	1,582	1,133	1,954	1,612	24,719	2014/15 Util Wkbk
2015/2016	2,197	3,023	3,073	2,852	2,507	1,793	1,046	1,208	1,743	0	0	0	19,442	2015/16 Util Wkbk
2016/2017													0	
2017/2018													0	
2018/2019													0	
2019/2020													0	

Residential Buildings Monthly Water Consumption - CCF														
	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	Total	Data Source
<i>Average</i>	523	543	1,115	1,778	2,019	2,060	698	1,006	1,845	1,280	1,805	1,303	15,970	
2013/2014	715	670	1,136	1,828	2,180	1,866	753	1,055	1,785	1,293	1,790	1,337	16,408	2013/14 Util Wkbk
2014/2015	330	416	1,093	1,727	1,857	2,253	642	956	1,904	1,266	1,820	1,268	15,532	2014/15 Util Wkbk
2015/2016	442	465	925	1,739	1,759	1,957	867	940	1,840	0	0	0	10,934	2015/16 Util Wkbk
2016/2017													0	
2017/2018													0	
2018/2019													0	
2019/2020													0	

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Appendix 5: Fuel, Electricity, & Water/Sewer Cost Data

Campus Combined Annual Electricity, Fuel, & Water/Sewer Cost Data

Campus Combined Annual Cost Electricity, Fuel, and Water/Sewer Costs														
Fiscal Year	Campus Total Area - Gross Sq Feet	Campus Main Electric Meter - Annual Cost	Chiller Plant Electricity - Annual Cost	Campus Buildings Electricity - Annual Cost	Residential Buildings Electricity - Annual Cost	Campus Total Electricity - Annual Cost	Heating Plant Fuel - Annual Cost	Campus Buildings Fuel - Annual Cost	Residential Buildings Fuel - Annual Cost	Campus Total Fuel - Annual Cost	Campus Water & Sewer Charges - Annual Cost	Campus Total Electricity, Fuel, Water & Sewer - Annual Cost	Central Plant Combined Electricity & Fuel Cost	Central Plant Combined Electricity & Fuel Cost per GSF
2009-2014 Average			\$128,553	\$50,412	27,936	\$1,163,014	\$478,376						\$606,929	\$0.45
1995/1996	994,387	\$531,951					\$211,777							
1996/1997	1,036,810	\$559,179					\$293,146							
1997/1998	1,036,810	\$613,894					\$220,834							
1998/1999	1,036,810	\$626,697					\$199,453							
1999/2000	1,054,219	\$621,699					\$221,394							
2000/2001	1,057,101	\$567,550					\$506,962							
2001/2002	1,133,166	\$640,022					\$326,532							
2002/2003	1,133,166	\$637,914					\$432,450							
2003/2004	1,133,166	\$639,256					\$423,755							
2004/2005	1,133,166	\$677,251					\$461,911							
2005/2006	1,133,166	\$807,129					\$715,476							
2006/2007	1,133,166	\$836,589					\$469,785							
2007/2008	1,307,783	\$796,219					\$785,994							
2008/2009	1,307,783	\$947,030					\$514,774							
2009/2010	1,324,368	\$820,824	\$85,800				\$461,433						\$547,233	\$0.41
2010/2011	1,359,139	\$793,897	\$114,236				\$466,126						\$580,362	\$0.43
2011/2012	1,295,727	\$728,953	\$175,022				\$316,037						\$491,059	\$0.38
2012/2013	1,404,194	\$859,665	\$120,133				\$393,809						\$513,942	\$0.37
2013/2014	1,405,147	\$937,093	\$147,573	\$50,412	\$27,936	\$1,163,014	\$754,475	\$72,383	\$41,798	\$868,656	\$242,491	\$2,274,160	\$902,048	\$0.64
2014/2015	1,405,147	\$893,954	\$142,054	\$45,844	\$24,787	\$1,106,639	\$518,092	\$35,230	\$38,087	\$591,410	\$239,016	\$1,937,065	\$660,146	\$0.47
2015/2016	1,405,147	\$670,819	\$138,317	\$33,842	\$19,852	\$862,831	\$228,439	\$55,540	\$22,184	\$306,163	\$212,872	\$1,381,865	\$366,757	\$0.26
2016/2017	1,405,147	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0		
2017/2018		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0		
2018/2019		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0		
2019/2020		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0		
2014-2015 %		46%	7%	2%	1%		27%	2%	2%		12%		100%	

