SGEF Application Review Portal: Greetings, Zaida Darley!

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USF Solar Initiative ($160,554.00)

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Status	Open/Funded
Administrator Options	Mark As Open/Under Review I Mark As Open/Not Funded I Mark As Closed/Funded I Mark As Closed/Not Funded
Proposal Cycle	Fall 2011
Principal Investigator	Jamie Trahan (jltrahan@mail.usf.edu, Phone: 8133907446)
Co-Investigator	Brian Bell (bdbell@mail.usf.edu, Phone: 9412845742)
Co-Investigator	Alden Earl (, Phone: 15112655523)
Organization	GAANN Fellows

Project Details

Description **582 words**	As a university that that has signed on to the American College and University Presidents' Climate Commitment (ACUPCC) and upholds that commitment as a priority, the University of South Florida (USF) is poised to become a leader in energy efficiency and renewable energy technology. By implementing the USF Solar Initiative, a plan that optimizes the amount of solar energy generated on campus using allocated funding from the Student Green Energy Fee (SGEF), the university will usher in a new age of dedication to sustainability, fostering creativity and leadership towards long term solutions to today's energy problems. The USF Solar Initiative proposes two ways to make renewable energy a reality at USF: • Installing photovoltaic (PV) panels on the roof of the Marshall Student Center (MSC) • Upgrading the PV system that is already proposed for the new amphitheater canopy of the MSC. These projects can be funded separately if necessary, but funding both projects simultaneously can create a more efficient implementation process and better utilization of funds. Combined, they will also bring the university one step closer to accomplishing the ACUPCC's goal that the university begins purchasing or producing at least 15% of the institution's electricity consumption from renewable resources within one year of signing the Climate Commitment. As systems that utilize photovoltaic panels, they will show immediate results in reducing greenhouse gases such as carbon dioxide and nitrogen oxide (CO2 and NOx), as well as toxic gases and heavy metals that are produced by conventional fossil-fuel derived energy technologies. An additional benefit lies in producing electricity at the point of use, which minimizes energy losses associated with transmission of electricity from the power plant. All energy production, carbon offsets, and other emission reductions will be tracked and reported to the Sustainability Tracking Assessment and Rating System (STARS). The USF Solar Initiative will be accomplished with the support of multiple organizations, individuals, and industry professionals to form a comprehensive and diverse solution that enables long term, sustainable reduction of USF expenditures for energy related costs. This project will succeed in providing social, economic, and environmental sustainability because it will be professionally supervised and community

	driven. Students will be educated on this project through an interactive solar display that will showcase the solar energy project, provide a learning tool for classes, and provide a design experience for graduate and REU students. The interactive solar display is an educational kiosk that will connect students to the solar project. If both projects were funded simultaneously the educational component could integrate the two systems' impacts on USF energy demand. For the campus to become truly sustainable there must be a variety of renewable energy systems and energy efficiency measures utilized on campus. While many reductions in energy consumption can be made by improving efficiency and reducing wasted energy, this initiative, if chosen as the first SGEF funded project, will not only provide sustainable energy production but will also symbolically represent the university's decision to take action on promoting and ensuring a clean and healthy future. PhD students with a background in solar engineering will lead this initiative with passion and determination and will continue to generate a wave of support from faculty, administration, industry, and student organizations to make solar energy production a reality at USF. Please see attached proposal for additional supplementary information. Faculty Advisors and supporting groups are listed on the first page. One more principle investigator, Trina Halfhide, is also listed and should be as recognized as all other listed principle investigators.
Amount Requested	$160,554.00
Amount Received	$0.00
Budget Justification 644 words	Please refer to Table 2 of the PV system budget in the attached proposal for additional detailed information. This proposal includes two potential funding options which can be funded separately. In a meeting with the Facilities Director, project manager, and consultant from Gould Evans, it was discussed that a 6.125 kW PV system was already planned for the MSC amphitheatre and that some of the 'soft costs' had already been paid, but it was not yet known if the budget would allow for actual construction of the system. A quote from Solar Source for the proposed PV system including installation amounted to $32,339. A potential expansion of 2.695 kW was addressed at a cost of $13,240, bringing the quoted total to $45,579 for an 8.82kW system. The 8.82kW MSC amphitheater system, not including any educational components, is proposed in our lower cost range. Since it is necessary to educate and connect USF students and faculty to a PV system that is physically out of reach, a monitoring system will detail the current energy production and annual CO2 offsets to a display that is public and easily accessible. This display includes a sleek educational kiosk with an accompanying solar panel and will be located outside the MSC to allow maximum viewing in one of the campus' busiest areas. The suggested kiosk is shown in section 3.5 in the attached proposal. The kiosk and solar panel costs approximately $1500-$2000. The simple monitoring system required to transfer information from both PV systems to the kiosk has been approximated at $4000. Additionally, the kiosk must be programmed and the educational script for the kiosk and student outreach must be written, all of which will take hours of work. The proposal discusses hours for an REU student to help program the kiosk as well as a flat amount of graduate hours to assist them, create and foster student involvement and knowledge of green initiatives on campus. It is assumed at least 100 hours of graduate assistance will be required, with no more than 100 hours paid for at a rate of $15/hr, totaling $1500. The combined cost of fully-funding the MSC amphitheatre ($45,579), the educational kiosk ($2,000) the monitoring system ($4,000) and the graduate student involvement ($1,500) creates a lowest range cost of $53,079. The second proposed PV system is a 15 kW solar field installed on the MSC rooftop (proposal section 2.1, figure 1). Cost estimates for this system are based on the Solar Source quote for the MSC canopy PV system. As is common in the calculations in the attached proposal, estimates were rounded up; the cost for the 15kW system was then increased to $5.1/watt, with an expectation that if both systems are funded this cost will likely decrease. At $5.1/watt a 15kW system would cost $76,500, as provided in Table 2 of the proposal. It was noted from the group's meeting with Facilities that Gould Evans would do the required design drawings needed for permitting of the system. This would add $7,500 to the cost of the PV system. The group was also notified that a construction manager would need to be hired and would cost approximately 12%-15% of the cost of the PV system, adding $9,180 - $11,475 to the cost. The price of the above educational kiosk, monitoring system and graduate-hours are also applicable to this system. Thus the 15 kW system ($76,500), design drawings ($7,500), construction manager (top end $11,475), educational components and graduate hours ($2,000, $4,000 and $1,500) would total $102,975. This amount is for the MSC rooftop and, as said before, kiosk and graduate work. Funding both systems will likely reduce costs by power of purchasing in bulk, as explained earlier in the application. In addition, the monitoring system, kiosk, and graduate hours would be grouped together. The cost for funding both systems completely is then $148,554: $45,579 for the 8.2 kW amphitheatre, $7,500 for the educational kiosk, monitoring system and graduate work, $76,500 for the 15 kW MSC rooftop, $7,500 for the design drawings of the roof, and $11,475 for the construction manager hired for the rooftop installation.

