Harnessing

THE SUN FOR CLEAN WATER

Along with our friends, students at Mount Notre Dame and Chaminade Julienne High Schools continue to work toward a simple dream: Bringing renewable energy and reliable safe drinking water to our Sisters in Africa.

It's happening in a special Photovoltaic Learning Laboratory built in a converted garage on the grounds of the Ohio Province Offices in Cincinnati.

At the heart of this Leaning Lab are two operating systems — one for solar energy and another for water treatment. With guidance from Michelle Shafer, the Science Department Chair/ STEM Coordinator at Mount Notre Dame High School, Meg Draeger, STEMM Coordinator at Chaminade Julienne High School and Volunteer Engineer Keith Hanley, the students study principles of solar-electricity and water purification.

PHOTOVOLTAIC PANELS AND LEARNING LAB: Solar panels installed on the roof of the Convent garage generate DC power, which is converted to 120 volt AC power through the Outback inverter located in the Learning Lab. With AC power, light fixtures in the garage and the garage door opener can be operated.

PHOTOVOLTAIC CONTROL PANEL: One section of the Learning Lab contains the key pieces of the photovoltaic equipment including an inverter, charge controller, mate controller and 12-volt batteries. This replicates the equipment our Sisters use in Congo and Nigeria. Students will learn how these electrical components function under varying conditions, how to operate them most efficiently, and how to troubleshoot when the components fail.

LIGHT EXPERIMENT: Ms. Shafer and her Mount Notre Dame students operate experimental equipment that uses light bulbs to test the electrical system. Through this experiment students learn that using light bulbs of a known wattage generates electrical demand or load on the system. For example, ten 100-watt bulbs create a load of 1000 watts.

They will also learn about how the photovoltaic portion of the Learning Lab performs over time and under varying weather conditions. Specifically, they will learn how much time it takes for the batteries to be drained and recharged under different loads and climatic conditions.

WATER TREATMENT FLOW CHART: Keith Hanley explains the water treatment system used by our Sisters in Ngidinga, Congo to Ms. Shafer and the Mount Notre Dame students. The Ngidinga system includes a water tank, pumps, filtration equipment, UV light (for sanitization), pipes and instruments.

ANTUNES PUMP: In another area of the Learning Lab, the students study water treatment techniques through the use of an Antunes ultra filtration system. This equipment was donated to the Lab by Jane and Glenn Bullock, whose company manufactures the equipment. It offers more advanced technology than that found in our water treatment system in Congo and Nigeria. It also offers the potential to improve dirt removal and make the UV light water sanitization process more efficient. Students learn how to select and size tanks, pumps, piping, valves and instruments in a complete water treatment process. Next school year, students will learn how this new water treatment technology performs and how it can be used with our water treatment systems in Congo and Nigeria.

In the near future, Mount Notre Dame and Chaminade Julienne students will work with University of Cincinnati engineering students to develop a flow diagram for treating water that matches the process in Ngidinga. In addition, students will learn how to run and experiment with the water treatment system in other configurations.

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members to use; both women and children can gain easy and quick access to water without the risk of accidents and deaths from falling into the water source.

Bore holes do not run dry even in drought conditions and can provide a safe and reliable source of water for the whole community. In combination with photovoltaic energy, boreholes can provide pumped and piped clean water to an entire community including schools and clinics.

Photovoltaic Project

Since 2003, photovoltaic plants have been installed in villages in Nigeria and Democratic Republic of Congo where our Sisters live and work. These sites provide electricity and clean water to the hospitals, clinics, schools, and communities in these villages where our Sisters serve the poorest of the poor.

The main components for building the photovoltaic plants include: *solar panels* to collect energy from the sun and convert it to electricity; *batteries* to store the electricity; *water purification* equipment to clean and treat water; and a *satellite dish* or *cellular service* to obtain internet access.

Using the power of the sun saves lives!

And let all the poor, let them come to the water…
Bring the ones who are laden, bring them all to the Lord;
Bring the children without might. Easy the load and light;
Come to the Lord…"
Isaiah 55

Sisters of Notre Dame de Namur
701 E. Columbia Avenue • Cincinnati, OH 45215 • 513-761-7636
www.sndohio.org/our-work/Clean-Water-Project

Why Clean Water?

Throughout Africa, there is a critical lack of clean water for drinking and sanitation…almost one billion people do not have access to safe water.

It is well documented that simply providing safe, clean drinkable water can reduce deadly diarrheal and other devastating diseases by about 50%. Providing a safe and efficient supply of clean water means children spend less time tending to survival tasks and more time dedicated to studies and brighter futures.

Your support will help the Sisters of Notre Dame de Namur in Africa provide life-changing electricity and clean water.

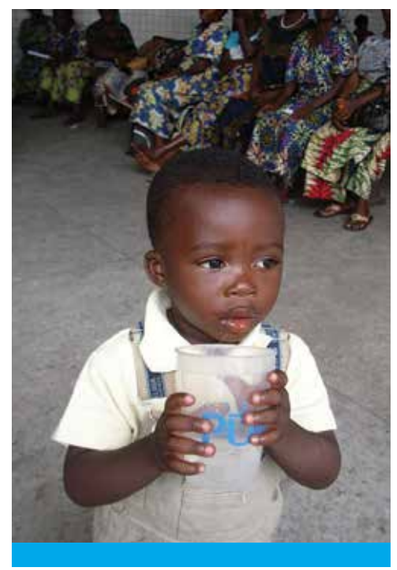
Clean Water *for Life!*

Sisters of Notre Dame de Namur

Meeting the Need

The Sisters of Notre Dame de Namur are using the following solutions to meet the critical need for electricity and clean water in Democratic Republic of Congo, Kenya and Nigeria.

- P&G Water Purification Packets
- Bore Holes
- Photovoltaic Project



P&G Water Purification Packets

The P&G water purification packet was created to enable people anywhere in the world to purify dirty water in a simpler, more affordable and convenient way. It is based on technology similar to municipal water systems in developed countries. The global network of schools and clinics where our Sisters serve are natural distribution and education points for the water purification packets. One $.10 packet purifies 2 ½ gallons of contaminated water.

Bore Holes

A hydrogeological survey is completed to indicate a location in or near the village likely to contain an underground water supply. Then a bore hole is drilled deep into the ground (300+ feet) using motorized equipment.

Pipes are installed into the hole, a concrete pad is installed over the hole, and a hand pump is installed to allow clean water to be brought to the surface. Boreholes are safe for all community

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