Project SolaRevolution

Cooking Meals One Tracking System at a Time

Team HotStuff

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ABSTRACT

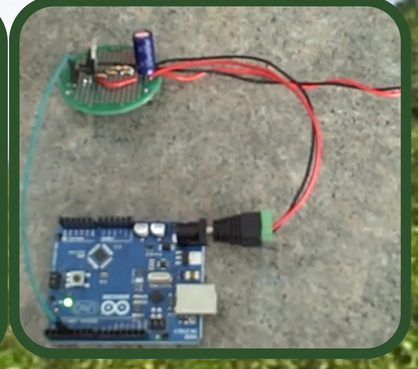
Part of the mission of Mbaracayu Forest Reserve School in Paraguay is to educate children and their families in different forms of sustainable energy that will hopefully be implemented in their homes as well. One such form of alternative energy is produced by the school's Scheffler Reflector, a device used to concentrate the sun's rays onto a single point for the purpose of heating water to be used for cooking and cleaning. The problem, however, is that the reflector's tracking system is malfunctioning; if it cannot follow the sun then it cannot focus the sun's rays and the energy is lost. Our project team designed a solution to this problem by replacing the tracking system of the school's reflector with an electric system controlled by a computer chip interface. We will provide the school with the tracking system, an instructional pamphlet that will help school personnel operate and maintain the reflector, and the computer program that will control the reflector's movement. This will ensure that reflector can be used to its fullest potential, to both educate the students and reduce energy costs for the school.

BACKGROUND

The world is pushing to find alternatives to biomass and fossil fuels for facilitating daily tasks such as cooking and heating. In Paraguay, and many other developing nations, the cost of photovoltaic solar panels is too expensive to be practical. However, an Austrian engineer, Wolfgang Scheffler, designed a solar cooking system that is widely used in countries across Africa and the Middle East. The Fundacion Paraguaya set out to build a system of its own based on Mr. Scheffler's model. Unfortunately, the tracking system was modeled after an older design, which failed to operate properly. Because of this problem, Martin Burt contacted the GPS program and our team stepped up to the challenge to create a system to replace the current tracking system in order for the reflector to be a fully functional component of the Mbaracayu Forest Reserve School's kitchen.

METHODOLOGY

Our approach consisted in switching from a mechanical-type system to the one powered by electricity. Considering that the last mechanical system failed, Martin decided to get an electric tracking system from us. We then considered the sustainability issues of using an electricity-powered system. We then decided on using a system that turned on only for the duration of movement every fifteen minutes, or at the discretion of the user. Once we decided on a system, we began work on it, which involved ordering parts, assembling them, and creating a software system to run the Reflector, along with a manual on how to use and maintain the system. Most of the information we received to aid in the construction and design was from Jean-Claude Pulfer and other resources given to us by Martin Burt himself via email and Skype. In the end, we developed a tracking system that will be electrically-powered and adjustable via a software program that is compatible with the computers owned by the Fundacion Paraguaya and easy to use by minimally trained personnel.



RESULTS/RECOMMENDATIONS

We will be providing Martin Burt and the Fundacion Paraguaya with the following:

. The tracking system
. Operational software
. A copy of our report
. An instruction manual on installation
. Materials List

PROJECT GOALS

. Produce a solution to the problem presented to us by Martin Burt.
. Allow the Scheffler reflector of the solar cooker system to be adjusted autonomously to follow the sun.
. Provide the Fundacion Paraguaya with a complete tracking system, along with a set of instructions on how to adjust the speed at which the reflector moves and how to install the new tracking system in place of the current one.

Photo Acknowledgements/Works Cited

http://www.everystockphoto.com/photo.php?imageId=1758597&searchId=88eb60614bb67782bd8c18afb4438329&npos=7

http://users.wpi.edu/~sdolson/wpi_logo.jpg

The above links are for photos either from public domain or logos used within regulations specified by WPI.

All other photos were received from Martin Burt via email or taken by the project group

"Haiti's Few Trees At Risk as Survivors Flee to Rural Areas." Environment News Service. Environment News Service. Web. 20 Nov. 2011. <http://www.ens-newswire.com/ens/jan2010/2010-01-26-01.html>.

"Paraguay - About, Maps, Flag, Weather, Geography, People, Culture & Economy." World Map, Map of the World. Maps of World. Web. 20 Nov. 2011. <http://www.mapsofworld.com/country- profile/paraguay-economy-people-culture- flag.html>.

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