

ENERGY REPORT JUNE 2016
ENERGY OFFICE & CENTER FOR SUSTAINABILITY
ACTIVITIES REPORT

The Energy Office and the Center for Sustainability (CFS) have been working together over to stabilize and reduce the energy use of University of Kansas buildings. This process started slow; however, as resources such as our Energy Technician, Josh Wheeler, and our Energy Conservation Behavioral Specialist, Cassi Reimer, were added, the savings have increase and building problems fixed.

The following are tables showing electric and natural gas energy use for last 3 fiscal years. The cost is based upon the current cost of these utilities.

All Utilities Paid By Operations

	Electric KWh	Electric Cost	Natural Gas MMBtu	Natural Gas Cost
FY13	123,415,908	\$10,395,920	497,850	\$1,791,591
FY14	124,409,769	\$10,479,638	522,901	\$1,881,741
FY15	124,181,229	\$10,460,387	500,967	\$1,802,808
FY16	124,973,190	\$10,527,097	448,211	\$1,612,958

Energy Utilities Charged to Auxiliaries

	Electric KWh	Electric Cost	Natural Gas MMBtu	Natural Gas Cost
FY13	23,095,774	\$1,926,479	83,732	\$455,588
FY14	22,740,829	\$1,896,873	83,420	\$453,890
FY15	23,857,481	\$1,990,015	75,871	\$412,813
FY16	26,551,119	\$2,214,699	69,558	\$378,464

Energy Utilities Paid by General Funds

	Electric KWh	Electric Cost	Natural Gas MMBtu	Natural Gas Cost
FY13	100,320,134	\$8,472,703	414,118	\$1,350,115.55
FY14	101,668,940	\$8,586,618	439,481	\$1,432,804.85
FY15	100,323,748	\$8,473,008	425,097	\$1,385,908.56
FY16	98,422,071	\$8,312,398	378,654	\$1,234,494.66

The numbers that changed this month are the energy uses and costs for the last 12 months and costs for the past three fiscal years were updated to match current utility rates. The electrical energy use has increased by 433,482 KWh for the last 12 months in Utilities Paid by Operations compared to last month, an increased cost

of \$36,610. Electric energy use in Utilities Paid by General Funds increased by 118,895 KWh compared to last month an increase of \$10,015.

Natural gas use for Energy Utilities Paid by Facilities Services decreased by 3,421 MMBtu compared to last month a savings of \$12,482. Utilities Paid by Operations decreased by 3,409 MMBtu compared to last month a saving of \$11,114.

The overall Campus KBtu/Sqft for the month of June decreased to 97.7 this compares to a low of 99.3 in February. The large shift is due to the Capitol Federal Hall & DeBruce coming on line.

Energy Conservation Measures

The Energy Office and CFS have been performing a number of Energy Conservation Measures (ECM) to improve efficiency of individual buildings and the Campus as a whole. Examples of these activities are as follows:

Building Scheduling

The building scheduling has been optimized so that heating ventilation and air conditioning (HVAC) have been shut down for a greater number of hours when it is not needed. The following is a list of steps taken to achieve this:

1. Developed a contact list for Departments in each building being considered for scheduling.
2. Personally contacted these departments by phone or held in person meetings to discuss how we are scheduling the buildings and received buy in from the Departments. Also, let them know to contact us if there is a problem with scheduling or an exception is needed.
3. Met with Departments that received exception from setback and setup scheduling in the past. Negotiated a process that would work for them plus save energy.
4. Used Department contacts to develop a better Holiday and Winter Break Scheduling. Also added Thanksgiving and Martin Luther King Day to Holiday Scheduling.
5. Use 25Live scheduling to optimize scheduling based upon room use.
6. Developed website at energy.ku.edu making it easy to contact us with energy related issues i.e. special weekend or after hour scheduling.
7. Exceptions to the regular heating schedules were put in place for evening classes and special events. Professors and special event coordinators were notified.
8. Unoccupied or shortened heating schedules were implemented in classroom buildings during Spring Break 2016.
9. After meeting with Library Staff, shorter heating/cooling schedules have been put in place in Spencer Library, Watson, and Anschutz Science Library. Temperature and Humidity monitoring continue.
10. HVAC schedules for Exams were implemented in classroom buildings and libraries.
11. Summer Break (May 16-June 6), Memorial Day, Summer School, and July 4th holiday schedules were put in place.
12. Summer class consolidation explored for energy savings with Scott McVey.
13. Establishing a Green Team at Lied Center was discussed with staff.

