

CENTRE OF EXPERTISE - WATER UNLOCKED?

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ABSTRACT

During the last WISA Conference in May 2012 the Centre of Expertise was launched by the Dutch ambassador to South Africa, Mr. Andre Haspels and the head of eThekwini Water and Sanitation, Mr. Neil Macleod. This was done by symbolically unlocking the Centre of Expertise logo and signing it.

The South African Water and Sanitation utilities face many challenges and the Centre of Expertise wants to assist the utilities in addressing the needs. In order to meet these challenges we have to change our ways and adopt new methods and technologies. Above all, we need to assist each other to move forward. The Centre of Expertise is one of the initiatives to help the utilities to try-out new, innovative technology to change our shared challenges in new opportunities with a collaborative approach. The Centre of Expertise does this by matching the needs of the utilities with new technology in a so called showcase. The results of these showcases are made available for the peer utilities.

1. INTRODUCTION

South Africa has many challenges in the water supply and sanitation sector. Scarcity of water resources, insufficient treatment of water, pollution, non-revenue water, and aging infrastructure are only a few of the technical problems. The lack of sufficient staff with sufficient skills has been recognized as one of the underlying problems. The theme of this conference is on how to turn these things around. How can we increase service delivery and meet the (basic) needs of all South Africans? How can we change our current ways to tackle these challenges? Innovation and peer to peer collaboration are the answers that the Centre of Expertise wants to offer.

eThekwini Water and Sanitation (EWS) has been recognized as an innovator in the sector and has executed a number of pilot and demonstration projects to test out new methods and technologies to deal with these challenges. EWS has partnered with a number of Dutch partners and set-up the Centre of Expertise to funnel new technology and methods (from the Netherlands) to meet the demand for new technology of the South African (and Southern African) water utilities.

The Royal Dutch Embassy to South Africa has given grant funding to Vitens Evides International (VEI) to set-up the Centre of Expertise with eThekwini Water and Sanitation and for the entire Southern African water sector. Vitens Evides International (VEI) is a joint venture of two major Dutch water supply companies for international, non-profit, activities. VEI runs utility assistance programs in (amongst others) Mozambique, Kenya, Ghana, Bangladesh and Vietnam. The other partners in the Centre of Expertise are:

- World Waternet is the international, non for profit, subsidiary of Waternet (water supply and Sanitation unit for the City of Amsterdam and its neighbouring municipalities).
- World Water Academy is a dedicated training instituted for the Dutch Water sector. World Water Academy offers courses that are being given by professionals from the sector and to people working in the sector.
- Your Man on Site offers business development on location in Europe and Southern Africa and acts as a facilitator in the Centre of Expertise.

2. CENTRE OF EXPERTISE CONCEPT

The Centre of Expertise wants to improve the South African water supply and sanitation sector by introducing technology that is new and innovative, yet absent, for the South African water utilities. This might be well-proven technology that has not been presented in South-Africa as well as completely new technology. New technologies and best practices will be tested at a 'Host utility' to see if they match the water supply and sanitation needs of Southern Africa. These tests will be called showcases.

The Centre of Expertise will guide these showcases. In a showcase innovative technology will be demonstrated by a (Dutch, private sector) company at a South African utility. The results of a showcase can be a guideline and/or tendering specifications and/or a decision support model that will be offered to the peer utilities. The results of a showcase will be offered to the peer utilities in small training courses or mini conferences, although this might differ per showcase. This mechanism is needed to make the Centre of Expertise self-supporting.

These showcases (and the resulting trainings or mini conferences) can be executed at any utility. The Metro's are, however, likely to take the lead in this. eThekwini Water and Sanitation has already committed itself to host the Centre of Expertise. EWS wants to host showcases that fit the focus areas of energy, asset management, non-revenue water, sludge processing and reuse. The Centre of Expertise is an open platform for collaboration amongst utilities. All the water utilities are invited to join in and (co-)host showcases. The Centre of Expertise has a business plan in which the legal, organizational and financial structures are explained.

