

## Short summary

The Watercone® is a simple solar powered water desalinator that takes salt, brackish and even water polluted with heavy metals and generates potable freshwater. With a harvest of max. 1,6 liters a day one Watercone® is an ideal device to cover a child's daily need of potable water.

Together with CARE in the year 2004 we provided a fisherman's hamlet by the sea in Yemen, which normally struggles for every drop of drinking water, with a set number of Watercones per family and thereby tested the Watercone's viability in real daily life of a developing country community.

The lab results by CARE essentially confirmed the findings submitted by the German TÜV and indeed, it became a very emotional moment for all involved when the village leader said (original quote):

***“The water from the Watercone® has a much better taste even than our local bottled water.”***



# Detailed project description

## Pilot Project Yemen by CARE Germany

The Watercone® is ready for market and needed a baptism of fire. Even though the Watercone® has received highest marks from the premier German testing and certification authority, TÜV Rheinland Berlin Brandenburg, has received 3 of the world's most prestigious design awards and even though extensive academic and field testing has been conducted in Europe, India, Thailand and Africa, the Watercone is now in need of real life justification.

In essence, the Watercone® has proven that it delivers immaculate drinking water in line with WHO Guidelines ([www.who.org](http://www.who.org)), regardless of the base water used in the pan. Here it is important to stress that the harvested water is not distilled water (chemically pure H<sub>2</sub>O) but condensed water (traces of most elements found in the base water poured into the Pan, can be found in the harvested water). For that reason an intricate and elaborate test was conducted by TÜV Rheinland Brandenburg Berlin, Germany's premier and internationally renowned testing and certification authority, in August 2003. This test gave the Watercone® cum laude grades and showed that next to eliminating salt from base sea water, it also did not transport highly toxic elements such as arsenic, mercury or cadmium from the pan into the cone

The 1<sup>st</sup> Pilot Project's mission was decided as following:

To provide a secluded fisherman's hamlet by the sea in Yemen, which normally struggles for every drop of drinking water, with a set number of Watercones per family and thereby test the Watercone's viability in real daily life of a developing country community.

### Who.

CARE Germany, Bayer AG, Stephan Augustin, Zeltec Distributions GmbH and a financial supporter, the Hans-Sauer-Foundation from Munich. CARE Germany is the German office of CARE USA, one the 3 largest aid and relief organizations in the world. CARE Germany provided a German project expert on location who has been living in Yemen for years and is currently on another project, which enabled him to handle the Watercone project as well. Also involved from CARE Germany was the Program Officer Africa / Middle East who has numerous years of experience on the field in Yemen; he also supplied a top-grade, accredited student/scientist on location full-time who had an opportunity to write a paper on the pilot project and accompanied it every day for long hours. Bayer AG, one of the world's largest pharmaceutical and chemical corporations provided the Watercone material and worldwide PR power for the pilot project. Stephan Augustin is the inventor of the Watercone concept and wanted to draw design-relevant feedback for the second generation of Watercones. Zeltec Distributions was (at that time) the manufacturer of the Watercones and the Hans-Sauer-Foundation is one of the most forward and progressive foundations supporting young technical inventions from Germany.

### Where.

The location for the project was roughly 50 miles (80 km) East of Aden around the town of Zinjibar. This is pure coast, sand beaches and aridity. It rains roughly 3 times per year; if that. The fishermen must travel downtown or land inwards to the wells either way for roughly 10 miles (15 km) to secure drinking water, even though they live right by the sea. Since the Watercone can be floated, they can also take the Watercones out to sea while fishing.

### **When.**

From January 2004 - March 2004. Weather still climbed to 80 degrees Fahrenheit (30 degrees Celsius) and full daylight sun was out roughly 9 hours per day.

### **What.**

100 Watercones distributed amongst 10 fishermen families. The fishermen families typically number 3-4 adults and 5-6 children.

### **Why.**

Yemen is a prototypical developing country with an extensive coastal line and a clear shortage of drinking water. Yemen is priority in CARE Germany projects and CARE Germany is a highly recognized institution. Also, even though there may be qualms about Yemen being the first pilot project country (happenstance, not intention) a pilot project conducted in Yemen will warrant recognition in most of the Mid-East, Africa and Asia.

### **Ramifications and Results.**

The effect of a united success on this pilot project had no less than a revolution as a consequence. A silent one, none bloody one and a positive one, yet a revolution no less. Over night century old traditions collapsed (fetching water at the faraway well or in a day-long travel to the city market, where the local bottled water is available) and whole systems and duty rosters were set up to fetch salt water, guard the Watercones at night and to fulfil harvest duties and distribution in the morning. The fishermen would have liked another 900 Watercones on the spot, so as to secure all their drinking water for everybody from the ocean a stone's throw away. The fishermen started taking the Watercones out on their fishing trips and as Augustin found out in Sep 04, the Watercones were now mainly used to help a new and flourishing tea culture amongst the fishermen, certainly a lifestyle improvement in such a barren environment. Truth be told, all these great socio-economical ramifications would have been worthless, if the chemical analysis of the harvested water had come up with negative results. But quite to the contrary, the lab results essentially confirmed the findings submitted by the German TÜV in their own tests and indeed, it became a very emotional moment for all involved when the village leader said (original quote): *"The water from the Watercone has a much better taste even then our local bottled water."*

