

Semiannual Energy Management Report

March 10, 2013

The purpose of this mid-year report is to update the university's administration on the activities and performance of Energy Management's energy and utility-cost savings program over the first half of fiscal year 2014. In addition to financial and project information this report provides a summary of other Energy Management activities and an update on energy consumption for the first half of FY14. The time frame for all current activity summarized in this report is July through December, 2013.

The contents of this report include:

1. Current Financial Activity
2. Summary of Current Projects
3. Summary of Past Projects
4. Other Energy Management Activities
 - Better Buildings Challenge
 - Metering
 - Energy Behavioral Program
 - Recommissioning
5. Current Energy Consumption

1. Current Financial Activity

Table 1 provides an overview of funding received and disbursed by Energy Management between July and December 2013.

Table 1: FY14 Program Budget	
Inflows (July - Dec 2013)	
Carryover from FY13	\$ 148,712
Measurement & Verification	\$ 233,534
Energy Savings	\$ 109,679
Utility Incentives	\$ 165,223
Other (SCIF Project)	\$ 10,065
Total Inflows	\$ 667,213
Outflows (July - Dec 2013)	
Energy Efficiency Project Expenses	\$ 104,905
Metering Project Expenses	\$ 19,463
Measurement & Verification	\$ 6,300
Other	\$ 26,668
Total Outflows	\$ 130,668
Net Balance in Energy Management Fund 12-31-13	\$ 536,545

For comparison, Table 2 shows a summary of all funding received by Energy Management from Fiscal Year 2008 (the beginning of the Energy Management Fund) to present.

	M&V	Energy Savings	Incentives	Other In	Total Inflows
FY08	\$ 220,000.00	\$ 5,000.00			\$ 225,000.00
FY09	\$ 222,200.00	\$ 137,062.87	\$ 303,012.30	\$ 10,000.00	\$ 672,275.17
FY10	\$ 224,422.00	\$ 176,269.94	\$ 48,594.78	\$ (252,100.00)	\$ 197,186.72
FY11	\$ 226,666.22	\$ 232,023.83	\$ 68,137.10	\$ 53,756.41	\$ 580,583.56
FY12	\$ 228,932.66	\$ 217,337.18	\$ 74,041.55	\$ 103,529.89	\$ 623,841.28
FY13	\$ 231,211.32	\$ 233,403.68	\$ 209,868.32	\$ 3,076.90	\$ 677,560.22
FY14	\$ 233,533.53	\$ 109,678.79	\$ 165,223.21	\$ 10,065.00	\$ 518,500.53
TOTAL	\$ 1,586,965.73	\$ 1,110,776.29	\$ 868,877.26	\$ (71,671.80)	\$ 3,494,947.48

Total funding to-date is approximately \$3.5 million. Annual M&V funding accounts for 45% of overall funding and energy savings/incentives accounts for 55%.

2. Current Projects

Table 3 provides a list of projects that closed out during the first half of fiscal year 2014 along with their costs, incentives and projected annual energy-cost savings. Annual energy savings shown include only Energy Management's 80% share. The overall projected post-incentive payback for these projects is 3.25 years. Most of the projects do not have finalized energy savings or incentives at this point as they are continuing to be evaluated during project closeout.

Project Name	Project Cost	Incentives	Annual Energy Cost Savings	Post Incentive Simple Payback
049 LNCO Occupancy Sensors (SCIF) ¹	\$ 10,434	\$ 1,800	\$ 1,500	5.76
064 MEB AHU VFDs	\$ 37,363	\$ -	\$ 7,250	5.15
303 Plant Office Insulation	\$ 2,554	\$ -	\$ 510	5.01
040 SSB Lighting Phase 2 - Offices	\$ 142,983	\$ 113,095	\$ 13,500	2.21
570 Evaporative Cooling	\$ 70,849	\$ 35,425	\$ 25,000	1.42
575 Evaporative Cooling ²	\$ 205,853	\$ -	\$ 60,000	3.43
TOTAL	\$ 470,036	\$ 148,520	\$ 99,010	3.25
Italicized numbers are estimates				
¹ Cost shown is the net cost to Energy Management, after SCIF contribution.				
² Energy Management borrowed \$166,969 from DFCM 0% energy loan to complete this project				

In addition to the six projects that were completed in the first half of FY14 there are five projects currently in progress. These projects are summarized in Table 4. Estimates show that these projects will continue to keep the overall payback well under the Energy Management Fund's five year limit.