Buildings that have had reduced HVAC hours of operation include:

Ambler	Bailey	Blake	Budig	Center for Design Research
Chalmers	Dole Center	Eaton	FS Shop	FS Warehouse
Fraser	Green	Hall Center	Lied Center	Lindley
Marvin	Nichols	Nunemaker	Pharmacy	Smith
Snow	Summerfield	Visitors Center	Watkins	Wescoe
LEEP2	Spencer Library	Watson Library	Anschutz Science Library	Lippincott

LED Lighting Retrofit

In the fall of 2013, a project to replace existing lighting in the Allen Fieldhouse and Mississippi Parking Garages was completed. The savings from these projects have been over \$25,000 annually. The success of these projects led us to look at more LED projects across campus.

We investigated the quantity of halogen, compact fluorescent, and incandescent lamps that were being used repeatedly around campus. With this information, LED alternatives were identified and compared, and a project was developed to replace these lamps.

The project involves replacing the above mentioned lamps with LEDs when they fail. This project began in March of 2015. As of the end of August 9th 2016, there have been 4,518 LED lamps installed with material cost of \$53,868 and estimated annual savings of \$61,720. The following are table showing the details of the lamp replacements each fiscal year.

LED Project Summary Table FY17

Description	Qty FY17	Investment	KWh Savings	Energy Savings	Maintenance Savings	Total Savings
LED 9.5A19	11	\$83	120	\$13	\$26	\$39
LED 19A21	37	\$535	808	\$90	\$120	\$210
MRX16	0	\$0	0	\$0	\$0	\$0
LED 9.5A19	18	\$136	197	\$22	\$42	\$64
LED 12A19	0	\$0	0	\$0	\$0	\$0
12PAR30L	14	\$198	1,660	\$186	\$243	\$429
8PAR20	72	\$1,087	6,964	\$778	\$770	\$1,549
AM HPL-7	18	\$236	1,067	\$119	\$72	\$191
AM HPL-7	49	\$643	2,905	\$325	\$196	\$520
AM VPL-9	0	\$0	0	\$0	\$0	\$0
6WG25	0	\$0	0	\$0	\$0	\$0
AM HPL-7	45	\$612	2,387	\$267	\$151	\$418
AM VPL-9	0	\$0	0	\$0	\$0	\$0
AM HPL-7	28	\$381	1,660	\$185	\$112	\$297
AM VPL-9	0	\$0	0	\$0	\$0	\$0
AM HPL-7	43	\$507	3,354	\$375	\$191	\$566
AM VPL-9	21	\$420	1,507	\$168	\$82	\$251
6.5MR16	5	\$25	445	\$50	\$83	\$133
17PAR38	24	\$277	3,969	\$444	\$437	\$881
10MRX16	0	\$0	0	\$0	\$0	\$0
17PAR38	0	\$0	0	\$0	\$0	\$0
	385	\$5,142	27,041	\$3,022	\$2,526	\$5,548