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Campus Main, Chiller, Campus Bldg. & Res Bldg Electric Meters - Combined Usage (KWH) & Demand (KW) Cost														
	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTAL	
1989/1990	\$40,002	\$43,555	\$39,046	\$47,470	\$36,458	\$40,253	\$39,151	\$34,275	\$32,454	\$25,672	\$38,774	\$45,943	\$463,053	
1990/1991														
1991/1992	\$41,113	\$50,861	\$47,208	\$49,654	\$37,848	\$37,085	\$36,864	\$30,817	\$39,191	\$33,672	\$37,281	\$32,378	\$473,973	One meter only
1992/1993	\$38,315	\$42,152	\$37,080	\$46,778	\$33,219	\$40,340	\$37,360	\$39,559	\$46,267	\$38,936	\$43,267	\$36,921	\$480,192	One meter only
1993/1994	\$40,092	\$44,376	\$44,376	\$43,186	\$44,626	\$41,550	\$40,723	\$37,921	\$44,895	\$36,793	\$37,621	\$35,346	\$487,722	One meter only
1994/1995	\$45,600	\$44,894	\$52,047	\$52,102	\$31,288	\$42,689	\$43,780	\$39,800	\$40,414	\$39,014	\$41,888	\$34,366	\$507,883	One meter only
1995/1996	\$46,926	\$51,453	\$46,913	\$43,310	\$41,541	\$41,915	\$43,312	\$43,312	\$41,360	\$43,474	\$43,715	\$44,719	\$531,951	One meter only
1996/1997	\$36,089	\$55,056	\$46,913	\$56,137	\$44,124	\$45,669	\$44,215	\$45,689	\$47,544	\$44,096	\$46,660	\$46,989	\$559,179	One meter only
1997/1998	\$51,716	\$50,880	\$52,282	\$64,303	\$56,190	\$49,899	\$50,753	\$42,517	\$46,017	\$48,439	\$48,518	\$52,378	\$613,894	One meter only
1998/1999	\$56,860	\$54,769	\$61,034	\$61,034	\$52,785	\$46,723	\$51,001	\$45,237	\$49,098	\$47,347	\$53,245	\$47,022	\$626,697	One meter only
1999/2000	\$51,795	\$60,748	\$59,773	\$64,596	\$52,768	\$51,195	\$51,792	\$46,139	\$47,863	\$45,512	\$47,971	\$41,546	\$621,699	One meter only
2000/2001	\$50,437	\$58,385	\$75,659	\$44,677	\$40,321	\$39,543	\$48,232	\$35,124	\$50,692	\$27,815	\$48,915	\$47,749	\$567,550	One meter only
2001/2002	\$60,568	\$80,559	\$58,604	\$44,218	\$60,032	\$50,222	\$41,399	\$60,251	\$40,348	\$48,772	\$53,995	\$41,055	\$640,022	One meter only
2002/2003	\$59,752	\$67,141	\$57,981	\$65,093	\$42,350	\$54,781	\$40,806	\$49,772	\$51,971	\$45,086	\$51,177	\$52,003	\$637,914	One meter only
2003/2004	\$55,075	\$58,883	\$68,025	\$59,588	\$60,317	\$45,625	\$52,572	\$47,504	\$49,615	\$39,193	\$56,545	\$46,314	\$639,256	One meter only
2004/2005	\$54,261	\$63,470	\$56,513	\$68,456	\$53,442	\$53,882	\$50,785	\$50,213	\$58,761	\$57,560	\$55,329	\$54,579	\$677,251	One meter only
2005/2006	\$68,546	\$76,184	\$79,428	\$78,118	\$61,548	\$57,571	\$68,579	\$63,251	\$75,516	\$65,618	\$60,893	\$51,877	\$807,129	One meter only
2006/2007	\$63,733	\$88,527	\$82,293	\$85,212	\$72,565	\$64,331	\$64,468	\$61,058	\$65,068	\$64,259	\$67,892	\$57,182	\$836,589	One meter only
2007/2008	\$71,047	\$88,678	\$78,242	\$72,049	\$54,837	\$59,534	\$69,111	\$60,479	\$65,735	\$60,522	\$59,103	\$56,881	\$796,219	One meter only
2008/2009	\$68,157	\$105,647	\$101,188	\$98,558	\$67,070	\$75,398	\$75,466	\$70,186	\$78,863	\$70,351	\$69,668	\$66,480	\$947,030	One meter only
2009/2010	\$59,417	\$97,080	\$77,542	\$87,056	\$78,767	\$75,774	\$82,198	\$74,977	\$75,174	\$71,319	\$64,758	\$62,563	\$906,624	Main & chiller meter
2010/2011	\$77,517	\$92,420	\$84,142	\$83,195	\$72,092	\$70,693	\$77,058	\$71,415	\$69,530	\$68,396	\$70,953	\$70,724	\$908,134	Main & chiller meter
2011/2012	\$74,721	\$95,764	\$84,510	\$89,771	\$76,422	\$62,656	\$77,041	\$69,266	\$71,502	\$68,952	\$69,512	\$63,859	\$903,976	Main & chiller meter
2012/2013	\$81,110	\$102,382	\$80,428	\$91,329	\$78,146	\$75,530	\$77,403	\$73,147	\$83,128	\$75,667	\$79,992	\$81,537	\$979,799	Main & chiller meter
2013-2014	\$104,687	\$116,483	\$111,560	\$119,219	\$93,021	\$81,292	\$89,728	\$89,004	\$105,004	\$89,553	\$85,961	\$77,500	\$1,163,014	Includes campus & res bldgs
2014-2015	\$106,751	\$109,531	\$106,359	\$113,212	\$80,980	\$86,377	\$86,420	\$81,703	\$88,721	\$75,853	\$83,644	\$87,088	\$1,106,639	Includes campus & res bldgs
2015-2016	\$94,109	\$110,027	\$97,466	\$118,699	\$94,364	\$86,859	\$81,166	\$89,806	\$90,334	\$0	\$0	\$0	\$862,831	Includes campus & res bldgs
2016/2017	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Includes campus & res bldgs
2017/2018	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Includes campus & res bldgs
2018/2019	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Includes campus & res bldgs
2019/2020	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Includes campus & res bldgs

