

application—membranes

By Andrew Warnes

SOLAR-POWERED water treatment

Combining ultrafiltration and microbiological purification with solar panels for remote populations

The primary obstacle to providing microbiologically purified water to remote populations is cost. Supplying the necessary equipment is only a portion of that cost. There are also the issues of reliably providing basic infrastructure like electrical supply, pumping mechanisms and shelter. By combining several proven off-the-shelf technologies, Innovative Water Technologies, Inc., Dumont, Colo., has been able to overcome these obstacles, and therefore significantly reduce the cost of supplying potable water to even the most remote sites.

The Need

Companies operating remote sites in the petroleum or mineral extraction industries, research institutions with ongoing studies in the field, nongovernmental organizations with missions to improve the lives of populations in the developing world, and recreational facilities that market a remote and pristine environment all share the need to provide their residents with microbiologically safe drinking water. These sites might be endowed with ample surface or groundwater supplies, but they are often contaminated by sediment, bacteria, virus and cysts.

Water cannot be trucked in where there are no roads, and in places with adequate transport links it is often uneconomical to do so. Water pumping and treatment equipment cannot be powered where there is no grid, and the use of a generator requires fuel transport and storage. Generators can also reduce the quality of life for those who have to be near them day after day. Drilling a well still requires bringing in equipment and a power source. If piped-in supplies are a potential option, it is often cost prohibitive.

All of these obstacles can be overcome with money, but money is often more scarce than water at these locations.

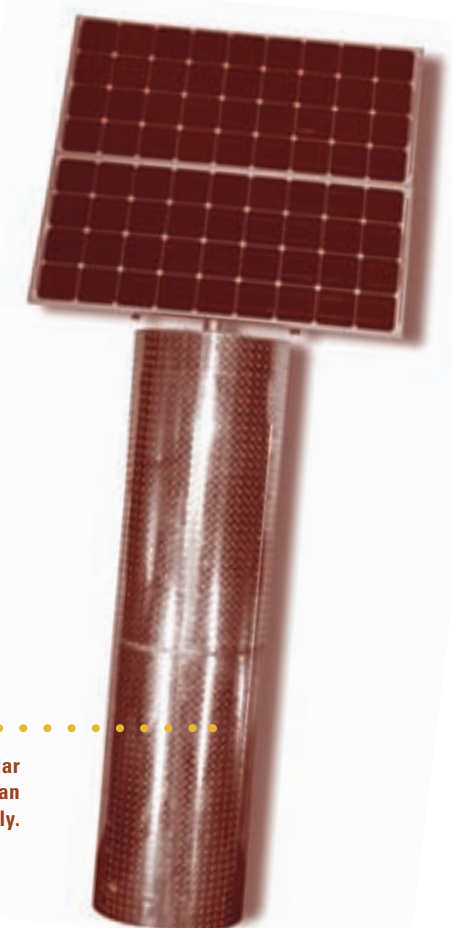
The need to provide product water that meets regulatory requirements is

another barrier. Organizations like the World Health Organization and the U.S. Environmental Protection Agency (EPA) provide safe drinking water guidelines based upon considerable study and experience. Even in the most remote locations, the target should be a reliable supply of water capable of complying with the guidelines of these organizations. Compromising water quality to compensate for difficult conditions can lead to unfortunate and potentially deadly results for organizations and the populations which they are responsible.

The Technology

There were three main technological obstacles that had to be overcome in order to develop a reliable remote solution. The first was treatment technology, the second was power supply and the third was shelter for the first two.

A scaleable series of solar panels were used to achieve an adequate power supply.



To achieve adequate water treatment, Innovative selected the GE Homespring ultrafiltration system as the core technology in their solar powered units. The Homespring uses hollow fiber membranes with 0.02 micron- (nominal) sized pores to remove sediment, bacteria, virus and cysts. The Homespring systems are widely available, proven and independently tested and certified to EPA Microbiological Purifier Guide Protocol for 7 log bacteria and 5 log virus reduction. They are also independently tested and certified to ANSI/NSF standards 42 and 53. Because the Homespring was designed for use on municipal, ground or surface water supplies, because it generates relatively high flows with low pressure drops, and because it is self cleaning and requires electricity only to initiate backwash,

the systems were ideal to incorporate into a solar-powered treatment system.

To achieve adequate power supply, Innovative Water Technologies included a scaleable series of GE solar panels. These panels can generate sufficient electricity to operate a system pump (models differ depending on depth and proximity of water supplies), a dosing pump to dispense chlorine residual when desired, and a battery pack to store energy for operation at night and to initiate backwash for the Homespring ultrafiltration system.

To house all of the above, Innovative Water Technologies designed a canister that can be made of diamond plate steel or aluminum. The canister protects key components from the elements and also prevents vandalism and theft. It was designed to be compact for shipping,

yet offer sufficient space for service and maintenance.

None of the key elements of the systems designed by Innovative Water Technologies are new. By combining existing water treatment systems, solar panels and designing a shelter to hold them, Innovative has delivered a reliable platform for water treatment that is truly off-road, off-grid and within many budgets. Like many other examples of revolutionary advances in technology, the owners of Innovative saw a need and used readily available technology in novel ways to meet it. *wqp*

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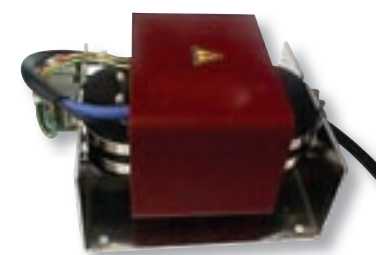
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