LED Project Summary Table FY16

Description	Qty FY16	Investment	KWh Savings	Energy Savings	Maintenance Savings	Total Savings
LED 9.5A19	131	\$992	1,431	\$160	\$305	\$465
LED 19A21	276	\$3,988	6,028	\$674	\$894	\$1,567
MRX16	343	\$899	46,017	\$5,142	\$5,632	\$10,774
LED 9.5A19	785	\$5,942	8,572	\$958	\$1,830	\$2,788
LED 12A19	16	\$219	549	\$61	\$25	\$87
12PAR30L	166	\$2,347	19,681	\$2,200	\$2,885	\$5,085
8PAR20	184	\$2,778	17,796	\$1,989	\$1,969	\$3,957
AM HPL-7	92	\$1,208	5,454	\$609	\$368	\$977
AM HPL-7	541	\$7,103	32,070	\$3,584	\$2,161	\$5,745
AM VPL-9	77	\$1,642	4,084	\$456	\$268	\$725
6WG25	160	\$1,998	16,973	\$1,805	\$2,240	\$4,045
AM HPL-7	82	\$1,116	4,349	\$486	\$276	\$762
AM VPL-9	18	\$393	1,067	\$119	\$70	\$189
AM HPL-7	191	\$2,600	11,322	\$1,265	\$763	\$2,028
AM VPL-9	91	\$1,820	6,530	\$730	\$357	\$1,087
AM HPL-7	244	\$2,879	19,032	\$2,127	\$1,083	\$3,210
AM VPL-9	218	\$4,360	15,644	\$1,748	\$856	\$2,604
6.5MR16	27	\$137	2,401	\$268	\$450	\$719
17PAR38	67	\$773	11,079	\$1,238	\$1,220	\$2,458
10MRX16	5	\$54	1,014	\$113	\$81	\$194
17PAR38	15	\$332	1,498	\$167	-\$5	\$163
	3,729	\$43,580	232,591	\$25,900	\$23,728	\$49,628

LED Project Summary Table FY15

Description	Qty FY15	Investment	KWh Savings	Energy Savings	Maintenance Savings	Total Savings
LED 9.5A19	107	\$810	1,168	\$131	\$249	\$380
LED 19A21	73	\$1,055	1,594	\$178	\$236	\$415
MRX16	0	\$0	0	\$0	\$0	\$0
LED 9.5A19	0	\$0	0	\$0	\$0	\$0
LED 12A19	0	\$0	0	\$0	\$0	\$0
12PAR30L	52	\$735	6,165	\$689	\$904	\$1,593
8PAR20	67	\$1,012	6,480	\$724	\$717	\$1,441
AM HPL-7	0	\$0	0	\$0	\$0	\$0
AM HPL-7	0	\$0	0	\$0	\$0	\$0
AM VPL-9	0	\$0	0	\$0	\$0	\$0
6WG25	0	\$0	0	\$0	\$0	\$0

AM HPL-7	0	\$0	0	\$0	\$0	\$0
AM VPL-9	0	\$0	0	\$0	\$0	\$0
AM HPL-7	0	\$0	0	\$0	\$0	\$0
AM VPL-9	0	\$0	0	\$0	\$0	\$0
AM HPL-7	0	\$0	0	\$0	\$0	\$0
AM VPL-9	41	\$820	2,942	\$329	\$161	\$490
6.5MR16	7	\$36	622	\$70	\$117	\$186
17PAR38	55	\$634	9,095	\$1,016	\$1,002	\$2,018
10MRX16	0	\$0	0	\$0	\$0	\$0
17PAR38	2	\$44	200	\$22	-\$1	\$22
	404	\$5,146	28,267	\$3,159	\$3,385	\$6,544

Ambler Rec Center has installed 28 LED replacements in their racquetball courts funded by the Revolving Green Loan Fund. Additionally, they have funded and installed 114 LED lamps themselves.

The Budig Hall auditoriums are being retrofitted with LED lights. This work began in July and will finish during Winter Break.

Funding for LED replacements in Summerfield was provided by the Student Environmental Advisory Board, Revolving Green Loan Fund, and Operation, and that project is proceeding.

We investigated LED alternatives for Dole Institute and found several options that are being implemented at this time. Discussions of LED replacements in Watkins Health have resumed.

LED replacements for fluorescent tubes have been ordered. Athletics is interested in plug 'n play LEDs. An LED option was found for a JRP auditorium and is compatible with Facilities installation pole.

Retro-Commissioning

This involves looking at buildings with high energy use and severe comfort problems i.e. too hot in winter. The HVAC system is investigated to verify proper operation of equipment and controls. When problems are discovered, they are fixed and many times, lead to reduced energy use. Examples of this are:

Anderson Football Complex

1. Found and repaired the outside air (OSA) damper linkage on Ahu-1. So the OSA damper would close when the unit was not in economizer mode.