Campus Main Electric Meter - Combined Usage (KWH) & Demand (KW) Cost														
	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTAL	
09/10 Main	\$59,417	\$62,489	\$63,458	\$71,687	\$73,850	\$74,088	\$80,616	\$73,209	\$73,619	\$69,519	\$62,548	\$56,324	820823.95	
10/11 Main	\$58,026	\$65,436	\$58,286	\$66,739	\$65,298	\$69,345	\$75,778	\$70,245	\$68,491	\$67,195	\$69,093	\$59,964	793897.23	
11/12 Main	\$47,693	\$52,555	\$50,178	\$61,585	\$60,368	\$58,715	\$73,828	\$66,606	\$70,055	\$67,251	\$68,179	\$51,940	728953.29	
12/13 Main	\$58,865	\$68,584	\$56,706	\$74,701	\$71,060	\$74,353	\$76,113	\$71,828	\$81,620	\$74,036	\$78,727	\$73,072	859665.36	
13/14 Main	\$71,190	\$77,277	\$72,262	\$82,187	\$77,242	\$73,937	\$82,488	\$80,755	\$95,425	\$81,191	\$78,903	\$64,235	937092.69	
14/15 Main	\$74,113	\$71,943	\$69,569	\$82,216	\$71,861	\$78,361	\$77,871	\$72,920	\$80,031	\$68,895	\$76,715	\$69,460	893954.39	
15/16 Main	\$62,601	\$69,718	\$62,816	\$79,544	\$81,185	\$79,019	\$73,504	\$80,914	\$81,519				670819.34	
16/17 Main													0	
17/18 Main													0	
18/19 Main													0	
19/20 Main													0	

Chiller Plant Electric Meter - Combined Usage (KWH) & Demand (KW) Cost														
	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTAL	
09/10 Chiller	\$0	\$34,591	\$14,084	\$15,370	\$4,917	\$1,686	\$1,582	\$1,767	\$1,555	\$1,799	\$2,209	\$6,239	\$85,800	
10/11 Chiller	\$19,491	\$26,984	\$25,856	\$16,455	\$6,794	\$1,348	\$1,280	\$1,169	\$1,039	\$1,201	\$1,860	\$10,760	\$114,236	
11/12 Chiller	\$27,028	\$43,209	\$34,332	\$28,186	\$16,054	\$3,940	\$3,213	\$2,660	\$1,447	\$1,701	\$1,333	\$11,919	\$175,022	
12/13 Chiller	\$22,245	\$33,798	\$23,722	\$16,628	\$7,086	\$1,176	\$1,290	\$1,319	\$1,508	\$1,631	\$1,265	\$8,465	\$120,133	
13/14 Chiller	\$26,366	\$30,461	\$29,703	\$28,888	\$9,326	\$2,182	\$2,427	\$2,425	\$2,654	\$2,530	\$2,448	\$8,163	\$147,573	
14/15 Chiller	\$25,845	\$30,239	\$29,775	\$24,832	\$4,115	\$2,641	\$2,411	\$2,432	\$2,389	\$2,385	\$2,270	\$12,721	\$142,054	
15/16 Chiller	\$25,228	\$33,148	\$28,421	\$32,042	\$8,217	\$2,945	\$2,626	\$2,992	\$2,698				\$138,317	
16/17 Chiller													\$0	
17/18 Chiller													\$0	
18/19 Chiller													\$0	
19/20 Chiller													\$0	

2014 -2015 Macalester College Central Plant Energy Use Report

Campus Buildings Electric Meters - Combined Usage (KWH) & Demand (KW) Cost														
	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTAL	
13/14 Campus Bldgs	\$4,898	\$5,817	\$7,329	\$5,247	\$3,834	\$3,019	\$2,692	\$3,546	\$4,358	\$3,624	\$2,688	\$3,360	\$50,412	
14/15 Campus Bldgs	\$4,563	\$4,843	\$4,603	\$3,931	\$3,068	\$3,457	\$3,819	\$4,320	\$4,116	\$2,796	\$3,022	\$3,307	\$45,844	
15/16 Campus Bldgs	\$4,301	\$4,692	\$4,205	\$4,207	\$2,859	\$2,897	\$2,877	\$3,947	\$3,857	\$0	\$0	\$0	\$33,842	
16/17 Campus Bldgs													\$0	
17/18 Campus Bldgs													\$0	
18/19 Campus Bldgs													\$0	
19/20 Campus Bldgs													\$0	

Residential Buildings Electric Meters - Combined Usage (KWH) & Demand (KW) Cost														
	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTAL	
13/14 Res Bldgs	\$2,234	\$2,929	\$2,266	\$2,896	\$2,620	\$2,154	\$2,121	\$2,277	\$2,567	\$2,207	\$1,922	\$1,742	\$27,936	
14/15 Res Bldgs	\$2,231	\$2,507	\$2,412	\$2,233	\$1,936	\$1,918	\$2,319	\$2,031	\$2,186	\$1,777	\$1,637	\$1,600	\$24,787	
15/16 Res Bldgs	\$1,979	\$2,469	\$2,025	\$2,906	\$2,103	\$1,998	\$2,160	\$1,953	\$2,260	\$0	\$0	\$0	\$19,852	
16/17 Res Bldgs													\$0	
17/18 Res Bldgs													\$0	
18/19 Res Bldgs													\$0	
19/20 Res Bldgs													\$0	

