Water purification for developing countries, design and results

UNESCO-IHE / IUVA  Delft  November 6 2014

Tonnie Telgenhof Oude Koehorst
Corporation since 1949

Turnover 2013: 174 Million Euro

709 employees
1929 - Eerste Schinkelstraat 30 Amsterdam
Opening new doors in security management.
General Lighting
In- and outdoor lighting solutions

Get the best out of your HID lighting

UV Disinfection & Curing
UV solutions for disinfection & curing

The best solution in UV disinfection

Ultra dependable white light

For fast drying of ink coatings and adhesives
General Lighting
In- and outdoor lighting solutions

Get the best out of your HID lighting

Ultra dependable white light

UV Disinfection & Curing
UV solutions for disinfection & curing

The best solution in UV disinfection

For fast drying of ink coatings and adhesives
Curing application

Floor & door curing
Curing 24/36kW application

HP Scitex FB10000
Industrial Press
Every 3 seconds….
Keimfrei am Brunnen sitzen

Von Eva Maria Magd


WATERWORKS OUTRE

PETER MÜLLER

UV for Water Treatment in Haiti – A Continuing Success Story

Sarah Brownell
595 E St, Apt 3
Oakland, CA 94609
email: brownell35@comcast.net

Befree the first UV system was installed in 2004, the first UV unit (provided by a 1.74 meter UV system) was installed in 2005. It is estimated that the system will treat approximately 1,000 gallons of water per day. The system is currently being used by the local water company. In addition, the system is being used by the local hospital. The hospital is very satisfied with the system and is planning to install a second unit. The local government is also interested in installing a second unit.

UV-Light for Water Treatment in Haiti – A Continuing Success Story

PETER MÜLLER

In February 2004, the first UV unit was installed in the rural community of Desarmes. The unit was provided by the United Nations Development Programme (UNDP) and was installed as part of a larger project to improve water supply in the region. The unit has been operating successfully ever since, treating approximately 1,000 gallons of water per day. The local government is very satisfied with the system and is planning to install a second unit. The local hospital is also interested in installing a second unit.

UV Light for Water Treatment in Haiti – A Continuing Success Story

PETER MÜLLER

The UV Light system is a very effective way to treat water and is widely used in developing countries. It is easy to install and maintain, and it is very cost-effective. The UV Light system is also very reliable, and it can treat water of any quality. The local government is very satisfied with the system, and they are planning to install a second unit. The local hospital is also interested in installing a second unit.
Access to safe water is a fundamental human need and therefore a basic human right.
Access to safe water.....
Alternatives
Good designs get copied.........
Targets

- rural areas: usage of present water sources
- multi barrier process
- storage of water (limited)
- low costs
- Easy transportation
- Easy technical education at user’s level
- Easy maintenance and service
Clean filter bags at least once a week

1. Remove screw
2. If dirty
3. Clean, wash at max. 60°C or 140°F. Do not rub
4. Dry
5. Ensure magnet is in the correct position
Solar panel
Water input
Filters
Reservoir
UV and control unit
Battery
4 Solar panel

- Remove screws
- Attach screw (M5 x 12 mm)
- Put wire through tube
- Attach screw (M5 x 12 mm)
- Put wire through Naiaide to the front
- 2 pin
- 4 pin
- Attach connectors
- DO NOT SQUEEZE CABLES
- Push firmly on shown position
- Attach screws (4 M5 x 16 mm)
- Attach screws (6 M5 x 12 mm)
Testing:

- Marmara University – Turkey
- Water research Institute – Ghana
- Ghana Standards Board - Ghana
- Water Quality Lab’s – Tanzania
- Ministre de l’énergie, des mines et de l’eau, Mali
- ATIRA – India
- Rwanda – Bureau of Standards
- Chinese Center for Disease Control – China
- UNESCO-IHE – Netherlands
ATIRA – India
Performance Testing
of
Naiade UV Disinfection System
(Final Report)