Table 4: Projects In Progress (July - Dec 2013)				
Project Name	Project Cost	Incentives	Annual Energy Cost Savings	Post Incentive Simple Payback
077 Retrocommissioning	\$ 50,000	\$ 12,500	\$ 18,000	2.08
Campus Steam Traps	\$ 20,000	\$ -	\$ 6,000	3.33
004 SSB Indirect Evap (Install Hx) ¹	\$ 50,000	\$ 2,500	\$ 9,800	4.85
212 SEFH LED Lighting ²	\$ 265,000	\$ 198,750	\$ 18,150	3.65
086 M LIB Retrocommissioning ³	\$ 35,000	\$ -	\$ 12,000	2.92
TOTAL	\$ 420,000	\$ 213,750	\$ 51,950	3.97
Italicized numbers are estimates				
¹ Contribution to Campus Utility Services deferred maintenance project				
² Project in partnership with Athletics - Athletics will pay for their part out of realized energy savings				
³ Project incorporated into Marriott Library controls upgrade. Energy Mgmt contribution				

Following is a list of projects being evaluated for possible implementation. Most of the projects are lighting retrofits but we are also planning an ongoing building tune-up program (recommissioning) and a pilot high performance window film project. These projects are listed in Table 5. Not listed are several potential Campus Utility Services projects that Energy Management will contribute to if funding allows.

Table 5: Projects In Study Phase (July - Dec 2013)				
Project Name				
205 GETC LED Lighting				
028 MCD Studio Lighting				
086 M LIB LED Retrofit (can lighting)				
049 Auditorium Lighting				
049 LNCO Lighting Control Expansion				
Campus Recommissioning				
High Performance Window Film				

3. History of Energy Conservation Projects

The following tables summarize Energy Management's history of energy conservation projects.

Table 6 shows energy savings achieved by energy management projects since the Energy Management Fund was created in 2008.

Project Group	kWh Savings	Avg Monthly kW Savings	DTH Savings
FY08	12,461,701	258.8	35,612.5
FY09	3,540,562	145.5	-
FY10	12,698,628	676.6	19,582.8
FY11	2,325,473	143.3	43,059.9
FY12	2,901,491	292.9	9,984.1
FY13	484,432	57.8	539.4
FY14	74,017	33.1	750.9
TOTAL	34,486,304	1,608.0	109,529.7

Savings from projects will naturally erode over time as equipment ages and control strategies change. To reflect this, energy and energy cost savings will be retired after a prescribed number of years. This concept is illustrated in Tables 7 and 8. Table 7 is a list of projects that have reached their payback limits but are still yielding savings and Table 8 is a list of projects that have reached their overall savings limit.

Project Name	Project Cost	Savings to Energy Management	Savings to Fuel & Power Accounts
063 EMCB Lighting	\$ 121,225.94	\$ 47,329.20	\$ 11,832.30
091 HPER Lighting	\$ 137,995.56	\$ 125,149.20	\$ 31,287.30
303 Central Plant Lighting	\$ 35,540.00	\$ 28,243.80	\$ 7,060.95
072 Law Library Lighting	\$ 44,540.00	\$ 40,644.00	\$ 10,161.00
565 EEJMRB Lighting (Delamping)	\$ 264.00	\$ 6,399.96	\$ 1,599.99
040 SSB HVAC Improvements	\$ 101,488.87	\$ 109,800.54	\$ 27,450.14
105 Annex Boiler Controls	\$ 4,500.00	\$ 10,996.80	\$ 2,749.20
077 CRCC Lamp Replacement	\$ 3,387.78	\$ 4,046.40	\$ 1,011.60
105 Annex & 026 CSW Pipe Insulation	\$ 3,529.00	\$ 3,561.60	\$ 890.40
052 Alumni Pipe Insulation	\$ 2,285.00	\$ 2,695.68	\$ 673.92
019/040 Hx Insulation Blankets	\$ 2,763.18	\$ 6,380.88	\$ 1,595.22
570 Steam Boiler Replacement	\$ 5,000.00	\$ 8,000.04	\$ 2,000.01
TOTAL	\$ 462,519	\$ 393,248	\$ 98,312

Project Name	Project Cost	Savings to Energy Management	Savings to Fuel & Power Accounts
533 Genetics Retrocommissioning	\$ 64,500	\$ 55,200	\$ 13,800
570 Retrocommissioning	\$ 61,083	\$ 32,201	\$ 8,050
302 East Plant Combustions Improvements	\$ 60,000	\$ 60,000	\$ 15,000
555 HCI Computer Energy Mgmt	\$ 7,740	\$ 3,912	\$ 978
025 BEH Computer Energy Mgmt (FY10)	\$ 1,365	\$ 4,242	\$ 1,060
Campus Steam Traps Phase 1	\$ 8,902	\$ 53,168	\$ 13,292
025 BEH Computer Energy Mgmt (FY11)	\$ 1,365	\$ 4,242	\$ 1,060
025 BEH Computer Energy Mgmt (FY12)	\$ 1,638	\$ 3,541	\$ 885
TOTAL	\$ 206,593	\$ 216,505	\$ 54,126

Table 9 provides a break-down of all energy cost savings from projects completed through December 2013.