Anschutz Lib

1. Changed out the old FMK Hot Deck, Cold Deck, and Humidity Controls to new more reliable EPC's controls
2. Replaced two bad Humidifier actuator boots.
3. Located 6 major air leaks on the VAV boxes throughout the building. In the process of repairing them.
4. 1st and 2nd floors worked on VAV boxes. Replacing relays and pneumatic controllers.

Blake Hall

1. Room 211 Blake Hall was warming up when class was in session on Monday night. Was able to go through the VAV box that serves the room. Also made a few adjustment to the AHU that feed the same space.

Eaton Hall

1. Heating hot water locked out at 65F outside air temperature in lieu of 85F.
2. Control valves on Air Handling Units and reheats were not closing. Actuators were either replaced or repaired to fix this.
3. Built an interlock to just shut down the fans on the hallway VAV boxes. The fans will not start back up until the average temperature rises above 78degF and the boxes discharge air temperature is lower than 65degF then the fans will start.
4. Replace many bad heating valve actuators and faulty discharge air sensors on the VAV boxes in the building.

Budig Hall

1. Heating hot water was not shutting off. Programing was done to fix this.

Pharmacy

1. Fixed actuator on control valve that was allowing uncontrolled heat to be dumped into building.
2. Lowered heating hot water temperature during mild weather.

Structural Biology Center

1. Raised air handling unit discharge air temperature set point.

JRP

1. Heating hot water locked out at 65F outside air temperature in lieu of 85F.
2. Fixed control valves that were allowing chilled water to run wild through a coil.
3. Had a concern about the 110 area in JRP being too cold. We did a calibration check on all the thermostats in the 110 complex. All so checked to make sure the VAV boxes that feed the area are working properly.

Nichols Hall

1. Lowered heating hot water temperature from 130F to 115F.

Watson Library

1. Found chilled water not closing all the way to air handling units. Made repairs to fix.
2. Found steam valve that was leaking by and repaired actuator
3. Updated controls on air handling units.
4. Started new night setback and setup procedure.

Watkins Home

1. Had a new steam condensate meter installed.

Frasier Hall

1. Added variable air volume control on return fan.

LEEP2

1. Classroom G400 was complaining of being too warm. Looking into their issues and found the thermostat was in a bad location. Worked with DCM on getting the thermostat relocated to a more appropriate spot in the classroom. Change was made and installation completed.

MRB

1. Found both chillers were starting up together when coming out of Free Cooling Mode. Looking into the timing blocks of the program.
2. Relocated a Phoenix thermostat in Rm 160. Moved it to a wall that was not being hit with sunlight (which was causing the Phoenix box to constantly blow cold air on the occupants.
3. On Ahu-2 the Pre-Heat temperature was running about 10degs warmer than Ahu-1. Discovered that the Pre-Heat valve on Ahu-2 was shut but it was letting a lot of steam to still pass through. Tried to make some adjustment but wasn't able to stop the flow. Will have to replace the Pre-Heat valve.

Visitor Center

1. Calibrated thermostats in the building.

General to All Buildings

1. The main issue on most buildings has to do with simultaneous heating and cooling. There are times where this is required (mild humid weather). However, it needs to be minimized for efficient operation.

The descriptions above that mention reducing hot water temperatures or shutting down hot water systems are examples of this.

2. Worked on campus wide schedules for the spring semester finals. As well as putting in place summer schedules flex hours for the building on campus.
3. Parking garages (AFH and Miss. St garage) LED sensor change out. We have replaced around 90 parking light sensor in these two garages. With the new sensors we will have the capability of having some of the exterior lights to shut off during the day. When the new sensors monitor a certain amount of light (foot candles) will shut off.

Solar Project

This involved working with Westar to get grant money for the installation of a 10KW solar array connected to the Measurement Materials & Sustainability Environment Center. The project installation was completed in the summer of 2015. System communication and monitoring was completed in February 2016.

Behavioral Program

CFS is developing a list of building contacts and working with them to address behavioral opportunities for energy conservation.

