

To: Hundred Projects for Peace Committee

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Project: Pumping System to Provide Water for El Porvenir, Nicaragua

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A mechanical engineering senior design group at Bucknell University is working on the project, "Water for El Porvenir." The goal of this project is to increase the supply of water to the mountain-top coffee cooperative and community of El Porvenir in Nicaragua. The El Porvenir community includes approximately 40 families scattered about the mountain. There is a well at the base of the mountain and a number of large storage tanks located at the top. The current method of water transportation uses a tractor to haul water, providing only two gallons of water per person per day during the 6 month long dry season. This method of water transportation wastes both time and fuel, in addition to supplying an insufficient quantity of water to the community. The lack of water opens up the possibility of substantial health problems for all members of the coop.



This project will be achieved using a pumping system with piping running from the current well over four kilometers up to the El Porvenir community. Several feasible designs for pumping systems have been generated, analyzed, and confirmed. One is powered by a generator with the possibility of future attachment to the power grid, and another is solar powered. Details on both designs have been researched and documented. Each design requires pushing water through a galvanized steel pipe line, for which we are requesting funding.



Summaries of these designs were presented to the El Porvenir community by group members during the January 2007 Bucknell Brigade trip to Nicaragua. The Bucknell Brigade is a delegation of Bucknell students, faculty, and staff who travel to Ciudad Sandino, a city just outside of the capital, Managua. This delegation began in 1999 when a student decided to help the victims of Hurricane Mitch that struck Central

America in October of 1998. Many families were displaced and forced to live on former cow pastures with a piece of tarp and some sticks for shelter. Now the brigade travels down for a week at a time twice a year bringing medicines and other needed supplies. The brigade is hosted by The Jubilee House Community, part of the Center for Development in Central America (CDCA), who is committed to developing an area called Nueva Vida by



answering the community's needs as best as they can. The Brigade has inspired hundreds of students to get involved in helping Nueva Vida not only by raising money and sending medicine, but also by spreading their knowledge on Bucknell's campus and at home.

During this last trip in January, three Bucknell student engineers and a community leader surveyed a potential path for the pipeline. Final decisions regarding this project have been made by the community with the help of the Center for Development for Central America. The pipeline, pump-system, and associated hardware are to be installed by the community members. Local appropriate techniques are to be supplemented with some guidance from Bucknell project members.

Benefits of completion of the project include increased water during the dry season and improved health. This water supply would have economic benefits in terms of crop production; El Porvenir is well-known for its organically shade-grown fair trade coffee, providing the community with a very sustainable economy. Having more accessible water will allow for increased coffee production and will enable the cooperative to roast their coffee for local sales. The roasting of their coffee is the last step in the process that El Porvenir has never done for themselves. This will also increase the quality of life for the community by allowing clean water for drinking, cooking, bathing, cleaning, laundry, and other daily uses. Currently, the community receives approximately just two gallons of water per person per day. This can be compared with the EPA statistic of 90 gallons per person per day in the US and demonstrates the extreme circumstances in which many Nicaraguans live. While we are not proposing a system that will provide a water level such as in the US, we do plan on increasing the current insufficient amount. An increase in water will result in proper hydration and improved hygiene, ultimately leading to noticeable improvements in the community's health. In addition, time and resources allocated to hauling water from the base of the mountain could be put to better use in the community.

With the help of the Davis 100 Projects for Peace grant we will purchase the galvanized pipe that will run water from the bottom of the mountain to the top. This summer, the pipe purchased with this grant will be installed by locals of Nicaragua with guidance from Bucknell Engineering students and professors. This money will fund the most costly part of this project, leaving us to fund the remainder of the pumping components. We are well on our way to successfully funding all parts of the project excluding the pipeline itself through the help of the Bucknell Brigade and Bucknell Alumni. Following the installation of the pipe we will continue to implement the remaining components of the system including the pumps, controls, and valves.

We believe the project can be completed this summer. The engineering design will be completed by April 1 by the engineering students. If the project is funded, the materials could be ordered in May and the installation can begin in June. Some of the students submitting this proposal intend to return to Nicaragua to work alongside the El Porvenir citizens who will install the pipe. Because the pipe will be installed only a few feet below the surface, installation should be completed by the end of the summer. We hope to provide the community with enough technical skills as well as materials to build and maintain this sustainable water system. Their full involvement will create a sense of ownership within the community, which is a critical consideration regarding appropriate development.

Recent history shows how engineering know-how can be used to destroy and displace communities. Please help us change how engineers are seen to affect the world. This project will help us work towards a peaceful relationship between emerging engineers and the world in which we live.