### **Extract of the 26 page CARE report with its final conclusion (see also Final Report)**

"...Considering the above results and recommendations, CARE thinks that the principle underlying the construction of the watercone is a very good idea which in certain circumstances will prove its worth in the purification or desalination of contaminated or sea water. The watercone has been quickly accepted by the users, is robust and easy to understand and to handle, and the quality of the harvested water is very good. The emergence of the sea as a new source for the easy production of good drinking water is an interesting path for the fishermen villages involved in this operation. If developed further, a solution for water supply in difficult areas on the basis of the watercone is absolutely conceivable.

However, in order to make a final statement about the long term efficiency and sustainability of a watercone-based drinking water supply, CARE recommends further long term testing, involving a larger number of watercones per person, a testing period that covers all seasons of the year and a larger variety of different locations. This would also allow for conclusions regarding the long term acceptance of the watercones and possible solutions for the concerns mentioned above. Also, pilot projects in other parts of the world are recommendable and will return valuable feedback on the settings and conditions under which the use of the watercone will be feasible as an alternative to the generation of potable water on the basis of salt- or brackish water and a substitute for a fix water supply system."

# Evaluation Criteria

## Project aim

The Watercone® is a brand new developed product invented by Stephan Augustin in 2001. From the beginning there was a huge demand of NGOs and potential distributors to demonstrate the Watercone's viability in real daily life of a developing country community.

In this project it has been demonstrated that the Watercone® fulfils the demands. The goal was also to promote this innovative product based on the experiences and findings out of this pilot project. The 100 Watercones has been donated to the village at the end of the project.

Unfortunately there is no production of the Watercone® at the moment as my last two licensees went bankrupted and now I am looking for new licensees or investors, who are willing to bring this humanitarian product to the people around the world.

## Innovative Aspects

The Watercone® is simple to use, lightweight and mobile. The technology is simple in design and use and is described by easy to understand pictograms.(see sample)

With the use of unbreakable and FDA approved BAYER Makrolon Polycarbonate with UV coating, the Watercone® will withstand physical requirements and solar radiation for minimum 5 years, as BAYER guaranteed. A use of 5-8 years is easily possible.

The Watercone is ideal for locally use in undeveloped areas. The philosophy of this innovation is, that many small units will ensure a better supply of freshwater than one single big generator. If the big one fails, there is no water for the village. If a small one fails, the other ones still work.

## Cost/Benefit

The Hans-Sauer-Foundation from Germany financed the pilot project in Yemen with a funding of 12.000 €.

This amount of money covered following entries:

- Production costs of 100 Watercones®.
- air freight charges from Frankfurt- Germany to Sana`a- Yemen.
- organisation, documentation, personal and impersonal expenses and chemical analysis provided by CARE Germany.

Assuming an intended € 20,00 wholesale for one Watercone® based on new manufacturing methods and a production of one liter of solar powered drinking water per day on the basis of free and endless sea water, 1 litter of Watercone water would cost the following:

by end of Year 1 = € 0,08 per litter,  
by end of Year 2 = € 0,04 per litter,  
by end of Year 3 = € 0,027 per litter,  
by end of Year 4 = € 0,02 per litter  
and by end of Year 5 = € 0,016 per litter.

Another calculation:

One liter of bottled water is often sold a higher price than petrol in developing countries. So the Watercone® concept is a perfect alternative for these markets. A return of invest could be within 1-3 months and then people have free and high quality water the next 5 years.

## **Replication Potential**

For millions of people who are living in oceanic and coastal regions throughout Africa, Asia and South America, there would be what one can mildly describe as a shift in paradigms; the sea, an unlimited yet untouchable enemy of thirst, would become a friend, a helper, a thirst quencher to common man. For the first time in human history. The social, economic and possibly political domino effects could only be positive.

With max. 1,6 liters a day the Watercone® is also an ideal device to cover a child`s daily need of freshwater. UNICEF: "every day 5000 children die as a result of diarrhea caused by drinking unsafe water"

Another positive capability of the Watercone, the elimination of heavy metals, could make it an essential live saver in many regions of the World. For example the mercury polluted rivers in Brasil caused by the gold mines or the arsenic soil in Bangladesh where millions of people suffer. Or just rivers like in India, which are heavily contaminated by the industry.

A local production of the Watercone® could be possible, if international industrial, environmental and quality standards are fulfilled.

## **Environmental compatibility**

As described before the Watercone® is a solar powered desalinator. The condensation runs just with sunlight. The longer and hotter, the better.

Yet without machines, nor chemicals, nor electricity, nor photovoltaic panels, nor filters.

Due to the fact that the Watercone® is made out of new and recycled Bayer Makrolon polycarbonate sheets which are very durable and environmental friendly, a long time sustainable use is taken for granted.