PROJECT PROPOSAL
GREEN ENERGY FUND

4/19/2016

Green and Gold Lighting Project-I

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ABSTRACT

USF pays about 600,000$ monthly to TECE for electricity charges. The electricity also accounts for a significant amount of carbon dioxide emissions by USF to the environment. A measure to reduce such impact is very vital for a University like USF. Energy efficiency is one such measure that has lower investments and high returns compared to alternate energy generation sources. Replacement of light bulbs with efficient LED lamps has a large potential of saving electricity throughout USF campus. The goal of this project is to reduce the carbon footprint of a USF buildings through reduction of energy consumption by building lighting for BSF building. This energy savings will be made possible by replacing all existing light bulbs with more efficient LED light bulbs followed by recycling all of the replaced lights. The project will reduce the energy consumption of lighting at BSF building and enable USF to meet the greenhouse gas (GHG) reduction goals set by the President Judy Genshaft's climate commitment (2008). As a project base case, conversion from the existing T8, CFL, U-bend bulbs to LED bulbs and installing light sensors in BSF building could result in an energy cost savings of $10,646/year along with 319 metric tons of CO_2 equivalent (CO_2e) every year. BSF building is a very small building as compared to the infrastructure at USF campus, and thus, an implementation across all USF buildings would result in significant savings as well as reduction of the carbon footprint of USF on the environment.

Technology and Design

Light emitting diode (LED) are characterized by low current and low energy consumption which makes them suitable for large types of applications. When used for lighting, they consume less energy without compromising much on the lighting levels. LED lights additionally have much longer life than ordinary bulbs (Sperber et al., 2012). LED's are a semiconductor device that emits light in a different way than incandescent or fluorescent bulbs. LED lights need lower voltage, and thus, the driver or ballast provides reduced voltage across the bulb. As LED are semiconductors, thus they offer negligible resistance and thus they are efficient and produce lower heat as well. This, in turn, results in lower cooling loads in the buildings with LED lights.

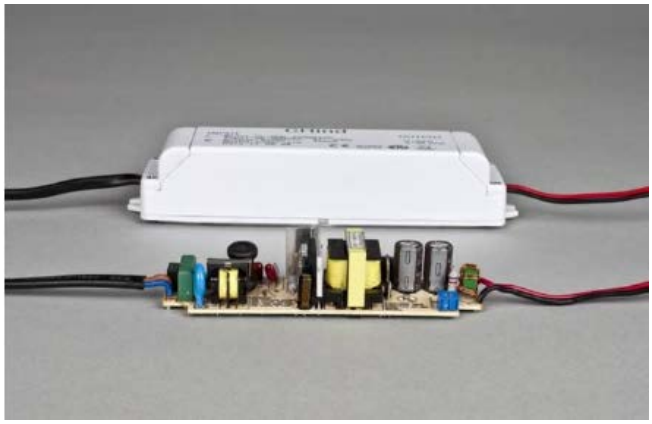

FIGURE 1. EXTERNAL DRIVER

FIGURE 2. LED TUBE

PROJECT PLAN

- Target building: Bioscience Facility (BSF) building
- Target lighting types: 4 ft, 2 ft T8 tubes, CFL, U-bend tubes and light sensors
- Lighting system working hours: weekdays and weekends

This project will be implemented by USF students in collaboration between USF Facilities Management. Students will survey building spaces to record the quantity and type of bulbs present in each area and verify that lighting levels and specifications of the fixtures. The team will prepare a detailed technical specification for the bid document based on the survey data. Building managers will be informed before surveys and light replacements to minimize disturbances to offices, labs, and other work areas. The impact on these areas will be minimal since the replacement process will take approximately 30 minutes per light fixture including waste disposal. Students will also work with Facilities Management during the bid and selection processes.

For the project management, a team of two students for six months is proposed for the BSF building. Students will carry out the survey and assist the USF project manager in execution the bid process, bid evaluation and during the execution of the project. The students will help in inventory management, technical documentations, and verification.

