SIU Sustainability Council Project
Final Report

Project title: Energy Efficiency GRA for Physical Plant
Project I.D. #: 14SP108
Award date: 4/23/2014
Completion date: 8/7/2015 (End of Summer 2015 Semester)
Funds used (if different from award amount):

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Brief write up of project/project experience (not to exceed 250 words):

I worked on Life Sciences II, one of the oldest and energy intensive buildings on campus. The main focus of the project is to evaluate methods to reduce the energy consumption by the HVAC system of the building. The first step was calculating the current energy used by the HVAC system for preconditioning the supply air. This was done for both heating season (winter) and cooling season (summer) based on the hourly surface temperature data. Cost for the energy used was calculated using the FY16 rates for steam, chilled water and electricity.

The current 100% outside air, constant volume systems offers great scope for implementing energy conservation techniques and energy efficient modifications to the equipment. Based on the characteristics of the existing HVAC system and the desired energy cost saving, the following three methods have been chosen to be evaluated:

1. Ethylene Glycol runaround loop
2. Return air constant air volume (CAV) system
3. Return air variable air volume (VAV) system

The energy conservation potential of each method has to be determined. Based on the results, suitable retrofit strategy will be proposed.

Best things learned/produced from project:
The project is related to an actual educational building and it gave me a chance to gain practical knowledge. Since the beginning of the project, my approach towards it has improved. I do not have much experience working with the concept of central heating/cooling until now as it is not as extensively used in my country. This project has given me a great opportunity to learn new things.

How do you define sustainability?
In general terms, I define sustainability as the ability to function effectively and maximize output while using minimum amount of resources.

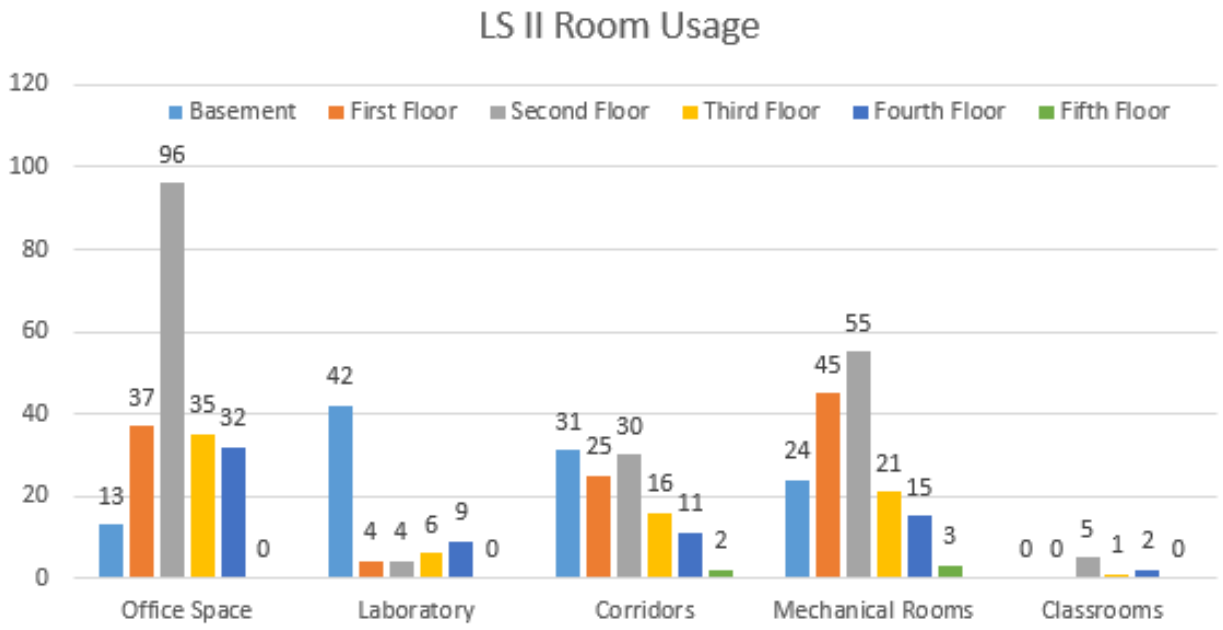
Has this changed over the course of your project? If so, how?
Yes, it has changed over the course of the project. I thought sustainability was related only to natural resources and energy, economic sustainability is a whole new concept for me. Also, the project enhanced the role of sustainability in cost effectiveness and better quality.