Resource Matching **369 words**	Many opportunities for fund matching and financial support of the proposed systems have been investigated including incentives from the Tampa Electric Company (TECO), government programs and tax incentives, and financial commitment from the MSC for system upkeep. Ms. Shelly Aubuchon, who works in TECO's Energy Management Services department on sustainable energy initiatives, was contacted in an effort to garner financial support from TECO. Communication has not resulted in any agreement to financial collaboration from the utility on the proposed PV systems. Joe Synovek, the MSC director, and Randy Hoople, the MSC maintenance supervisor, have endorsed both proposed systems as desirable additions to the MSC and encouraged the group's efforts by claiming that the system would be maintained by MSC personnel and that any required maintenance costs would be submitted for approval to Student Government. Maintenance costs of the system should be minimal, however the replacement of inverters will be an important part of keeping the system functioning. The MSC has committed to supporting this system by replacing any necessary system components and checking the system to make sure it is functioning properly. The benefit of funding the MSC amphitheater canopy system is that any "soft" costs such as architectural drawings, permitting, and construction manager costs, are already paid by funds allocated to the construction of the amphitheater canopy. Therefore direct financial support has already been committed by facilities and the MSC for this system. Anne Jetmundsen, a tax advisor for USF, was contacted for her expertise on possible tax incentives that the university could benefit from. After talking with her it seems that the possibility of benefiting from tax incentives is uncertain but may be possible. These tax incentives are not included in the project costs, though if they can be employed it may be possible to receive up to 30% of the total project costs back in tax credits. Additional production tax credits are available from the federal government but because of USF's status as a public university, the ability to use these credits is also uncertain. It was communicated by Anne that "It is possible that USF could benefit from the credit as it files Form 990T which is similar to a corporate tax return".
Timeline **385 words**	The implementation of the MSC amphitheater upgrade project will be governed by the existing Facilities construction plans. It is the understanding of the Principal Investigators that construction is scheduled on November 7th, 2011 and should be complete by January of 2012. All permitting and construction plans are already complete, making this project an extremely appealing funding opportunity because it can be implemented quickly and smoothly. The MSC rooftop PV system implementation is broken down into three phases. Each phase is then broken down into sub-phases. Tentative start and finish dates have been assigned to each. Many of these phases and sub-phases will be performed simultaneously in order to implement the system efficiently. Technical Design 1. Project Manager Meetings (Start: 11/02/11 Finish: 1/02/12) 2. Finalized Design (Start: 11/02/11 Finish: 2/02/12) 3. Permitting (Start: 12/05/11 Finish: 2/02/12) 4. Finalized Contracts (Start: 01/10/12 Finish: 2/13/12) Implementation of System 1. PV system installation (Start: 3/05/12 Finish: 4/09/12) 2. Monitoring System (Start: 4/09/12 Finish: 4/23/12) Educational outreach 1. Preparation of content (Start: 1/10/12 Finish: 8/15/12) 2. Showcasing interactive kiosk (Start: 5/01/12) 3. Student feedback (Start: 5/01/12) Explanation of Implementation Phases and Terms Technical Details •Project Manager Meetings: This will include multiple meetings with the Project Manager, GAANN fellows, Gould Evans, MSC staff, and Facilities to establish the project goals and implementation. •Finalized Design: Complete all architectural and engineering drawings that are necessary •Permitting: Project Manager will work on permitting as soon as appropriate engineering drawings are available •Finalized Contracts: A bid will be released for contractors. Contracts for all jobs will be determined by the Construction Manager, GAANN students, and Facilities. Implementation of System •PV Panel Installation: Roof work and mounting structure will be complete and PV panels will be added. •Monitoring System: Monitoring will allow USF to track energy production. Information will be used in educational component of the project Educational Outreach •Preparation of content: GAANN students will prepare educational content in conjunction with TIER REU students •Showcasing interactive kiosk: This kiosk will be interactive and allow students, faculty, and visitors to view relevant information on solar panels, showcasing university activity for renewable energy, and allowing for feedback on the energy project. •Student feedback: Student Feedback will be compiled through information obtained from interactive kiosk and possibly other resources (ie. facebook and other social media). This information will be accessible to students, researchers, and USF Administrators to help guide future funding projects and learn about what students want the green energy fund to be spent on.
Evaluation Metrics **394 words**	Monitoring System Effectiveness of the project in terms of energy production can easily be gauged with the use of monitoring systems that are readily available through solar distributors. The monitoring system will record the total power production of the implemented PV system(s) and this data can be displayed on a TV screen in the Marshall Center. The collected data will be recorded and analyzed to see if it corresponds to expected power production models. Other data will be calculated based on