Campus Monthly Cost of Gas & Oil - Central Plant Plus Residential Buildings & Campus Buildings														
YEAR	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTAL	
2013/2014	\$9,833	\$8,803	\$6,005	\$12,263	\$41,158	\$20,854	\$103,167	\$246,857	\$147,930	\$146,318	\$57,722	\$67,745	\$868,656	
2014/2015	\$2,892	\$3,068	\$2,831	\$7,279	\$49,958	\$83,422	\$101,562	\$113,974	\$106,208	\$73,048	\$34,578	\$12,591	\$0	
2015/2016	\$11,907	\$10,367	\$9,864	\$14,943	\$28,280	\$39,509	\$60,110	\$68,711	\$62,473	\$0	\$0	\$0	\$0	
2016/2017	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2017/2018	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2018/2019	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2019/2020	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	

Heating Plant Cost of Gas & Oil														
YEAR	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTAL	
1995/1996	\$289	\$289	\$289	\$4,333	\$14,333	\$26,743	\$26,190	\$32,872	\$38,188	\$34,120	\$26,100	\$8,031	\$211,777	
1996/1997	\$289	\$289	\$289	\$289	\$18,560	\$45,037	\$56,550	\$76,119	\$41,494	\$25,949	\$16,175	\$12,108	\$293,146	
1997/1998	\$289	\$289	\$289	\$289	\$20,556	\$45,722	\$38,798	\$35,106	\$26,520	\$31,884	\$16,972	\$4,120	\$220,834	
1998/1999	\$289	\$289	\$289	\$2,018	\$18,469	\$26,299	\$37,553	\$41,044	\$27,809	\$24,531	\$15,854	\$5,009	\$199,453	
1999/2000	\$289	\$289	\$289	\$984	\$20,198	\$28,860	\$35,145	\$42,257	\$35,989	\$28,526	\$24,229	\$4,340	\$221,394	
2000/2001	\$289	\$289	\$309	\$2,597	\$35,860	\$59,466	\$96,326	\$93,743	\$88,344	\$70,521	\$45,815	\$13,404	\$506,962	
2001/2002	\$289	\$289	\$289	\$3,851	\$18,462	\$35,101	\$54,182	\$59,123	\$51,218	\$52,102	\$35,390	\$16,235	\$326,532	
2002/2003	\$309	\$309	\$309	\$4,947	\$39,439	\$56,829	\$52,623	\$67,889	\$71,726	\$70,426	\$51,597	\$16,045	\$432,450	
2003/2004	\$309	\$315	\$309	\$9,400	\$34,166	\$62,380	\$58,807	\$78,434	\$73,579	\$54,571	\$37,896	\$13,591	\$423,755	
2004/2005	\$388	\$310	\$310	\$332	\$34,965	\$47,832	\$83,109	\$95,724	\$64,053	\$76,128	\$47,603	\$11,156	\$461,911	
2005/2006	\$324	\$324	\$324	\$14,186	\$110,147	\$148,119	\$129,735	\$89,204	\$96,262	\$86,712	\$30,263	\$9,877	\$715,476	
2006/2007	\$500	\$310	\$310	\$18,235	\$39,441	\$71,396	\$68,867	\$73,583	\$77,937	\$67,946	\$44,748	\$6,514	\$469,785	
2007/2008	\$0	\$0	\$0	\$306	\$36,287	\$92,518	\$133,688	\$149,481	\$151,876	\$122,751	\$77,871	\$21,216	\$785,994	
2008/2009	\$311	\$311	\$311	\$4,062	\$40,230	\$82,559	\$98,179	\$103,167	\$72,481	\$62,953	\$40,033	\$10,177	\$514,774	
2009/2010	\$311	\$311	\$311	\$1,221	\$39,544	\$46,604	\$90,231	\$120,374	\$79,087	\$47,116	\$23,692	\$12,631	\$461,433	
2010/2011	\$333	\$338	\$333	\$337	\$21,530	\$57,297	\$100,001	\$90,111	\$76,186	\$69,476	\$38,991	\$11,193	\$466,126	
2011/2012	\$311	\$311	\$311	\$921	\$24,175	\$52,924	\$66,790	\$60,419	\$56,345	\$28,973	\$20,384	\$4,172	\$316,037	
2012/2013	\$311	\$311	\$311	\$2,573	\$28,322	\$46,005	\$63,048	\$63,343	\$60,296	\$71,437	\$43,192	\$14,660	\$393,809	
2013/2014	\$311	\$311	\$311	\$1,137	\$33,970	\$13,431	\$91,806	\$234,545	\$134,431	\$133,358	\$50,742	\$60,121	\$754,475	
2014/2015	\$317	\$311	\$311	\$1,068	\$42,302	\$75,608	\$91,158	\$103,730	\$96,221	\$67,319	\$30,405	\$9,342	\$518,092	
2015/2016	\$311	\$311	\$311	\$2,973	\$23,382	\$34,192	\$53,165	\$60,010	\$53,785	\$0	\$0	\$0	\$228,439	
2016/2017													\$0	
2017/2018													\$0	
2018/2019													\$0	
2019/2020													\$0	

