

**Title:** Fresh Water-The Impending Crisis of the Developing World

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**Abstract:**

It is anticipated that fresh water will be the oil of the 21<sup>st</sup> century, especially for most developing countries. Unlike fossil fuels that can be replaced by alternate technologies, water has no substitute (Ref 1, 2). Fresh water constitutes only about 2.5 percent of the total volume of water on Earth, and two-thirds of this fresh water is locked in glaciers and icecaps. Just 0.77 percent of all fresh water is held in aquifers, lakes, rivers, etc, (Ref 3). Irrigation accounts for the lion's share (70 percent) of the world's consumption. Today, 26 countries are considered water-scarce and by 2050 this number could reach 55 countries. As major rivers dwindle to a trickle farmers (and cities) pump water from underground aquifers, seriously overdrawing these resources. In fact, many countries in the Middle East (ME) and North Africa (NA) are experiencing the invasion of salt water into these overdrawn wells, making them brackish (1000-4000ppm solids) and unfit for domestic use and irrigation.

During the past five years, the author has been involved in the development of solar and wind-operated desalination systems for brackish waters in MENA villages, systems that are increasingly becoming affordable. The work that will be described in this presentation includes small scale solar desalination units (0.5-400m<sup>3</sup>/hr), now in use in Iraq, Jordan, the West Bank and Libya, for schools and small villages (Ref 4, 5). Most MENA countries have high solar insolation, and some have good wind resources (coastal regions). The renewable energy operated desalination systems include simple solar stills for distillation and more sophisticated but small reverse osmosis desalination units, with electricity generated by wind and/or solar cells (photovoltaics-PV). We will describe a few of these systems in actual operation today, and plans for assembling skid mounted mobile units that can be trucked from location to location to generate fresh water and store them in large cisterns for subsequent use. It will be shown that fresh water can be produced by such mobile units at less than 50 cents a cubic meter which is often competitive with trucking it in to remote locations.

*References*

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