

PROPOSAL NARRATIVE

(Max. of 3 pages including figures/tables but excluding budget page, 1" margins, 12-point font. See Sec. XII of RFP for more details.)

Proposals not complying with format guidelines will not be considered.

I. Project Title

Solar-Powered Cook Stove

II. Abstract

As a part of the Appropriate Technology program at Cal Poly, we have worked closely with the technological and business model development of a Solar-Powered Cook Stove. Our research thus far has been productive, yet limited due to our inability to easily work with and develop the technology based off of the needs of the end users. The advancement of this technology will benefit from the opportunity for Cal Poly students to work directly with target communities in Sub Saharan Africa. We are requesting the financial funding from the Warren J. Baker Endowment for the learning opportunity to gather primary market data in order to further develop our technology based off the directly observed needs of end-users in the developing world.

III. Introduction

According to the World Health Organization, "Over 4 million people die prematurely from illness attributable to the household air pollution from cooking with solid fuels" which is more than three times the global fatality rate of AIDS. This highlights an incredible problem that many families in developing countries around the world are experiencing first hand. There are too many people using inefficient cooking mechanisms which lead to a myriad of health problems from smoke inhalation due to cooking with open fires in their homes. Furthermore, there is a large harmful environmental impact that comes from the biomass combustion stoves in millions of homes around the world. Deforestation and GHG emissions are primary areas of concern when assessing the current environmental impact of wood fueled cook stoves.

Technical solutions such as our solar-powered cook stove serve as an innovative and appropriate way to eliminate indoor cooking related deaths while eliminating the associated environmental harm that arises from traditional biomass cook stoves.

IV. Objective(s)

Our **overall objective** is to improve the quality of life for many people by providing solar-based electrical cooking services while reducing environmental impact by displacing environmentally damaging technologies largely related to the burning of biomass such as wood.

Our **specific objective** within the scope of this proposal and possible funding opportunity is to travel to Africa with the non-profit organization [AidAfrica](#) in order to gather primary market data, work directly with communities to develop our technology based on their needs, and test implementation of some solar cooking units to evaluate our technology's strengths, weaknesses, opportunities, and threats of implementation in the developing world. We are choosing to partner with AidAfrica specifically because they have pre-existing relationships with communities in Sub Saharan Africa and are interested in the possible use of our solar cooking technology.

V. Methodology

We are asking for funds to go to Sub Saharan Africa with AidAfrica in order to gain insight into the lives and cooking methods of local community members. AidAfrica is a non-profit organization that has successfully implemented 60,000 brick cook stoves among other development projects in the Sub-Saharan region of Africa. The brick cook stove is an increased efficiency stove, still using biofuels as the energy input. This differs from our solar cook stove, however AidAfrica has expressed interest in collaborating with us to develop and distribute our solar cook stove.

More specifically, our solar cook stove technology is comprised of a 100 Watt solar panel that is connected to a heating element in the form of a stove top which will emit heat at 100 Watts. Insulation is key to this technology since 100 W is not enough power to bring water to a boil due to heat losses. Subsequently, the majority of our focus during the upcoming months will be developing a second prototype consisting of easily accessible and sustainable insulators such as Cob and hay. It will have a built in temperature controller to ensure that the temperature does not exceed 130 degrees Celsius to prevent a fire. The solar cook stove will be located in the [Student Experimental Farm](#): a space on Cal Poly campus for students to implement and develop innovative and sustainable technologies.

VI. Timeline

There is already considerable interest and activity surrounding the development of the solar cook stove technology, involving about 20 people. This includes the three principle investigators, six Mechanical Engineering senior project students, one business senior project student, and two Electrical Engineering senior project students. In Dr. Schwartz's appropriate technology class, and eight students including us, are dedicated to photovoltaic cooking.

The continuation of engagement from these 20 individuals will continue from now until June 2016. We plan to further develop the technology, business model, and community relations within that time so that by June 2016 two students will have the necessary existing infrastructure to ultimately travel to Sub Saharan Africa with a strong prototype and understanding of an implementation plan. Subsequently, the information gathered on this trip will serve as a pivotal stage in the development of this technology and dissemination model. The trip itself will last two weeks in June or July (subject to Aid Africa's itinerary). The two weeks will be spent traveling through Sub Saharan Africa to observe the current living and cooking conditions, collect primary market research data (in-depth interviews, focus groups, surveys, etc.) and test the prototype in its intended environment.

VII. Final Products and Dissemination

The final product of our proposed field study will be to experience first hand the reality of our targeted end user. We also hope to investigate what the dissemination of solar energy in the developing world on a community scale. More importantly exploring this cooking alternative could be the beginning of many new appropriate technologies that could tackle the number one cause of children's death in developing countries. We look forward to an exchange of knowledge of cultural norms, technical systems, and the fusion of the two.

VIII. Budget Justification

Our intention is to support Cal Poly students in their 'learn by doing' endeavors to develop this solar cooking technology with the hope of widespread dissemination of these technologies in the developing world. Inside of this, we wish to support the involvement of students to provide hands-on experience in science, engineering, product development, business, and marketing. Hence the funding is only for student travel cost and associated travel costs.

PROPOSAL BUDGET

Student Applicant(s):	
Faculty Advisor:	
Project Title:	Requested Endowment Funding
Travel <i>subtotal</i>	\$
Travel: In-state	\$
Travel: Out-of-state	\$
Travel: International	\$ 2500 (per student)
Operating Expenses <i>subtotal</i>	\$
Non-computer Supplies & Materials	\$
Computer Supplies & Materials	\$
Software/Software Licenses	\$
Printing/Duplication	\$
Postage/Shipping	\$
Registration	\$
Membership Dues & Subscriptions	\$
Multimedia Services	\$
Advertising	\$
Journal Publication Costs	\$
Contractual Services <i>subtotal</i>	\$
Contracted Services	\$
Equipment Rental/Lease Agreements	\$
Service/Maintenance Agreements	\$
TOTAL	\$5000

To whom it may concern,

I strongly support this proposal. The Photovoltaic-Electric Cooking Project (besides being a year-long mechanical engineering senior project) is being studied by a group in UNIV-392, Design of Appropriate Technologies including Maddi Fleming and Mia Sheperd. I have known Maddi Fleming for more than a year, as she has taken 4 classes with me - both physics classes as well as both appropriate technology classes. She has always been engaged, successful, and highly motivated to work toward improving the lives of the disenfranchised. I also find Mia Sheperd particularly well-suited for this project because of her engineering background as well as her humanitarian motivation. Additionally, we are actively collaborating with AIDAfrica (<http://www.aidafrica.net/>) in developing these cooking facilities. The subject of cooking in the developing world is likely the World Health Organization's greatest concern as the related indoor air pollution represents 4 million deaths a year (greater than malaria and AIDS together); and fuel collection results in considerable time and money investment, exposure to violence, and deforestation. These students are well suited for this grant because they have been studying the related technology and cultural issues since January (and for some since September). Those receiving the grant will continue on to study the cultural issues surrounding the project such as the factors affecting adoption of the new technologies. Both myself and Dr. Andrew Davol are committed to these projects for the duration of the student involvement and thereafter. We have full access to all the physical resources necessary to support our projects in Bonderson Mustang '60 and the Hangar. Additionally, we will be implementing projects at the Student Experimental Farm where Schwartz is a facilitator.

Sincerely,

Dr. Peter Schwartz