2014 -2015 Macalester College Central Plant Energy Use Report

Campus Buildings Monthly Fuel Cost														
KBTUs	June	July	August	September	October	November	December	January	February	March	April	May	Total	
2013/2014	\$7,895	\$7,040	\$4,228	\$8,548	\$4,238	\$3,917	\$6,046	\$6,502	\$7,408	\$7,070	\$4,025	\$5,467	\$72,383	
2014/2015	\$1,107	\$1,224	\$1,174	\$3,089	\$3,855	\$3,741	\$4,835	\$5,028	\$4,840	\$2,679	\$2,137	\$1,521	\$35,230	
2015/2016	\$10,213	\$8,831	\$8,265	\$9,724	\$2,709	\$2,780	\$3,768	\$4,489	\$4,761	\$0	\$0	\$0	\$55,540	
2016/2017													\$0	
2017/2018													\$0	
2018/2019													\$0	
2019/2020													\$0	

Residential Buildings Monthly Fuel Cost														
KBTUs	June	July	August	September	October	November	December	January	February	March	April	May	Total	
2013/2014	\$1,627	\$1,452	\$1,466	\$2,579	\$2,950	\$3,506	\$5,315	\$5,811	\$6,092	\$5,889	\$2,954	\$2,157	\$41,798	
2014/2015	\$1,468	\$1,533	\$1,346	\$3,121	\$3,801	\$4,073	\$5,569	\$5,215	\$5,147	\$3,050	\$2,036	\$1,728	\$38,087	
2015/2016	\$1,382	\$1,225	\$1,288	\$2,247	\$2,189	\$2,537	\$3,176	\$4,212	\$3,928	\$0	\$0	\$0	\$22,184	
2016/2017													\$0	
2017/2018													\$0	
2018/2019													\$0	
2019/2020													\$0	

Central Plant Combined Annual Electricity & Fuel Cost Data

Central Plant Combined Annual Cost of Electricity, Gas, & Oil															
Fiscal Year	Building Area Served by Central Boiler & Chiller Plants - GSF	Chiller Plant Electricity Annual Cost	Chiller Plant Electricity Cost per GSF	Chiller Plant Electricity Annual Consumption - KWH	Chiller Plant Cost Per KWH	Electricity Annual Consumption KWH KBTUs	Chiller Plant Cost per Electricity MMBTU	Heating Plant Fuel Annual Cost	Heating Plant Fuel Cost per GSF	Heating Plant Fuel Annual Consumption KBTU	Heating Plant Cost per Fuel MMBTU	Central Plant Combined Elect & Fuel KBTU	Central Plant Combined Electricity & Fuel Cost	Central Plant Combined Elect & Fuel Cost per MMBTU	Central Plant Combined Electricity & Fuel Cost per GSF
2009-2014 Average		\$128,553	\$0.10	1,047,200	\$0.124	3,573,046	\$36.35	\$478,376	\$0.38	80,492,760	\$5.83	84,065,806	\$606,929	\$7.15	\$0.48
1995/1996	942,486							\$211,777	\$0.22	91,539,850	\$2.31				
1996/1997	984,909							\$293,146	\$0.30	96,011,967	\$3.05				
1997/1998	984,909							\$220,834	\$0.22	82,412,800	\$2.68				
1998/1999	984,909							\$199,453	\$0.20	86,679,236	\$2.30				
1999/2000	984,909							\$221,394	\$0.22	76,959,815	\$2.88				
2000/2001	984,909							\$506,962	\$0.51	94,701,500	\$5.35				
2001/2002	1,060,974							\$326,532	\$0.31	85,425,440	\$3.82				
2002/2003	1,060,974							\$432,450	\$0.41	91,334,450	\$4.73				
2003/2004	1,060,974							\$423,755	\$0.40	87,583,070	\$4.84				
2004/2005	1,060,974							\$461,911	\$0.44	81,052,800	\$5.70				
2005/2006	1,060,974							\$715,476	\$0.67	78,282,150	\$9.14				
2006/2007	1,060,974							\$469,785	\$0.44	77,067,300	\$6.10				
2007/2008	1,235,591							\$785,994	\$0.64	89,309,140	\$8.80				
2008/2009	1,235,591							\$514,774	\$0.42	85,402,500	\$6.03				
2009/2010	1,252,176	\$85,800	\$0.07	796,600	\$0.108	2,717,999	\$31.57	\$461,433	\$0.37	77,752,400	\$5.93	80,470,399	\$547,233	\$6.80	\$0.44
2010/2011	1,252,176	\$114,236	\$0.09	992,600	\$0.115	3,386,751	\$33.73	\$466,126	\$0.37	80,809,520	\$5.77	84,196,271	\$580,362	\$6.89	\$0.46
2011/2012	1,188,764	\$175,022	\$0.15	1,556,800	\$0.112	5,311,802	\$32.95	\$316,037	\$0.27	64,591,000	\$4.89	69,902,802	\$491,059	\$7.02	\$0.41
2012/2013	1,297,231	\$120,133	\$0.09	981,400	\$0.122	3,348,537	\$35.88	\$393,809	\$0.30	82,309,800	\$4.78	85,658,337	\$513,942	\$6.00	\$0.40
2013/2014	1,303,956	\$147,573	\$0.11	908,600	\$0.162	3,100,143	\$47.60	\$754,475	\$0.58	97,001,080	\$7.78	100,101,223	\$902,048	\$9.01	\$0.69
2014/2015	1,303,956	\$142,054	\$0.11	954,800	\$0.149	3,257,778	\$43.60	\$518,092	\$0.40	86,711,760	\$5.97	89,969,538	\$660,146	\$7.34	\$0.51
2015/2016	1,303,956	\$138,317	\$0.11	986,600	\$0.140	3,366,279	\$41.09	\$228,439	\$0.18	56,405,100	\$4.05	59,771,379	\$366,757	\$6.14	\$0.28
2016/2017															
2017/2018															
2018/2019															
2019/2020															