CFS is targeting efforts in five pilot buildings that are among the top 15% in energy use. These buildings are:

Ambler Student Recreation Center
Blake Hall
Dole Institute of Politics
Multidisciplinary Research Building (MRB)
Shankel Structural Biology Center (SBC)

The following are steps taken in this program:

1. Met with and interview building/facility managers.
2. Conducted energy audits in pilot facilities. Results passed along to KU Energy Office.
3. Developed Green Teams in Blake, MRB, and SBC comprised of building occupants.
4. Further investigated pilot facilities for technical solutions identified in the energy audit (See *Blake Hall, Dole Institute of Politics, MRB, Ambler Rec Center* below)
5. Selected energy conservation behaviors to address in each pilot facilities through a behavior program during the Spring 2016 semester.

MRB

- Occupants in Room 254 were cold and using space heaters. Fixed thermostat and temperatures are normal, occupants are happy, and space heaters are no longer being used.
- 5 thermostats were fixed with similar issues as above.
- 1st and 3rd floor bathrooms were cold. Hot water coils in bathrooms were investigated and fixed. Temperatures are back to normal and occupants are more comfortable.
- Green Teams chose to address shutting fume hood sashes as their energy conservation behavior program.
- A strategy was developed for the "Shut the Sash" campaign and implementation of the program began on April 1, 2016.
- Ongoing data monitoring for "Shut the Sash" continues. Weekly updates and graphs provided to lab staff. The press release was published and interviews were conducted with Channel 6 and KUJH-TV.
- The campaign concluded on May 31st. A celebration event was hosted on June 6th. Based on those 29 fume hoods, MRB saved over 322 million cubic feet of air from being air conditioned and exhausted through the fume hood to the outside. In other words, you could fill Allen Field House over 43 times with that air

Blake Hall

- Placed temperature logging devices in 6th floor. Temperature were very cold in the summer. A work order was placed to fix/replace thermostats. Temperatures are back to normal and occupants are more comfortable.
- Wasps are a constant issue. Air sealing was done but did not resolve the issue.
- Green Teams chose to address computer shutdowns as their energy conservation behavior program.

SBC

- Green Teams chose to address computer power settings and computer shutdowns as their energy conservation behavior program.

- Meetings with laboratories were conducted to discuss computer power needs and the settings were implemented.

Dole Institute of Politics

- Found some LED replacements for interior lights. Mapped out the electrical plans.
- Replaced exterior lighting with LEDs.

Ambler Student Recreation Center

- Met with Jason Krone to discuss energy conservation measures including retrofitting 4 AHUs.
- Discussed LED retrofit kits for current metal halides. Energy savings calculated and presented. Sample LED retrofit kit has been installed. Jason Krone is expressing interest to proceed.
- 75 retrofit kits were ordered and installed in the lobby. 39 LEDs were ordered and installed to replace CFLs above the walking track.
- Application to the Revolving Green Loan Fund was approved to fund 28 metal halide replacements in the racquetball courts. Lights have installed.

Watkins

- Conducted a lighting audit.
- Explored lighting sensor potential with a further audit with Hubbell Wiring Device-Kellems.
- Replaced four compact fluorescent lights above the registration table with LEDs as a solution to heat issues brought to our attention by Joe Gillespie, Associate Director.
- Provided an Energy Comparison between Watkins existing HVAC and a new system they are considering. The department is looking to see if the cost for the HVAC system can be financed.

New buildings were selected for round 2 of behavior programs: Simons, Child Care, Lied Center, and McCullum Lab.

Campus buildings were submitted for EnergyStar Ratings; results pending

Energy Audits have been conducted at and results shared with Hilltop Child Development Center, Green Hall, ISPR, Visitor's Center, and Strong 200.

Energy Reporting

In April of 2015, a new report was developed to assist in the evaluation of the energy efficiency of all the KU Buildings. This involves monitoring the monthly kBtu/ft² of the buildings and looking for changes that indicate inefficient operation (increasing energy use). This report can also be used to see how ECM are improving the efficiency of buildings.

