



Solar-Powered Hospital in Haiti Yields Sustainable Savings



It's among the most basic, most critical, and most overlooked resources needed to run a hospital: electricity.

But in Haiti's Central Plateau, the flow of energy is intermittent at best. Consider that in Mirebalais, located 30 miles north of Port-au-Prince, the power goes out for an average of three hours each day. This poses an enormous challenge to running any hospital; surgeries are jeopardized, neonatal ventilators stall, the cold chain is interrupted, and countless everyday tasks get derailed. As Partners In Health co-founder Paul Farmer noted during a recent lecture at the Harvard School of Public Health, "It's not great if you're a surgeon and you have to think about getting the generator going."

To make sure the patients and staff at Hôpital Universitaire de Mirebalais (HUM) aren't left in the dark, PIH and its partners looked toward the sun. Stretched across the roof of the new 200,000-square-foot hospital is a vast and meticulously arranged array of 1,800 solar panels.

On a bright day, these panels are expected to produce more energy than the hospital will consume. Before the facility even opened its doors—the official opening is slated for March—the system churned out 139 megawatt hours of electricity, enough to charge 22 million smartphones and offset 72 tons of coal. Perhaps most important is that the excess electricity will be fed back into Haiti's national grid, giving a much-needed boost to the country's woefully inadequate energy infrastructure.

Scaling Up

PIH is no stranger to solar energy. In 2007, we collaborated with the Solar Electric Light Fund (SELF) to install small-scale solar-energy systems at five clinics in rural Rwanda. Soon after, similar programs cropped up at PIH sites in Malawi, Lesotho, and Haiti. But scaling this technology to deliver reliable power for a 300-bed hospital demanded elegant design and extensive collaboration.



“The challenge was in the design and engineering, and getting the solar power produced to mesh with the often unstable grids and the backup generators,” said Jim Ansara, HUM’s director of design and construction. “At each step of the way, we were attempting things that had never before been done in Haiti.”

Solon, a German company, supplied the solar panels while Massachusetts-based Solectria Renewables manufactured the inverters, devices that convert the electricity and send it to the grid. To get the system up and running, engineers from Sullivan & McLaughlin Companies traveled to Haiti and trained six local electricians how to install and maintain the system. Two of the Haitian electricians will continue working at the hospital full-time when it opens (overall, it's estimated the hospital will create more than 800 new jobs for Haitians).



In order to maximize energy production, researchers from the University of Oregon provided sun charts that showed how to best position the panels. Though Haiti's ample sunshine is what powers the hospital, the scorching temperature of a sunbaked roof could actually cause the panels to produce less electricity. To work around this conundrum, engineers floated the panels about a foot above the roof and added a coat of white paint, which lowers the surface temperature and bounces more sun rays on to the panels.

“This is an incredibly simple system to maintain once installed,” Ansara said. “All we need to do is rinse the panels quarterly with water.”

Sustainable Savings

In a country ravaged by deforestation, the ecological benefits of this alternative energy source cannot be overstated: Annually, the system is expected to save 210 metric tons of carbon emissions.

And while a sea of solar panels perched atop a hospital in the mountains of Haiti is certainly eye-catching, it's just one part of a comprehensive environmental strategy. Other green-friendly features at the hospital include natural ventilation that minimizes the need for air conditioning and motion-sensor activated lights that cut energy consumption by 60 percent when compared with traditional lighting.

This push toward sustainability and energy self-sufficiency translates into significant financial savings. In Haiti, electricity is expensive: The price per kilowatt hour is 35 cents, compared with 5.5 cents in New England. Using solar is expected to slash \$379,000 from the hospital's projected annual operating costs.

When fully operational, HUM is expected to be the largest solar-powered hospital in the world that produces more than 100 percent of its required energy during peak daylight hours, an impressive feat for the first-ever teaching hospital in central Haiti. The many lessons learned from the project will prove invaluable as PIH, its partners, and others undertake similarly ambitious and sustainable projects.