2014 -2015 Macalester College Central Plant Energy Use Report

Central Plant Combined Monthly Cost of Electricity, Gas, & Oil														
YEAR	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTAL	
1995/1996	\$47,215	\$51,741	\$47,201	\$47,643	\$55,874	\$68,659	\$69,503	\$76,185	\$79,548	\$77,594	\$69,815	\$52,750	\$743,727	
1996/1997	\$36,378	\$55,345	\$47,201	\$56,425	\$62,684	\$90,706	\$100,764	\$121,808	\$89,038	\$70,045	\$62,835	\$59,097	\$852,326	
1997/1998	\$52,005	\$51,169	\$52,570	\$64,592	\$76,746	\$95,622	\$89,551	\$77,624	\$72,538	\$80,323	\$65,490	\$56,499	\$834,728	
1998/1999	\$57,148	\$55,058	\$61,866	\$63,052	\$71,255	\$73,021	\$88,554	\$86,281	\$76,906	\$71,878	\$69,099	\$52,032	\$826,150	
1999/2000	\$52,084	\$61,037	\$60,062	\$65,579	\$72,966	\$80,055	\$86,937	\$88,396	\$83,852	\$74,038	\$72,201	\$45,885	\$843,093	
2000/2001	\$50,726	\$58,674	\$75,968	\$47,273	\$76,181	\$99,009	\$144,558	\$128,867	\$139,036	\$98,336	\$94,730	\$61,153	\$1,074,512	
2001/2002	\$60,857	\$80,848	\$58,893	\$48,070	\$78,494	\$85,322	\$95,581	\$119,374	\$91,566	\$100,874	\$89,385	\$57,290	\$966,554	
2002/2003	\$60,062	\$67,450	\$58,290	\$70,040	\$81,790	\$111,610	\$93,429	\$117,660	\$123,697	\$115,512	\$102,774	\$68,048	\$1,070,364	
2003/2004	\$55,384	\$59,198	\$68,335	\$68,988	\$94,483	\$108,005	\$111,379	\$125,938	\$123,194	\$93,764	\$94,441	\$59,905	\$1,063,012	
2004/2005	\$54,649	\$63,780	\$56,822	\$68,788	\$88,406	\$101,715	\$133,894	\$145,937	\$122,814	\$133,688	\$102,932	\$65,735	\$1,139,161	
2005/2006	\$68,870	\$76,508	\$79,752	\$92,303	\$171,695	\$205,690	\$198,314	\$152,455	\$171,778	\$152,330	\$91,156	\$61,754	\$1,522,605	
2006/2007	\$64,233	\$88,836	\$82,603	\$103,446	\$112,006	\$135,727	\$133,335	\$134,641	\$143,005	\$132,205	\$112,640	\$63,696	\$1,306,373	
2007/2008	\$71,047	\$88,678	\$78,242	\$72,356	\$91,124	\$152,052	\$202,799	\$209,960	\$217,611	\$183,273	\$136,974	\$78,098	\$1,582,213	
2008/2009	\$68,468	\$105,958	\$101,499	\$102,620	\$107,300	\$157,956	\$173,645	\$173,353	\$151,344	\$133,304	\$109,701	\$76,657	\$1,461,804	
2009/2010	\$311	\$34,902	\$14,395	\$16,590	\$44,461	\$48,290	\$91,813	\$122,141	\$80,642	\$48,915	\$25,902	\$18,870	\$547,233	
2010/2011	\$19,823	\$27,322	\$26,189	\$16,792	\$28,324	\$58,645	\$101,281	\$91,280	\$77,225	\$70,677	\$40,851	\$21,953	\$580,362	
2011/2012	\$27,339	\$43,520	\$34,643	\$29,107	\$40,229	\$56,865	\$70,003	\$63,079	\$57,792	\$30,674	\$21,717	\$16,091	\$491,059	
2012/2013	\$22,556	\$34,109	\$24,033	\$19,201	\$35,408	\$47,181	\$64,338	\$64,662	\$61,804	\$73,068	\$44,457	\$23,125	\$513,942	
2013/2014	\$26,677	\$30,772	\$30,014	\$30,025	\$43,296	\$15,613	\$94,233	\$236,970	\$137,085	\$135,888	\$53,190	\$68,284	\$902,048	
2014/2015	\$26,162	\$30,550	\$30,087	\$25,900	\$46,417	\$78,249	\$93,569	\$106,162	\$98,610	\$69,704	\$32,674	\$22,063	\$660,146	
2015/2016	\$25,539	\$33,459	\$28,732	\$35,015	\$31,599	\$37,137	\$55,791	\$63,001	\$56,483	\$0	\$0	\$0	\$366,757	
2016/2017														
2017/2018														
2018/2019														
2019/2020														