The following is an updated list of buildings for May that are of concern due to energy increases.

MAIN CAMPUS BUILDINGS	AREA (ft²)	Increased KBtu	Increased Cost
WAGNON STUDENT ATHLETE CENTER	55,900	5,067,344	\$34,753
WATKINS STUDENT HEALTH CENTER	79,715	1,489,920	\$4,340
KJHK TRANSMITTER BUILDING	160	127,902	\$3,103
WATKINS HOME	6,828	464,601	\$3,073
ART AND DESIGN	160,237	208,064	\$3,066
MARVIN STUDIOS	7,873	404,996	\$2,852
VISITORS CENTER	16,190	175,662	\$2,803
SUDLER HOUSE ANNEX	1,472	123,576	\$2,372
PUBLIC SAFETY	35,229	29,803	\$1,911
CHANCELLORS RESIDENCE	11,366	170,565	\$1,657
HOREJSI FAMILY ATHLETICS CENTER	22,623	301,333	\$1,467
HOUGLAND BALLPARK	4,333	203,001	\$1,392
SPRAGUE APARTMENTS	11,310	185,980	\$1,173
PARROTT ATHLETIC CENTER	24,084	266,524	\$1,017
MAX KADE CENTER	6,267	36,406	\$883
CHAMNEY RESIDENCE AND BARN	5,865	96,086	\$822
FITCH FARM RESIDENCE	1,200	32,278	\$783
PHARMACY BUILDING	122,972	34,561	\$767
GREEN HALL	101,833	350,861	\$763
RECREATION SERVICE BUILDING #1	978	24,607	\$597
RECREATION SERVICE BUILDING #2	973	16,268	\$395
KGS STORAGE FACILITY	12,075	9,458	\$229
HALL CENTER FOR THE HUMANITIES	14,470	8,219	\$199
ENVIRONMENTAL HEALTH & SAFETY	995	8,474	\$155
REC SERVICES BLDG OLD SCHOOL	3,000	2,426	\$59
NESA MAINTENANCE SHOP	1,200	624	\$15
SHENK RESTROOM FACILITY	727	1,030	\$4
CARRUTH OLEARY HALL	50,314	394,698	-\$26
KANU TRANSMITTER BUILDING	1,062	118,078	-\$574
LIPPINCOTT HALL	32,883	254,533	-\$937
SMITH HALL	20,181	60,017	-\$2,795
SNOW HALL	96,783	254,445	-\$2,862
BEST BUILDING	76,455	517,985	-\$3,126
		11,440,324	\$60,333

The highlighted buildings above and below are having the greatest impact on energy cost. The following is what has been discovered on the buildings that have been repeatedly on this list.

Watkins Student Health Center: As part of the ESP project, Watkins was doing night setback & setup. In winter of 2013-2014 they made a request to stop doing this due to problems they were having in the North Wing and issues in Pharmacy and Lab where this was

creating problems. Energy use increased since that time. We are continuing to work with the health center to see about ways of operating as efficiently as possible. Watkins cost increased by \$4,340 for the past 12 months.

MRB:

The increased cost at MRB has been due to increased electrical energy in the chilled water/boiler plant. We have been looking at the operation of the plant. We did find a problem with chillers in the plant starting at one time when only one chiller is needed. This has been fixed and bills will continue to be monitored. The electric use for June of 2016 has increased when compared to June 2015. The 12 month additional cost also increased by \$7,370.

Haworth Hall

Haworth is another building where there have been significant decreases in steam energy use with increases in electrical energy. The increased cost being about \$17,000. This will require additional analysis.

One area to note are the buildings on the bottom of the list have increases in energy use but costs have gone down. The reason for this is the difference in cost between electricity, natural gas and steam. Electricity is almost 6 times the cost of natural gas and 2.5 times the cost of Steam on a Btu per Btu basis. The buildings where Btu has gone up and cost gone down have had large increases in steam or natural gas and a smaller decreases in electricity.

The following is an updated list of buildings for May that have had a decrease in energy use.

