FALL 2012 PROPOSAL

Thank you for your interest in the Student Green Energy Fund. Please fill out this form, which you can save to your computer. When you are ready to submit, please email the proposal by 5 pm on October 5th, 2012 to Shawna Neckar at shawnaneckar@usf.edu. You also have the option to include up to 10 MB of attachments to support your proposal.

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Commented [GK1]: Is a student involved?

Proposal Title: Finding An Energy Efficient and Long Life Light Bulb

Organization: USF Contemporary Art Museum (CAM)
(if applicable)

Description (1,000 words)
Describe the project, including goals and objectives, methods to be used to assess the outcome of the project, and how the results of the project will be communicated to the USF community.

USFCAM presents a series of changing exhibitions featuring the work of emerging and established artists from around the world. The exhibitions are open throughout the year

for academic and cultural benefit to USF students, faculty, staff, and visitors to the University. All our exhibitions are admission free.

Paramount to all the exhibitions is proper lighting for conservation, aesthetics, visibility and safety of the visitors, staff and artworks.

Because of the importance of the lighting element to our mission, we have a plan to overhaul the complete track system with new fixtures and lamps, additional tracks and dimming switch system. However, the intent of our application of The Student Green Energy Fund is to convert the types of lamps we use in the fixtures.

We primarily use 90W Halogen PAR38 narrow floods and 35W MR16's to light the exhibitions. Depending on the number of artworks, and the show's design, the museum may use as many as 150 lights for a single exhibition. These lamps burn very hot, consume many kilo watt hours of electricity, have life of about 2,500 hours and the lumen and beam consistency varies.

We would like to convert to a LED type equivalent lamp. This change can achieve the following objectives:
•Reduce the amount of energy consume by the track lights
•Lessen the heat output, thereby reducing the load on the HVAC system
•Increase the life hours of the lamp, thereby reduce the frequency of replacement costs and staff time for maintenance
•Eliminate the UV output, thereby improve the conservation environment for the artworks
•Improve health and safety of staff handling hot lamps to replace bulbs

We have investigated research papers from other museums (see attached) that are testing LED technologies as applied to museum use. We have also started testing several LED lamps to confirm some of the data described in the reports. The conclusion is it makes economic, conservation and aesthetic sense to convert to use of LED lamps.

A 90W Halogen PAR38's equivalent in LED uses only 21 watts; can burn 47,500 hours longer with very low heat (lost energy) output; has no UV output.

This results in tremendous savings in the kWh used:
•Longer use life means less replacement costs and staff time for maintenance
•Low heat output results in safer handling for staff and reduces the load on the HVAC system (see Evaluation Metrics)
•No UV output (and less heat) improves the environment for conservation of the artworks.

Commented [GK2]: Repetition

When calculating using USFCAM's track light usage in one year - assuming lights are on 9 hours a day for 312 days a year; and we are using 150 - 21W PAR38 LED's and 25 - 6W MR16's, the following is the approximate savings:

1. 31,098.6 kWh from the LED lamps and 10,366.2 from reduce load on the HVAC system for a total of 41,464.8kWh saved.
2. For every one LED PAR38 lamp used for 50,000 life, 20 Halogen lamps are used. Average per 21W LED PAR38 is $56.00 and $7.50 per 90W Halogen PAR38. That is a saving of $94.00 per lamp, or $792 per year for 150 lamps. The saving on staff time for changing out the burnt out lamps is less defined to calculate, but is definitely substantial.

We are confident of the projected outcome by using not only the LED manufacturers estimates, but also by testing the lamps ourselves using several methods. A traditional method is in field observation, like touching the lamps to compare the different heat output. We can also use our light meters, UV meters to test the UV output and lumens of the lamps. There are also proven formulas to calculate the savings of kilowatt-hours, as described in detail in the Evaluation Metrics section.

The Museum lobby has signage that informs visitors that USFCAM is accredited by the American Alliance of Museums, as does our website. With the confirmed positive LED conversion results, CAM will also use signage and website to credit the USF Student Green Energy Fund for the lighting system upgrade, and the support of its initiatives that encourage technologies that lower energy consumption to create a greener building and work environment on the USF Tampa campus.

Amount Requested
The total amount of funding to complete the project

$ 9,100.00

Budget Justification (1,000 words)
Detail all expenditures for the project, including a brief statement describing the nature and necessity of the expense.

Expenditure:
150 21W PAR38 LED lamps...average @$56.00...sub-total $8,400.00
25 6W MR16 LED lamps.....average @28.00....sub-total $700.00
Total $9,100.00

The number of lamps requested are based on the maximum number of lamps we have used in past exhibitions.

The cost is based on the type of LED lamps the museum staff has tested or will be testing. The decision on the type of LED lamps to purchase will be based on the final results of the tests. We use primarily 90W Halogen lamps. But, depending on each exhibition's needs, we have also used a variety of narrow spots to wide floods with various wattages.