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Water & Sewer Cost Data

Total Monthly Water & Sewer Cost - Campus & Residential Buildings														
	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	Total	Data Source
<i>Average</i>	\$ 20,460	\$ 19,076	\$ 24,508	\$ 23,880	\$ 23,568	\$ 20,852	\$ 9,351	\$ 13,819	\$ 22,447	\$ 16,321	\$ 23,974	\$ 20,997	\$ 239,254	
2013/2014	\$ 21,645	\$ 23,195	\$ 24,450	\$ 21,011	\$ 27,425	\$ 19,114	\$ 10,956	\$ 14,590	\$ 21,898	\$ 15,586	\$ 21,590	\$ 21,030	\$ 242,491	2013/14 Util Wkbk
2014/2015	\$ 19,275	\$ 14,957	\$ 24,566	\$ 26,749	\$ 19,712	\$ 22,591	\$ 7,745	\$ 13,048	\$ 22,996	\$ 17,056	\$ 26,357	\$ 20,965	\$ 236,017	2014/15 Util Wkbk
2015/2016	\$ 19,104	\$ 20,666	\$ 28,540	\$ 31,741	\$ 29,173	\$ 26,303	\$ 14,754	\$ 16,092	\$ 26,498	\$ -	\$ -	\$ -	\$ 212,872	2015/16 Util Wkbk
2016/2017	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2017/2018	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2018/2019	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2019/2020	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	

Campus Buildings Total Monthly Water & Sewer Cost														
	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	Total	Data Source
<i>Average</i>	\$ 16,680	\$ 14,999	\$ 17,205	\$ 12,953	\$ 11,130	\$ 8,046	\$ 4,290	\$ 6,685	\$ 9,836	\$ 7,637	\$ 11,822	\$ 11,758	\$ 133,039	
2013/2014	\$ 16,763	\$ 18,212	\$ 17,184	\$ 10,303	\$ 14,101	\$ 7,649	\$ 5,812	\$ 7,312	\$ 10,330	\$ 7,220	\$ 10,066	\$ 12,066	\$ 137,018	2013/14 Util Wkbk
2014/2015	\$ 16,597	\$ 11,786	\$ 17,226	\$ 15,604	\$ 8,159	\$ 8,443	\$ 2,767	\$ 6,057	\$ 9,342	\$ 8,053	\$ 13,577	\$ 11,450	\$ 129,060	2014/15 Util Wkbk
2015/2016	\$ 15,321	\$ 16,801	\$ 21,081	\$ 19,495	\$ 16,971	\$ 12,448	\$ 8,037	\$ 8,886	\$ 12,594	\$ -	\$ -	\$ -	\$ 131,635	2015/16 Util Wkbk
2016/2017	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2017/2018	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2018/2019	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2019/2020	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	

Residential Buildings Monthly Water & Sewer Cost														
	June	July	August	September	October	November	December	January	February	March	April	May	Total	Data Source
<i>Average</i>	\$ 3,781	\$ 4,006	\$ 7,355	\$ 11,367	\$ 12,360	\$ 13,156	\$ 5,613	\$ 7,158	\$ 13,042	\$ 8,685	\$ 12,152	\$ 9,239	\$ 106,215	
2013/2014	\$ 4,882	\$ 4,983	\$ 7,267	\$ 10,708	\$ 13,324	\$ 11,465	\$ 5,144	\$ 7,278	\$ 11,568	\$ 8,367	\$ 11,524	\$ 8,963	\$ 105,472	2013/14 Util Wkbk
2014/2015	\$ 2,679	\$ 3,170	\$ 7,340	\$ 11,145	\$ 11,553	\$ 14,148	\$ 4,978	\$ 6,991	\$ 13,654	\$ 9,003	\$ 12,780	\$ 9,515	\$ 106,957	2014/15 Util Wkbk
2015/2016	\$ 3,783	\$ 3,865	\$ 7,459	\$ 12,247	\$ 12,203	\$ 13,856	\$ 6,716	\$ 7,206	\$ 13,904	\$ -	\$ -	\$ -	\$ 81,237	2015/16 Util Wkbk
2016/2017													\$ -	
2017/2018													\$ -	
2018/2019													\$ -	
2019/2020													\$ -	