What do you see as the next step for the project?
Other aspects of the HVAC system like the terminal reheat, energy lost through fume hood exhaust can be looked into.

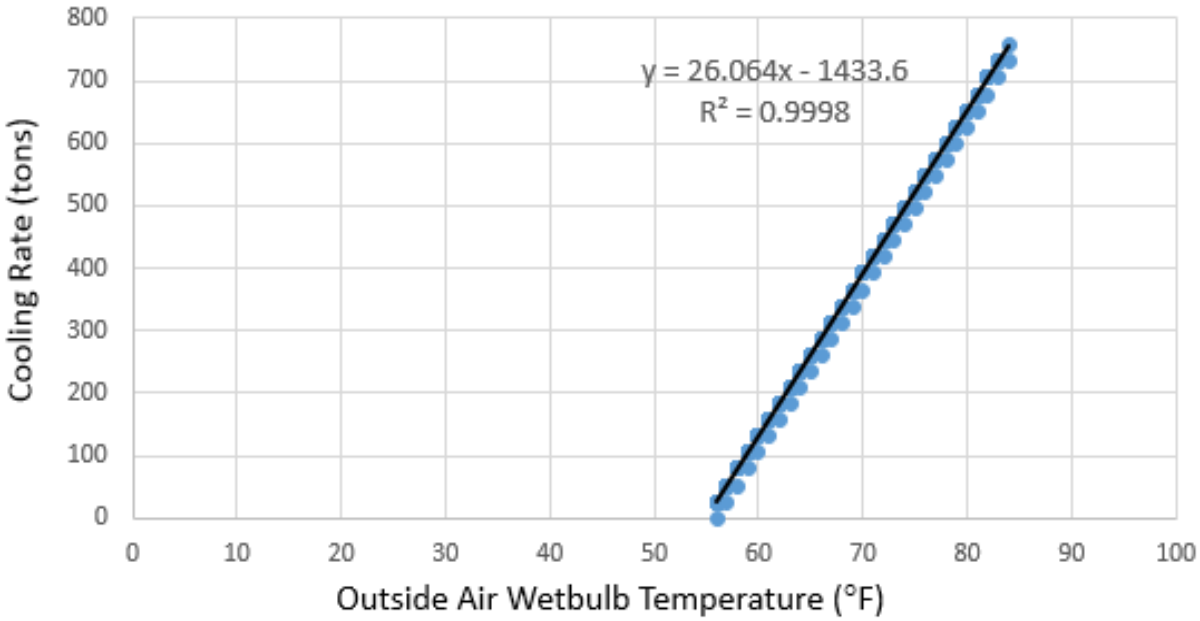
Optional: Do you have any suggestions for the SIU Sustainability Council to improve the Green Fund award process?

Attach a minimum of five images – these will be used to promote interest in Sustainability Council projects. These can be photographs of the progress of the project, the completed project, or promotional materials.