January 2005

Delft, The Netherlands
Test reports & references

- **KIWA** Evaluation report. Declaration of the performance of the Naiade, Nieuwegein, The Netherlands, January 2005
- **IFFCO** Declaration of performance, New Delhi, India, April 2008
- **Ghana Standards Boards**, Accra, Ghana, December 2005
- Test reports on the Naiade, **Water Research Institute**, Accra, Ghana, September 2005
- Naiade water disinfection efficiency test report, **Ministry of Water and Livestock Development**, Dar es Salaam, Tanzania, November 2004
- Performance Evaluation Report, **Atira** Ahmedabad Textile Industry’s Research Institute, Ahmedabad, India, August 2005
- Naiade Test Results, **Marmara University**, Istanbul, Turkey, September 2004
- Analyse d’eau, **Ministre de l’energie, des mines et de l’eau**, Bamako, Mali, Octobre 2008
- Test results Naiade, **Chinese Centre for Disease Control**, Beijing, China, May 2007
- Test results of the Naiade, **Governement de Bamako**, Bamako, Mali, April 2008

**UNESCO-IHE:**

Total coliform and E-coli from the raw water up to 3 to 4-log removal
Targets

- rural areas: usage of present water sources
- multi barrier process
- storage of water (limited)
- low costs
- Easy transportation
- Easy technical education at user’s level
- Easy maintenance and service
Field test:

★ transportation
★ installation
★ education
★ maintenance & service

★ Integration

>>>>> Effect of Naïade <<<<<<
Brazil
For field tests, in total more than 750 units are operational in:

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TO WHOMSOEVER IT MAY CONCERN

IFFCO Foundation installed NAIADE Solar operated Water Purifier supplied by Nedap NV, Parallelweg 2, P.O. Box 101, NL-7140 AC Greenlo, The Netherlands at Village Panjkoshi in the State of Punjab.

The machine is being utilized by the Community since last one and a half years. Seeing the successful operation of the machine and the benefit to the Community, IFFCO Foundation has placed Repeat Order for 3 more machines which will be installed in the month of May, 2008 at public places in India.

(A.K. Dixit)
Adviser
IFFCO FOUNDATION
IFFCO HOUSE
34, NEHRU PLACE
NEW DELHI-110 019

2nd April, 2008
Equal Opportunity Fund

News Letter
JULI 2009

E.O.F.
- werkt met vrijwilligers en heeft daardoor lage organisatiekosten
- geeft informatie over de projecten.
- heeft rechtstreeks contact met desduidelijke partners in Nederland en in Ghana.
- zorgt dat er snel en efficiënt gewerkt kan worden en heeft direct meetbare resultaten.
- steunt duurzame en kleinschalige projecten voor onderwijs, landbouw en gezondheidszorg.

Naiade waterfilters

Translation:

At the hospital in Busongo, at the primary schools in Pwalugu and Peo-Awisi, and also in the villages themselves, five Naiade water systems are in operation. Our contact person in Ghana, Justin, regularly visits these locations to see how the units are performing. At the villages, a committee will oversee the yearly contribution of 75 Eurocents per person. This way all people contribute to the maintenance and service costs of the units. Although it seems to be a very low amount, it’s important to understand that these people only have 30 to 50 Eurocents per day available for their daily needs.

The primary school students are also loyal users of the water systems, which has resulted in healthier children. Since the introduction of the system, significantly less illness of the children has been reported.

In the hospital the results are very clear: due to the use of the Naiade, not one person died in the months February and March. Before that time, on average 2 children died every month. Additional benefits include less firewood being used in the villages, as it is now only used for food preparation as well as reduced medical costs for families as fewer and fewer children fall victim to water-borne illness and disease.
Green-UV Award
2011-2012
Naiade Solar Powered
UV Water Purifier
Presented to
Nedap Light Controls
In recognition of
sustainable UV
product design
2013
Tanzania
40% more children attended school within 2 weeks after installation of the Naïade.

Ghana
On average 2 children died every month in hospital. No person died after installation of the Naïade.
Twa, Accra Ghana project

- Ghanaian Ministry of Water Resources, Works & Housing, Accra
- Nedap, Nedap France
- Melpool Ltd.