Monthly Water & Sewer Cost per CCF - All Buildings														
	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	Total	Data Source
<i>Average</i>	\$ 6.67	\$ 5.41	\$ 5.77	\$ 5.89	\$ 5.77	\$ 5.99	\$ 6.69	\$ 6.86	\$ 6.83	\$ 6.80	\$ 6.72	\$ 6.91	\$ 5.90	
2013/2014	\$ 6.29	\$ 6.00	\$ 5.34	\$ 4.39	\$ 6.00	\$ 5.50	\$ 6.73	\$ 6.73	\$ 6.49	\$ 6.48	\$ 6.47	\$ 6.53	\$ 5.94	2013/14 Util Wkbk
2014/2015	\$ 6.49	\$ 4.30	\$ 4.82	\$ 6.37	\$ 4.48	\$ 5.45	\$ 5.64	\$ 6.35	\$ 6.60	\$ 7.11	\$ 6.98	\$ 7.28	\$ 5.86	2014/15 Util Wkbk
2015/2016	\$ 7.24	\$ 5.92	\$ 7.14	\$ 6.91	\$ 6.84	\$ 7.01	\$ 7.71	\$ 7.49	\$ 7.40				\$ 7.01	2015/16 Util Wkbk
2016/2017	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2017/2018	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2018/2019	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2019/2020	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	

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Appendix 6: Weather Normalization Data

Heating Plant Weather Normalization Calculations										
Fiscal Year	Actual Usage	Expected Usage	Normalization Ratio	Weather Normalized Usage						
1995/1996	91,539,850	97,671,146	0.87	79,558,663	Regression Formula:		y = 10.874x + 11.738			
1996/1997	96,011,967	98,213,681	0.86	82,984,492	m =		10.874		b = 11.738	
1997/1998	82,412,800	79,725,162	1.06	87,749,130						
1998/1999	86,679,236	81,642,093	1.04	90,124,840	Average Year					
1999/2000	76,959,815	76,956,176	1.10	84,891,479	Month	Days per Month	HDD/ Month	HDD/ Day	Usage - KBTU	
2000/2001	94,701,500	93,538,638	0.91	85,942,776	JUN	30	37.3	1.2	757,585	
2001/2002	85,425,440	79,809,436	1.06	90,860,798	JUL	31	4.3	0.1	410,999	
2002/2003	91,334,450	89,417,780	0.95	86,707,027	AUG	31	6.2	0.2	431,711	
2003/2004	87,583,070	84,785,456	1.00	87,688,444	SEP	30	124.6	4.2	1,707,248	
2004/2005	81,052,800	82,777,261	1.03	83,119,042	OCT	31	477.1	15.4	5,552,329	
2005/2006	78,282,150	78,030,760	1.09	85,160,944	NOV	30	893.3	29.8	10,065,729	
2006/2007	77,067,300	81,450,245	1.04	80,319,558	DEC	31	1347.3	43.5	15,014,781	
2007/2008	89,309,140	91,614,328	0.93	82,751,537	JAN	31	1517.2	48.9	16,861,807	
2008/2009	85,402,500	89,840,701	0.94	80,693,957	FEB	29	1260.0	43.4	14,042,160	
2009/2010	77,752,400	83,186,978	1.02	79,341,794	MAR	31	994.9	32.1	11,182,472	
2010/2011	80,809,520	89,070,200	0.95	77,014,706	APR	30	527.5	17.6	6,087,916	
2011/2012	64,591,000	72,399,970	1.17	75,731,609	MAY	31	221.5	7.1	2,772,728	
2012/2013	82,309,800	89,241,078	0.95	78,294,328	Totals		7,411		84,887,464	
2013/2014	97,001,080	100,435,084	0.85	81,985,054						
2014/2015	86,711,760	87,794,447	0.97	83,840,626	7411 = 20 year average for HDD					
2015/2016	56,405,100	58,633,486	1.45	81,661,287						
2016/2017										
2017/2018										

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Chiller Plant Electricity Use Weather Normalization - 55° Cooling Degree Days											
Fiscal Year	Campus GSF	Actual Usage	Expected Usage - KWH	Weather Normalization Ratio	Weather Normalized Usage - KWH						
1995/1996	942,486										
1996/1997	984,909						Regression Formula:		y = 405.03x + 37.745		
1997/1998	984,909						m =	405.03	b =	37.745	
1998/1999	984,909										
1999/2000	984,909										
2000/2001	984,909						Average Year				
							Month	Days per Month	CDD/ Month	CDD/ Day	Usage - KWH
2001/2002	1,060,974						JUN	30	432.9	14.4	176,452
2002/2003	1,060,974						JUL	31	611.4	19.7	248,817
2003/2004	1,060,974						AUG	31	532.4	17.2	216,820
2004/2005	1,060,974						SEP	30	282.4	9.4	115,505
2005/2006	1,060,974						OCT	31	57.5	1.9	24,450
2006/2007	1,060,974						NOV	30	3.8	0.1	2,656
2007/2008	1,235,591						DEC	31	0.0	0.0	1,170
2008/2009	1,235,591						JAN	31	0.0	0.0	1,170
2009/2010	1,252,176	796,600	825,268	1.07	848,630		FEB	29	0.0	0.0	1,095
2010/2011	1,252,176	992,600	900,787	0.98	968,781		MAR	31	6.0	0.2	3,581
2011/2012	1,188,764	1,556,800	938,638	0.94	1,458,170		APR	30	37.1	1.2	16,157
2012/2013	1,297,231	981,400	907,685	0.97	950,570		MAY	31	173.1	5.6	71,298
2013/2014	1,303,956	908,600	921,665	0.95	866,708		Totals		2,137		879,171
2014/2015	1,303,956	954,800	815,469	1.08	1,029,386						
2015/2016	1,303,956	986,600	796,511	1.10	1,088,987						
									2137 = 20 year ave for CDD		