Table 9: Project Energy Cost Savings Summary				
Project Group	Energy Savings to Energy Mgmt	Energy Savings to Fuel & Power	Maximum Savings to Energy Mgmt	% Paid Back
Retired Projects (no longer saving)	\$ 216,505	\$ 54,126	\$ 216,505	100%
Repaid Projects (still saving)	\$ 393,248	\$ 98,312	\$ 393,248	100%
Projects Still in Payback				
FY09	\$ 82,538	\$ 20,635	\$ 83,937	98%
FY10	\$ 199,395	\$ 49,849	\$ 242,243	82%
FY11	\$ 115,669	\$ 28,917	\$ 230,360	50%
FY12	\$ 134,280	\$ 33,570	\$ 245,752	55%
FY13	\$ 17,474	\$ 4,369	\$ 90,977	19%
FY14	\$ 2,672	\$ 668	\$ 96,116	3%
TOTAL	\$ 1,161,782	\$ 290,445	\$ 1,599,138	73%

4. Other Energy Management Activities

Energy Management is currently engaged in the following ongoing programs.

A. Better Buildings Challenge (BBC). We are now entering the third year of our involvement in the Department of Energy’s Better Buildings Challenge. Nearly all of our activity to this point has been centered around 1) developing an overall strategy to reach our 20% energy reduction goal, and 2) developing the first phases of building retrofit projects.

Phase 1 of building retrofit projects focuses on 3 buildings: Henry Eyring Chemistry (0085), Skaggs Biology (0082), and the Biology (0084) buildings. Phase 1 is now in final design and upon project and funding approval will be ready to go to bid at the end of FY14. The budget for Phase 1 is \$8.9M and it is expected to generate \$677,000 in annual energy cost savings.

Phase 2 is early in the development phase and is focusing on the Health Sciences campus. This project is split into two parts with one focused on Facility Operations managed buildings and the other focused on University Health Care managed buildings. UUHC has not yet committed to undertaking their part but we are working with them to identify potential measures and savings that will hopefully establish the justification to move forward.

B. Campus Metering. During the first half of FY14 we reached substantial completion of the third and final phase of our campus wide University funded automated metering project. We are also in the process of implementing our selected system analytical software (AiM Utility and Energy Management). The end result of these efforts will be automated data acquisition from the majority of our campus meters and analytical tools to assist Facility Operations in identifying greater energy efficiency.

Toward the end of 2014 a greater emphasis on air quality and emissions reduction created a corresponding emphasis on further development of the campus metering system. We are now in the process of thoroughly evaluating the system to determine the exact scope to complete the metering system to the greatest extent possible. This includes installing, calibrating and repairing meters where needed

and developing a more robust O&M program to ensure that meters remain at a high degree of accuracy. Most of the remaining meter work will be focused on high temp water, chilled water and gas.

C. Behavioral. We currently have an RFP out to procure the services of an energy-behavioral specialist to complement the BBC retrofit work we are undertaking. This consultant will work with Energy Management and the occupants of the Chemistry and Biology buildings to identify and implement occupant based energy conservation strategies to help solidify the energy savings achieved through the HVAC improvement projects. This program is part of our BBC strategy.

D. Recommissioning. The third part of our strategy to achieve our BBC energy reduction goal is an ongoing program of building tune-ups. Between new construction, major renovation, Total Productive Maintenance and the Better Buildings Challenge there is a growing pool of buildings that need to be revisited to ensure energy savings are maintained. We are developing a recommissioning program that will focus on this need. The program will aim to re-tune buildings within two years of project completion and will rotate through 7 to 10 buildings per year.

5. Current Energy Consumption

This section summarizes the energy consumed by the University over the first half of FY14. These totals represent main campus (lower campus, health sciences, student housing and a handful of buildings adjacent to campus). There are a variety of other University owned properties that are not reflected in these totals; this represents the utilities that are controlled by Facility Operations.

	FY 2014	% Change	FY 2013	% Change	FY 2012
Energy (kWh)	142,888,761	2.07%	139,993,997	5.41%	132,806,726
Power (kW)	47,718	2.45%	46,576	0.61%	46,295
Cost (\$)	\$ 9,257,603	9.38%	\$ 8,463,993	13.12%	\$ 7,482,353
Rate (\$/kWh)	\$ 0.0648	7.16%	\$ 0.0605	7.31%	\$ 0.0563

	FY 2014	% Change	FY 2013	% Change	FY 2012
Energy (DTH)	833,906	6.70%	781,575	-11.97%	887,822
Cost (\$)	\$ 4,008,219	17.01%	\$ 3,425,489	-28.76%	\$ 4,808,269
Rate (\$/DTH)	\$ 4.807	9.67%	\$ 4.383	-19.07%	\$ 5.416

	FY 2014	% Change	FY 2013	% Change	FY 2012
Energy (MMBtu)	1,321,462.57	4.94%	1,259,254.02	-6.09%	1,340,977.14
Cost (\$)	\$ 13,265,822	11.58%	\$ 11,889,481	-3.26%	\$ 12,290,623
Rate (\$/MMBtu)	\$ 10.039	6.32%	\$ 9.442	3.01%	\$ 9.165