To prove Naïade concept in combination with water supply from river at 1 mile distance
Twa, Accra Ghana project
Twa, Accra Ghana project
Twa, Accra  Ghana project
Twa Project:

🌟 It is possible to set up sustainable, self-supporting drinking water supply units

🌟 Local lack of regulations for drinking water supply systems

🌟 Removal of chemicals (Arsenic, Fluor) is desired
Naïade at disaster area
China province of Yunnan, August 2014
Naïade at disaster area
China province of Yunnan, August 2014
Naïade at disaster area
China province of Yunnan, August 2014
Water thieves at work

Chetan Chauhan
New Delhi, March 16

SUMMER HAS just begun and the black market is already doing a brisk business of selling water to parched areas.

This is how they work: Water is tapped from the mains, stored in cans and sold at exorbitant rates to unsuspecting customers. The residents don’t mind paying extra for the water — “at least the supply is regular”, they say. But what they don’t know is that these water pilferers are responsible for their water problems. When water is tapped from the mains, homes get water in a trickle.

On Tuesday, a bucket of water was selling for Rs 10 in parts of Rohini. The water had been tapped from the mains in Bawana. "Since the last one week, water supply has reduced considerably. The underground water is not fit for drinking. And packaged water is too expensive. The cheapest option is to purchase a couple of buckets of water every day," said a Rohini Sector 3 resident.

It’s the same story near the Chandrawal waterworks. Water tapped from DJB mains is sold to houses in Civil Lines and Mukherjee Nagar. Those into the business earn about Rs 200 a day. "It is a handsome amount as we work for only about six hours. I start early so that I can fill gallons to meet the demand," said Dina Ram, a slum-dweller who sells water. The water is then delivered to the customers at their homes.

Finding a DJB main is not difficult — it is uncovered. The four nut-bolts at the joints are loosened to ensure that only a limited quantity of water flows out. "The affected people may complain to Jal Board if the nuts are loosened to a large extent. We prefer to tamper with pipes for industrial areas," said Natraj, an ‘expert’.
Mexico

Soft drinks:

CHEAPER AND MORE ACCESSIBLE THAN WATER

Mexico is the largest consumer of soft drinks, according to the U.N.’s World Health Organization -- the average Mexican drinks 163 liters per year of soda, 40 percent more than the average American (118 liters).
of how indigenous women give soda to their babies.
For a better start in life

START COLA EARLIER!

How soon is too soon?

Not soon enough. Laboratory tests over the last few years have proven that babies who start drinking soda during that early formative period have a much higher chance of gaining acceptance and "fitting in" during those awkward pre-teen and teen years. So, do yourself a favor. Do your child a favor. Start them on a strict regimen of sodas and other sugary carbonated beverages right now, for a lifetime of guaranteed happiness.

The Soda Pop Board of America
1515 W. Hart Ave. - Chicago, ILL.
Naïade in Mexico
Nederlanders wisselen frisdrank in voor kraanwater

Door: Martijn van Beeten en Eva Schouten
31-10-14 - 05:15 bron: AD

Nederlanders hebben in 2013 maar liefst 58 miljoen liter minder frisdrank en vruchtensappen gedronken. Volgens de Nederlandse vereniging Frisdranken, Water, Sappen (FWS) dronken we miljoenen liters meer kraanwater.
So, what we really need:

- Local “devoted” partner
- Back up and support by government
- Import duty exemption
- Local education
- Simple and reliable solutions
- Convince big NGO’s for simple solutions
- PATIENCE......
No local “devoted” partner

......
Back up and support by government

......
At this time we do not see any use for Naiade within the Red Cross organization......
Education.....

Transparency Worksheet 23
Hard and Soft Water

1. Briefly explain what hard water is.

2. Note that calcium is one of the solids dissolved in ocean water. Describe two ways by which calcium is removed from hard water.
Education.....

Transparency Worksheet 23

Hard and Soft Water

1. Briefly explain what hard water is.
   ice

2. Note that calcium is one of the solids dissolved in ocean water. Describe two ways by which it can be collected.
“Africa is experiencing economic water scarcity, rather than physical water scarcity”
C.Flatt – Water 21, August 2009

“Every dollar invested in water and sanitation yields an estimated seven dollars’ worth of productivity”
Ban Ki-Moon, UN Secretary General
Thank you

and

thanks to

colleagues at Nedap
Dick van Dijk
Rob van Opdorp

UNESCO-IHE
Marmara University
Water research Institute & Standards Board Ghana
Water Quality Lab’s Tanzania
ATIRA India
Chinese Center for Disease Control
and many others
Questions?