MAIN CAMPUS BUILDINGS	AREA (ft²)	Reduced KBtu	Reduced Cost
EATON HALL	84,735	-4,108,151	-\$65,361
AMBLER STUDENT RECREATION & FITNESS CENTER	103,905	-5,460,059	-\$55,708
MALOTT HALL	328,888	-2,663,933	-\$50,194
MOORE HALL	46,843	-2,746,286	-\$43,286
LEARNED HALL	229,892	-3,920,738	-\$42,061
ALLEN FIELDHOUSE	188,500	-5,315,267	-\$37,986
COMPUTER SERVICES FACILITY	47,595	-925,129	-\$30,007
BUDIG HALL_HOCH AUDITORIUM	92,839	-2,728,477	-\$23,689
MISSISSIPPI STREET PARKING GARAGE	239,700	-962,355	-\$23,348
BLAKE HALL	50,010	-2,450,624	-\$22,251
DYCHE HALL	106,685	-1,395,455	-\$19,380
JOSEPH R PEARSON HALL	146,250	-1,225,408	-\$16,150
LINDLEY HALL	86,675	-1,240,708	-\$15,128
ALLEN FIELDHOUSE PARKING FACILITY	244,789	-681,675	-\$14,221
FRASER HALL	124,095	-875,828	-\$13,379
MCCOLLUM LAB	15,065	-979,833	-\$12,386
STRONG HALL	175,806	-1,289,199	-\$11,441
ANSCHUTZ LIBRARY	155,300	-58,236	-\$10,104
WESCOE HALL	179,844	-781,393	-\$9,292
MEMORIAL STADIUM	179,420	-265,976	-\$9,097
REGNIER HALL	86,255	-2,284,402	-\$8,971
SUMMERFIELD HALL	93,565	-360,387	-\$7,270
EAST HILLS BUILDING	67,392	-589,509	-\$6,055
TWENTE HALL	30,418	-671,874	-\$5,145
DOLE INSTITUTE OF POLITICS	27,500	-562,972	-\$4,476
SMISSMAN RESEARCH LAB	14,000	-638,021	-\$4,453
WAREHOUSE	45,350	-837,480	-\$4,433

SPOONER HALL	23,272	-373,924	-\$4,302
NUNEMAKER CENTER	10,090	-528,786	-\$3,800
ROBINSON HEALTH AND PHYS ED CNTR	218,631	-1,257,478	-\$3,660
ANSCHUTZ SPORTS PAVILION	108,506	-673,566	-\$3,528
SIMONS BIOSCIENCES RESEARCH LABS	48,345	-1,383,147	-\$3,320
ANDERSON FAMILY FOOTBALL COMPLEX	83,863	-113,962	-\$3,282
VEHICLE MAINTENANCE SHOP	13,817	-161,140	-\$3,101
SHANKEL STRUCTURAL BIOLOGY CENTER	17,000	-272,728	-\$3,036
MILITARY SCIENCE BUILDING	38,479	-460,427	-\$3,027
BAILEY HALL	76,108	-410,961	-\$2,998
BAEHR AUDIO READER	11,042	-135,554	-\$2,635
WESLEY FOUNDATION BUILDING	12,788	-108,211	-\$2,535
CHILD CARE FACILITY	17,684	-350,597	-\$2,475
MAINTENANCE & SURPLUS PROPERTY	16,166	-169,094	-\$2,386
FACILITIES ADMINISTRATION BUILDING	24,721	-231,961	-\$2,177
CONSTRUCTION AND LANDSCAPE	20,611	-410,786	-\$1,939
GEOLOGICAL CORE LIBRARY	11,793	-381,389	-\$1,802
ENTOMOLOGY RESEARCH LAB	2,223	-240,331	-\$1,696
LIED CENTER	88,482	-754,933	-\$1,322
NORTH COLLEGE PARKING GARAGE	37,075	-52,036	-\$1,262
WATSON LIBRARY	189,249	-626,972	-\$1,194
OLDFATHER STUDIOS	19,745	-358,448	-\$1,144
AIRPORT HANGAR 1	14,000	-229,599	-\$1,132
BOTANY GREENHOUSE	4,846	-194,041	-\$873
UNIVERSITY PRESS WAREHOUSE	8,899	-221,071	-\$758
BRIDWELL RESEARCH LAB	8,975	-133,057	-\$730
UNIVERSITY PRESS OFFICES	6,422	-114,169	-\$693
REGENTS CENTER	55,304	-33,844	-\$653
NESA RESEARCH LAB	5,295	-24,464	-\$594
JAYHAWK CENTRAL	19,155	-23,945	-\$581
515-517 WEST 14TH	2,880	-152,212	-\$569
PARKER HALL	15,935	-13,428	-\$468
PHARMACEUTICAL CHEMISTRY LAB	7,850	-5,789	-\$467
NESA AQUATIC LAB	1,480	-13,617	-\$330
GROUNDWATER TREATMENT BUILDING	2,160	-11,055	-\$268
NESA TRAILER (CARETAKER RES)	1,200	-7,336	-\$178
INTERNATIONAL HOUSE	3,554	-61,459	-\$154
CENTER FOR DESIGN RESEARCH	3,618	-5,667	-\$137
STORAGE BUILDING A	6,480	-5,091	-\$124
FOLEY HALL	5,000	-22,514	-\$119
AIRPORT HANGAR # 2	4,260	-3,483	-\$84
ST ANDREWS OFFICE FACILITY	33,354	-363,782	\$363
YOUNGBERG HALL	25,490	-46,240	\$1,393
HIGUCHI BUILDING	42,655	-310,016	\$1,910
DOLE HUMAN DEVELOPMENT CENTER	132,963	-693,750	\$3,549
HAWORTH HALL	274,788	-1,197,177	\$16,874
MULTIDISCIPLINARY RESEARCH FACILITY	112,990	-5,758,478	\$23,526
		-	
		65,121,091	-\$583,190

