

Just add humidity: How this air-to-water machine can quench your thirst

20 June 2019, by Andrew Boryga



Credit: CC0 Public Domain

It's a devil's pact: The gleaming rays of sunshine this time of year come hand-in-hand with body-drenching humidity. But what if that humidity could serve as a commodity for our current and future water needs in South Florida and beyond? What if clean water could be created ... right out of thick air?

A niche industry has emerged in recent years to do just this, and a small Cooper City company, with access to all the suffocating humidity they could ever want, is a key player.

Atmospheric Water Solutions or AWS, sits in a very unassuming office park, but since 2012 they have been tinkering with a very remarkable product. They dub it the AquaBoy Pro. Now in its second generation (the AquaBoy Pro II), it is one of the only atmospheric water generators available to the everyday buyer on the market in places such as Target or Home Depot.

Atmospheric water generator sounds like something straight out of a sci-fi movie. But Reid Goldstein, the executive vice president of AWS

who took over in 2015, says the basic technology traces back to the development of air conditioners and dehumidifiers. "It's essentially dehumidification technology with modern science thrown in."

The device's sleek exterior resembles a water cooler without the cooler and costs upward of \$1,665.

It functions by drawing in air from the outside. In places with high humidity, that air brings plenty of water vapor along with it. The warm vapor makes contact with cooled stainless steel coils inside, and, similar to that inconvenient water that drips from your air conditioning unit, condensation is created. The water is collected and cycled through seven layers of high-grade filtering until it comes out the tap in EPA-certified, clean drinking water.

Just like that water cooler at work, the household version of the device can create about five gallons of drinking water a day.

The amount depends on the humidity in the air, and where the device is located. Put in your garage or somewhere outside and you'll get more. Stick it in your kitchen with the air conditioner going and it will make slightly less. According to Goldstein, the device requires anywhere from 28% to 95% humidity, and temperatures between 55 degrees and 110 degrees to function.

You can see why somewhere like South Florida is ideal.

About three quarters of the 1,000 units sold so far have gone to homes and offices here or in similarly humid areas around the country, as well as global locales known for their stifling air like Qatar, Puerto Rico, Honduras and the Bahamas.

The other portion of sales have come from bigger devices the company is continuing to tinker with, which can make anywhere from 30 to 3,000 gallons

of [clean water](#) a day and have the potential to service far more dire global needs.

Juan Sebastian Chaquea is a global project manager at AWS. His previous title was project manager at FEMA, where he dealt with the management of homes, shelters and transitional housing during disasters. "In emergency management, the first things you have to cover are food, shelter and water. But all of those things are useless if you don't have water," he said.

Chaquea's previous job taught him about the logistical challenges of transporting bottled water. It is heavy, which makes it costly to ship. It also requires bodies to move and transport once it arrives to a disaster area, which tends to leave people in harder-to-reach areas without access for days. It also easily contaminates when left in the sun for too long.

Chaquea joined AWS this year because he believes the development of atmospheric water generator technology could help solve those issues—and ultimately save lives. "Being able to bring water to people allows them to have the number one thing they need for survival," he said.

Randy Smith, a spokesman for the South Florida Water Management District, has never heard of the product or technology.

But he said the SFWD has always supported citizens to seek "alternative water supplies." According to the agency, groundwater, which generally comes from water found in cracks and spaces in soil, sand and rock, accounts for 90% of South Florida water used in homes and businesses.

It functions sort of like a bank account. We withdraw from it and it is recharged by rainfall. And though it rains plenty in South Florida, the potential for droughts and contaminated and unusable groundwater during floods and storms is always present.

For instance, when it doesn't rain enough in the dry season, officials often worry about whether there will be enough rain during the wet season to

balance our accounts. Often there is, despite nail-biters like back in 2017.

But full-on droughts have affected the region, such as the one in 1981 that forced Gov. Bob Graham to declare South Florida a disaster area.

While drought and storms are always a possibility, an increased demand for groundwater in the coming years is all but certain.

By 2025, 6 million new residents are projected to make Florida their home and more than half will settle in South Florida, according to the SFWD. This will increase demand for fresh water by 22 percent. Smith said that any technology that would aid in the conservation of water is "critical."

AWS believes products like theirs, which requires zero groundwater to function, are perfect to reduce day-to-day needs, such as drinking water or filling up your coffee machine.

However, their leaders have a vision of expanding business for needs such as growing agriculture, servicing kidney dialysis machines, and providing drinking water to hospitals—some of which they already do. They are currently developing a mobile unit that can create 1,500 gallons of water a day, which they say could serve construction sites, emergency relief and remote areas.

"Even though everyone knows you need water to live, it is a much wider spread and much more used commodity than what meets the eye," said Goldstein.

This vision is exciting to others involved in the space, such as Sameer Rao, an assistant professor of mechanical engineering at the University of Utah.

In 2017, Rao was a post doc at MIT. He published a paper with colleagues suggesting they could create an atmospheric water generator that could be used in any location, regardless of humidity levels.

And, unlike the AquaBoy, it would not require electricity or complicated moving parts—only sunlight. The paper created a buzz in the scientific

community as the concept was seen as a potential solution to severe water shortages affecting arid regions around the globe that are only expected to become worse as the climate continues to heat up and populations continue to grow.

In 2018, Rao and his team turned heads again when they created a prototype for their concept that was able to make water from a rooftop in Tempe, Arizona, with close to zero humidity.

According to Rao's research, there are trillions of liters of water in the form of vapor in the air. However, current methods for extracting that [water](#), such as AWS's technology, can't yet serve the arid regions that often need them most.

Even those areas in humid regions are not a given, since products like the AquaBoy Pro II require costly energy to use—something the company hopes to decrease as they continue to refine their technology and look for alternative energy sources.

But Rao is happy that products like the AquaBoy exist on the market. He noted that AWS is one of a handful of companies around the country working with this "nascent technology," and he welcomes more. "The universities are great at developing technology, but we need companies to realize it and make the products," Rao said.

As for the price tag, Rao said we should expect it to come down as there is more of an understanding about the technology and, ultimately, demand. He likens it to any new technology that has caught others by surprise in history. "If we were able to make an air conditioning unit low cost, the cost of this technology can come down," he said.

©2019 Sun Sentinel (Fort Lauderdale, Fla.)

Distributed by Tribune Content Agency, LLC.

APA citation: Just add humidity: How this air-to-water machine can quench your thirst (2019, June 20) retrieved 24 January 2021 from <https://phys.org/news/2019-06-humidity-air-to-water-machine-quench-thirst.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.