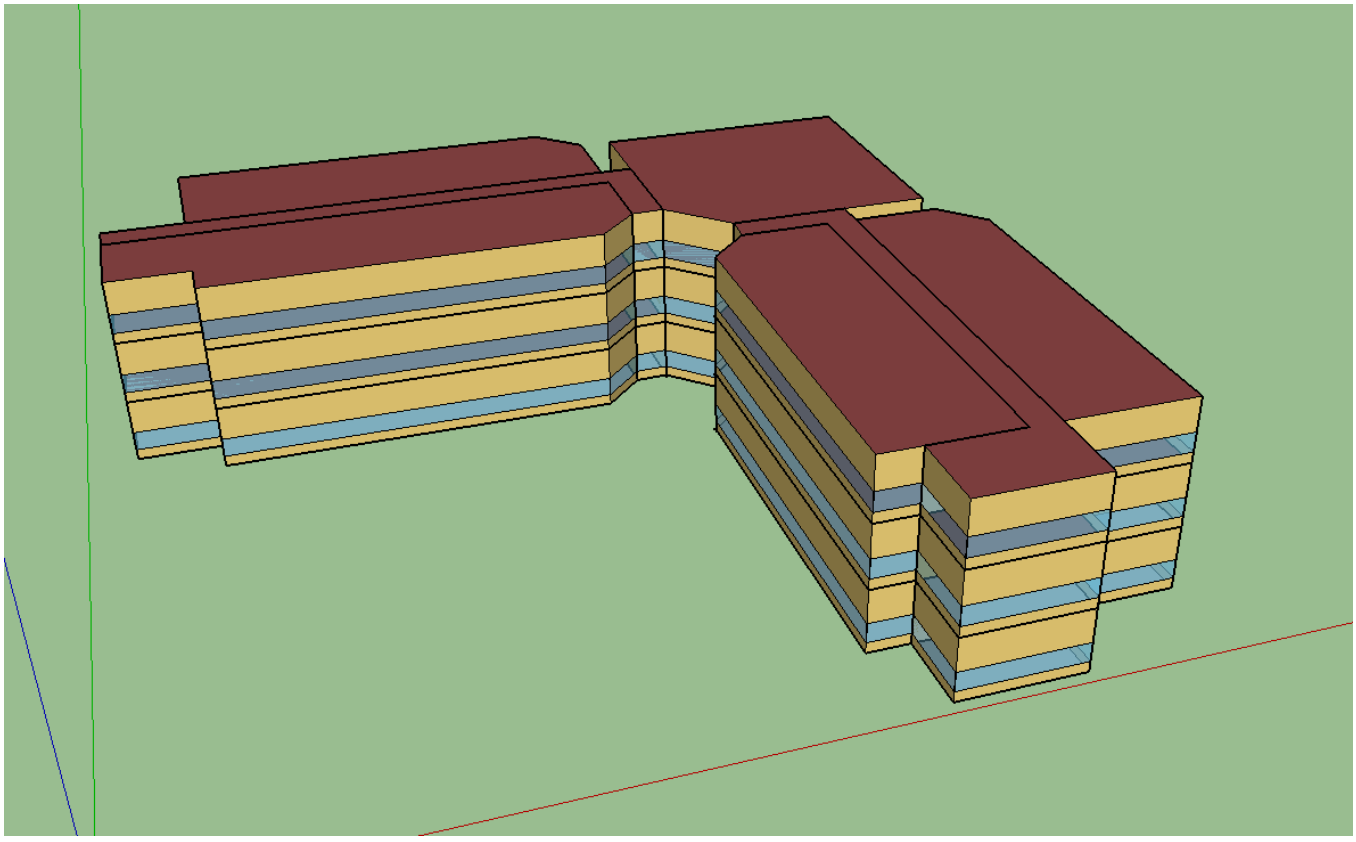

FIGURE 3. BIOSCIENCE FACILITY BUILDING ENERGY MODEL

	Name	Duration	% Comp
1	Project Kick-off meeting with stakeholders and Project Manager	1d?	0%
2	Student Resource Engagement	10d?	0%
3	Training and administration	10d?	0%
4	Detailed Survey and light level measurements	10d?	0%
5	Data validation compiling and specifications	10d?	0%
6	Bid Document with detailed BOM and specifications	10d?	0%
7	Invite bids	14d?	0%
8	Bid evaluation	4d?	0%
9	Award	12d?	0%
10	Kick off Meeting	1d	0%
11	**Implementation**	60d?	0%
12	Inventory management	30d?	0%
13	Procurement	30d?	0%
14	Installation	30d?	0%
15	Inspection from inspector	1d?	0%
16	Project closure	1d?	0%

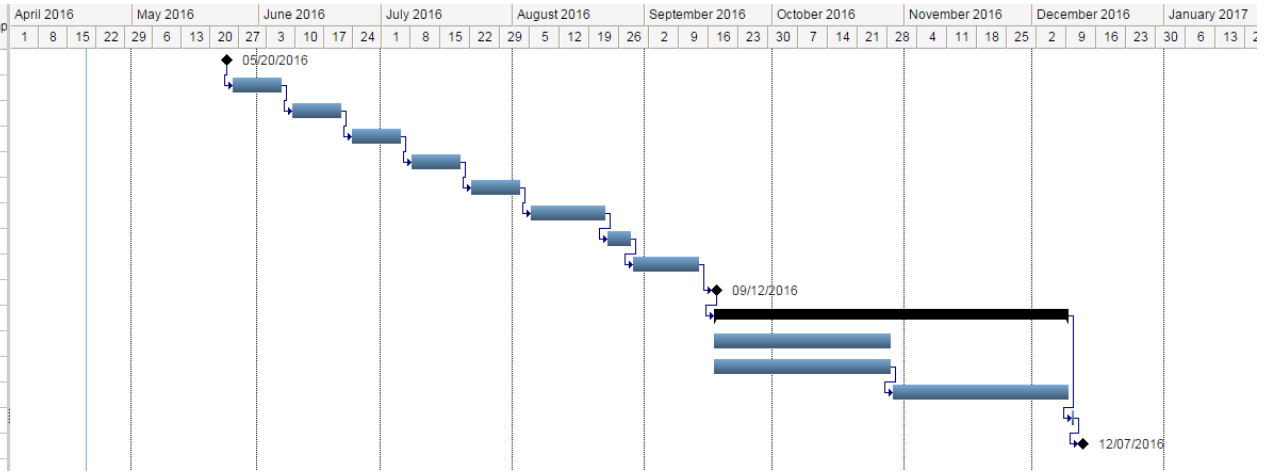

FIGURE 4. PROJECTED TIMELINE

PROJECT COST

Student Engagement

In the first phase of this project, two students will be engaged to carry out the project along with USF facilities management. We propose the following costs:

Students hire rate≈ $20/hr
For BSF building =2 students for 6 months

Capital investment

Items	Cost
Cost of the materials:	$ 29292
Cost of inspection:	$ 500
Cost of labor:	$ 32730
Recycling cost:	$ 723
Total cost	$ 63245
Student engagement:	$ 20000
Total Project Cost	$ 83245

Matching Grant

Facilities management has agreed to cover the cost of resources assigned for project management during the entire project. Facilities Management will cover the cost of replacing/upgrading special incandescent lamps for large lecture hall #100. About 45 such lamps ranging between 250 - 100 Watt in capacity will be upgraded in the entire BSF building.

The current project has the following financial highlights:-

- One time rebate from TECO = $ 4,620
- Annual savings in electricity cost = $ 10,646
- Payback period = 5 years
- Return on Investment = 20%
- Net present value of savings= $ 69,125 assuming 12 year of life of the bulbs

PROJECTED RESULTS

Sustainability

This project uniquely aims to reduce the energy consumption on campus by targeting its major component, campus lighting, as a low hanging fruit. LED lights consume less energy than fluorescent and incandescent lights while providing the same illumination levels. Utilizing LED lighting throughout campus will reduce the lighting energy demand by about 40%. Thus, the project will enable the university to reduce economically GHG's along with total electricity consumption. The proposed LED bulbs will be selected with a lifetime of over 50,000 hours. The 100% lighting upgrade to LED lights for BSF building would result in an annual energy saving of 128,735

kWh (lighting) and 30,748 kWh (cooling), reducing emissions by 319 metric tons of CO_2e from the BSF building alone. Such a project will have a simple payback period in less than five years. Additionally, the local utility provides a one-time rebate for reducing the fixed loads of about $4600 from this project as part of efficiency incentive schemes.

The following emission reduction are expected from the current project. During the minimum entire life (12 years) of the LED lights, this project will collectively reduce CO2e of 3832 Metric tons.

Annual GHG reductions[1]

	kg/kWh	**Total kg**
CO2	2.480971	**319386.54**
N2O	8.83E-05	**11.37**
CH4	2.61E-05	**3.36**

Energy efficiency projects have added value to the GHG reduction holistically. The use of alternate fuels is another viable option but does not compete economically well with an energy efficiency project with such high returns.

After combining all of the benefits and impacts of this proposal, we can confidently say that this is a very rewarding project. The project highlights a very low payback period along with the contribution to the USF Policy 10-051, which was formulated to meet the USF president's climate commitment signed in 2008. It also generates the opportunity to provide students with active learning and project management experience along with an on-campus employment.

[1] Numbers based on Florida emission factor by EPA

ANNEXURE

USF Facilities Management
Space Impact Request

TELEPHONE 974-4983
FAX 974-3199

DATE April 11, 2016

REQUESTING DEPARTMENT Facilities Management

COLLEGE of Arts and Sciences CAMPUS ADDRESS Bioscience Facility (BSF)

REQUESTOR _____ PHONE NO, _____

E-MAIL _____ FAX NO. _____

DESCRIPTION OF REQUEST *(INCLUDE SKETCH AND COST ESTIMATE IF APPLICABLE)*

During this project, all of the compact fluorescent lamps (CFLs) and 4 ft fluorescent lamps of the BSF building will be replaced with comparable LED lamps which are more efficient and consume less electrical energy, thus reducing the cooling loads and costs. Motion sensors will be added to all rooms, except for labs, that are currently without.

REASON FOR REQUEST This project is to improve the sustainability of the USF Tampa campus, specifically the BSF building, by reducing its energy load from lighting.

ANTICIPATED SOURCE OF FUNDS OR GRANT NUMBER Student Affairs - Green Energy Fund

SIGNATURES BELOW ARE REQUIRED PRIOR TO REVIEW AND DO NOT IMPLY APPROVAL OF THIS REQUEST

DEAN / DIRECTOR *(PLEASE PRINT)* Harold Bower EXT. 4-5000 CAMPUS ADDRESS ALN151

SIGNATURE H E Bower DATE 4/18/2016

AREA VICE PRESIDENT *(PLEASE PRINT)* Guy Conway EXT. 4-5401 CAMPUS ADDRESS MSC 4111

SIGNATURE G Conway DATE 4/18/16

RETURN COMPLETED FORM TO FACILITIES MANAGEMENT OPM 100 OR FAX TO 974-3199
FOR INFORMATION CALL 974-4983