These decreases can be attributed to behavioral changes, ECMs performed, and also weather.

In addition to the building listed above, there have been new buildings, buildings with bad metering and those that been modified in a way that increased energy consumption. The following is a list of those buildings and reasons why they were not included. Those that are building changes that were made that have led to increased energy use.

MAIN CAMPUS BUILDINGS	AREA (ft²)	Increased KBtu	Increased Cost	
ANDERSON STRENGTH CENTER	43,484	1,374,104	\$65,464	Bad Metering in 2013
CAPITOL FEDERAL HALL	175,024	2,694,747	\$52,555	Under Construction 2016
DEBRUCE CENTER	31,846	796,049	\$17,686	Under Construction 2016
ELLSWORTH HALL ANNEX	8,259	3,897,414	\$76,863	Under Construction 2013
HILL ENGINEERING RESEARCH & DEV	3,874	86,747	\$2,105	Meter not being read 2013
KANSAS UNION	220,490	1,834,634	\$81,472	Bad Metering in 2013
KURATA BUILDING	5,430	1,096,246	\$15,000	Renovated 2013
LIBRARY ANNEX	17,510	1,250,122	\$20,802	Addition added 2013
MARVIN HALL	55,226	-570,430	\$1,256	Annex Addition 2014
		-		
MEASUREMENT MATERIALS & SUSTAINABILITY ENVIRONMENT CENTER	194,573	13,109,649	\$244,843	LEEP2 Addition 2015
MURPHY HALL	188,800	2,077,834	\$25,692	Bad Metering in 2013
NICHOLS HALL	69,500	2,579,884	\$89,059	UPS & Cooling Added 2013
SHOP FACILITY	41,018	-596,468	\$10,500	Meter not being read 2013
SPENCER MUSEUM OF ART	91,095	-3,175,683	-\$46,274	Chiller Plant Added 2013
SPENCER RESEARCH LIBRARY	107,729	2,630,833	\$97,764	Chiller Plant Added 2013
STAUFFER FLINT HALL	36,868	5,897	\$7,564	Bad Metering in 2013
STRUCTURAL TESTING & STUDENT PROJECTS FACILITY	27,004	2,032,284	\$25,108	Built in 2014
		4,904,566	\$787,460	