So the final cost will be determined after testing all the bulbs as needed. The cost range is not dramatically different between the various manufacturers, so the above amount is a close estimate.

Resource Matching (500 words)
Describe additional sources of funding that have been applied for and/or received for this project.

This project, 'Finding An Energy Efficient Light Bulb' is part of a larger plan of improving USFCAM's complete track light system, which includes new fixtures; additional tracks and a dimming switch system.

'Finding An Energy Efficient Light Bulb' contributes to the overall plan of reducing energy consumption, reducing the load on the HVAC system, improving art conservation, reducing labor and material costs and a general aesthetics upgrade.

We have raised funds through our museum donors and sponsorship programs for the museum's overall building fund. Because of the high cost of the other aspects of the track light upgrades, we are hoping The Student Green energy Fund (SGEF) will be able to cover the cost of the energy efficient LED bulbs.

Commented [GK3]: Why was the lump replacement left out from the fund requisition for the overall upgrades?

Timeline & Milestones (500 words)
Provide a schedule for the project from start to finish, noting the general dates of major milestones and accomplishments.

As described in Resource Matching, finding an energy efficient light bulb is part of a much larger project to improve USFCAM's complete track light system. Plans for that began in 2011.

The part of looking for an improved light bulb began in February 2012. Testing LED bulbs to the Halogen started in June 2012 with LED lamps from General Electric and Sylvania.

The complete testing should finish in November this year. At that time we should know the best LED brand to use in our situation.

Should we receive The Student Green Energy Fund, we will immediately complete purchase order requests for the LED lamps we tested to accomplish our exhibition and facilities improvement goals.

Our current exhibition closes on December 15, 2012. We will then prep the galleries and install the next exhibition to open January 18, 2013. So it is our aim to have the new LED lamps ready and installed for operation by this date.

Evaluation Metrics (500 words)
Provide a plan describing how the project will be assessed for effectiveness, noting how each goal or objective will be evaluated.

As noted in Project Description, in conversion from Halogen to LED lamps, we are looking for improvements in energy consumption, heat output - affect on HVAC load and staff handling, longer life hours, improved color and lumen output and quality, and UV output amount.

To evaluate and assess whether the objectives are met, there are formulas, test equipment and field observations will be used and applied.

For improvements in energy consumption, besides the manufacturers' estimates, we have the following formula to calculate energy used and potentially save: watts of the lamp being used, divide by 1000 to get kilowatts (w/1000=kW); multiply that by the number of hours usage to get kilowatt-hours (kW*hours=kWh).

Ultimately, we can compare the electric bills during the Halogen period with the bills after the LED's are installed and in operation. The actual dollar amount saved will depend on the cost of electricity, and how much the University pays per kWh.

For the reduced heat output's affect on the HVAC system, the general rule is that for every three watts of power saved in operational costs with LEDs, one watt is saved from HVAC operational costs (Source: The Getty Conservation Institute and the Canadian Conservation Institute. Report attached.)

The final method is using field observation, which we are applying in side-by-side comparison testing of the LED's and a known standard. For the color rendering, lumen and UV output, we first have the manufacturer's data from their test results. We also have light meters and UV meters we use to record the long-term usage results, and confirm how that advances our exhibitions and aesthetic goals.

Based on these methods and formulas, and the number of hours and lamps in operation as estimated in the Project Description, and based on $0.11 cost per kWh, the savings are :

$3,420.85 savings from the conversion to LED's;
$$1,140.28 savings on the reduced load to the HVAC system;
$792.00 savings on the reduced replacement costs for the lamps.

Plan for Sustainability (500 words)
Describe how the project will be sustainable over the long term, including any institutional commitments received for assistance in maintaining the project after its completion.

It is the mission of USFCAM to present a regular changing exhibition schedule. This is what we do to the maximum extent our ingenuity and resources can carry.

There is an extensive record of USFCAM's commitment to maintain every aspect of its operation necessary to fulfilling its mission, via grants, fund raising events, courting donors, sponsors, patrons and many other efforts through out this institute's history to maintain and advance its programming, staff continuing education of skill and knowledge, improvement of working environment, facility and infrastructure.

And USFCAM's gallery lighting system is an integral part of this continuing effort. We already have a regular maintenance schedule for keeping the track lighting system functioning. Maintaining the LED lamps provided by the SGEF will be similar to maintenance schedule already in place for the Halogen lamps. As we phrase out the Halogen lamps, we schedule in the LED maintenance.

And the maintenance and upgrade schedule will adapt as the LED technology develops and evolves, or as other technologies advance to replace LED’s. At which time we may need to apply for another SGEF or other funding sources.

Annual Energy Savings 41,464.8 kWh