	these power production measurements such as carbon offset and emissions offset. This data will be stored and accessible to students, faculty, and administration and will be accessible by contacting the project's Principal Investigators. All relevant information will also be displayed through the educational kiosk. Educational Kiosk Per Joe Synovek, the MSC director, the educational kiosk will be on display at the MSC for at least one month. A space impact form has been submitted but not yet approved. The kiosk will feature a touch screen computer and solar panel display. A picture of this kiosk (minus the solar panel) can be found in the attached document in section 3.5 figure 2. After a trial period at the MSC, the location of the solar education kiosk will be re-evaluated and the final location will be determined. The goal of the kiosk is to communicate to the students and visitors of the MSC the impacts of the green energy fund through the USF Solar Initiative. Project information and solar education information will be communicated in a way that reaches all students, not just engineers or scientists. REU students and graduate students will prepare the content for display. Students will also be able to comment on the USF Solar Initiative. If a measure of the effectiveness in educating the student body on renewable energy is desired, a survey can be performed. Student Feedback After understanding the economic and environmental benefits of the project, students will be able to submit their feedback which will be collected through the solar education kiosk and possibly social media (ie. Facebook, Twitter, etc). Student concerns, comments, and support will be critical in evaluating the effectiveness of the project. This feedback will be available for students, faculty, and administration in an effort to evaluate the effectiveness of the USF Solar Initiative and determine if there is support for future solar energy projects.
Sustainability Plan 188 words	Sustainability of the PV system is guaranteed as long as personnel are available for scheduled O&M. As previously mentioned, MSC staff members have voiced their support for the proposed projects and are willing to maintain the systems throughout their lifetime. They are also willing to submit a budget for any maintenance costs that are associated with the PV systems, as is done for other components of the building that require replacement. The ease of operation and maintenance of photovoltaic systems makes this an attractive technology for energy production, especially on a large scale and for a system that does not utilize battery back-up. PV systems can be thought of as maintenance free, however the performance of the solar panels can be assured with occasional preventative maintenance and inspection procedures. A typical scheduled operation and maintenance (O&M) protocol should include washing of panel surfaces during dry periods when rain is not available to naturally clean the panels, examination of the panels to check for cracks, discoloration, or other defects, and inspection of the inverters and wiring. These routine inspections are only required once or twice a year.

Return On Investment Details

Energy	34066 kWh
CO_2 Emissions	60189.85276 pounds CO_2 per kWh
Cost Savings	$3747.26
Return On Investment	2.00%

Attachment	View Attachment

Reviewer Comments (Add Yours)

On 2011-10-17 14:48:24, **Margaret Rush** said:

I think this is a classic PV project that is situated in a central, active area on campus. I would combine the MSC rooftop and amphitheatre for a more significant project for energy production. The interactive solar display is essential for visual awareness of the project and can be very interesting to instantly evaluate solar output under different weather conditions. The price tag is high, but not unreasonable for a medium sized solar project.

On 2011-10-13 12:39:56, **Stanley Kroh** said:

I like the interactive component and especailly the fact that it will be located in a busy area to maximize exposure. I also like that energy production, carbon offsets and other emission reductions will be tracked and reported to STARS. The project will provide a learning tool for classes and a design experience for graduate students and will be led by PhD students, so there are opportunites at all levels. Excellent details on costs and alternatives and it appears an exhaustive effort was made to identify other funding sources.

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