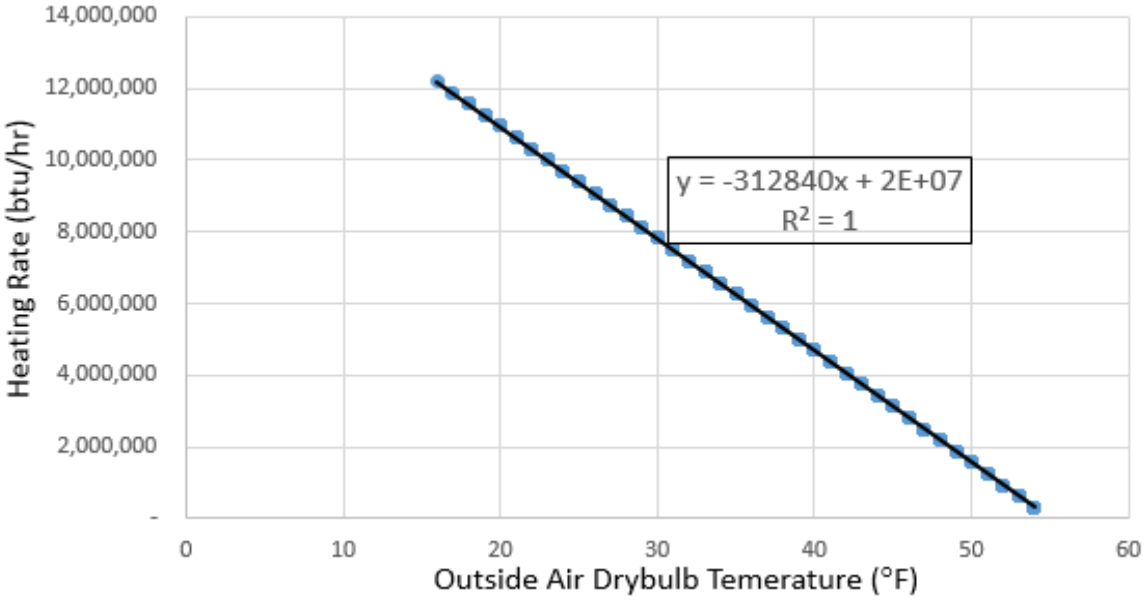
Room Usage of Life Sciences II (No. of rooms)



Cooling Season Energy Usage



Heating Season Energy Usage



Energy Cost for Air Pre-conditioning for the Current System

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	drybulb	heating load, btu/hr	no of hours	heating load Mmbtu	Steam cost	cost/cfm		wetbulb	cooling load,tons	no of hours	cooling load ton-hr	Chilled water cost	cost/cfm	
27	41	4,379,760.00	97	424.83672	$5,225.49	$0.000186		81	677.584	24	16262.016	$3,826.79	$0.0005519	
28	42	4,066,920.00	125	508.365	$6,252.89	$0.000173		82	703.648	19	13369.312	$3,146.08	$0.0005731	
29	43	3,754,080.00	120	450.4896	$5,541.02	$0.000160		83	729.712	10	7297.12	$1,717.17	$0.0005943	
30	44	3,441,240.00	127	437.03748	$5,375.56	$0.000146		84	755.776	2	1511.552	$355.70	$0.0006155	
31	45	3,128,400.00	131	409.8204	$5,040.79	$0.000133					Total cost =	$327,558.67		
32	46	2,815,560.00	146	411.07176	$5,056.18	$0.000120								
33	47	2,502,720.00	158	395.42976	$4,863.79	$0.000107								
34	48	2,189,880.00	144	315.34272	$3,878.72	$0.000093								
35	49	1,877,040.00	168	315.34272	$3,878.72	$0.000080								
36	50	1,564,200.00	129	201.7818	$2,481.92	$0.000067								
37	51	1,251,360.00	120	150.1632	$1,847.01	$0.000053								
38	52	938,520.00	132	123.88464	$1,523.78	$0.000040								
39	53	625,680.00	117	73.20456	$900.42	$0.000027								
40	54	312,840.00	124	38.79216	$477.14	$0.000013								
41	55	-	149	0	$0.00	$0.000000								
42				Total cost =	$177,605.15									
43														
44			Annual summary											
45				total cost										
46			heating season	$177,605.15										
47			cooling season	$327,558.67										
48				$505,163.81										

Variable Air Volume System (One of the Proposed Models)