3. EXECUTED SHOWCASES

The showcases that will be executed in the Centre of Expertise are divided in 4 categories. A single showcase has been executed in each category while setting-up the Centre of Expertise. These showcases are:

3.1. Trenchless pilot program (category: product specification)

When a piped network ages more leakages occur in this network. Replacing piped networks is traditionally done by removing the ground cover, removing the old pipe and reconnecting the new pipe. This causes nuisance to the local community. An alternative for this is a trenchless pipe replacement by inserting a new, flexible, pipe in the old pipe. This technology was new for South Africa and has been demonstrated in the trenchless pilot program (within the AC pipe replacement program of EWS). This program has already proven successful with other utilities (Port Elizabeth and Pietermaritzburg) adopting the technology and additional works in Durban. The Dutch innovators have trained and licenced local contractors for the works. The result of this showcase are specifications for utility tenders.

3.2. Carbon footprint assessment (category: exploration)

EWS wanted to calculate their Carbon footprint in order to be able to actively reduce their environmental impact. A carbon footprint assessment had not been done before. This showcase has produced a guideline on how to do the carbon footprint assessment as a utility and a simple calculation model. EWS is now actively executing projects to reduce the environmental impact with a focus on energy reduction.

3.3. Comparative study for the use of PVC and PE water mains (category: decision support)

An integral part of asset management is to get the most value for money. For tangible assets this often results in the comparison of investment costs and maintenance costs over the live time of an asset. The selection of the right material for the installation (or replacement) of

water mains is dependent on many factors (purchasing of the pipes, installation costs, number of bursts et cetera). This showcase has produced two decision models (and accompanying documentation) assisting water utilities in selecting the right pipeline.

3.4. Module 1 of the basics of waste water treatment course (category: organization and training).

On many of the waste water treatment plants in South Africa (additional) staff training is needed. A basic training about waste water treatment is designed in 4 modules (10 days total). The first, 2 day, module has been executed as a showcase. This training familiarized EWS with the training of trainers concept of World Water Academy. The results of this showcase are a number of experienced EWS trainers, a training programme and training materials. The training can be offered to peer utilities.

More information on these showcases is available on the Centre of Expertise website (<http://www.coe.org.za>)

4. NEW SHOWCASES

New showcases are developed by the Centre of Expertise with innovators putting forward their ideas. The decision to execute a showcase is being made by the host utility:

4.1. More information from your data (category: exploration)

All utilities have data on the performance of their treatment works or networks. In two pilot projects the current, existing information from various data resources will be collected and combined to make an integral report and to advice on additional sensors and optimization software. The two pilot projects are for a specific water supply area (information from GIS, Flow and pressure measurements, call centre and job card system) and a treatment works (information from SCADA, lab and work orders). This showcase follows the principles of joint solution finding: A number of details will be decided on along the way as well as advice on additional sensors and optimization software. The product of this showcase will be the tendering specifications for the chosen solution.

4.2. Thermophilic sludge digestion (category: product specification)

By operating the sludge digesters at a higher temperature the current mesophilic sludge process can be shifted to thermophilic. The result: decreased sludge volumes and increased biogas yields. This showcase is a starting point in making more use of the sludge and opens the doors for additional pilot projects. The result of this showcase will be tendering specifications. This showcase will be executed in a two-step approach. The first step is an in depth feasibility study and the second step is a (full scale) pilot at Phoenix waste water treatment works.

4.3. Waste water design strategy (category: decision support)

This showcase without an innovator focusses on developing a decision support model choosing the right waste water treatment method (activated Sludge, MBR et cetera) for a specific site. The product of this showcase will be a decision model assisting (young) engineers.

4.4. Various applications of ultrafiltration (category: product specification)

In this showcase a number of applications of membrane technology will be tried out in pilot projects. The first project is an upgrade (capacity increase) of a small potable water treatment works. At this site a containerized ultrafiltration unit will be used as an integral alternative for traditional treatment of surface water. This pilot will be evaluated on integral costs over its total life span as well as treatment results. A number of additional pilots with other water sources and other applications of the technology will be executed at a later stage.

4.5. Asset Management game (category: organisation and training)

This board game assists in introducing asset management (PAS 55) to a utility. It works on setting the stage for needed improvements and understanding the various needs of the departments. In this showcase the game is adjusted to the South African circumstances.

4.6. UV on waste water

Disinfecting of waste water with UV instead of chlorine has become the international standard. In South Africa, however, UV has had a premature introduction in open channels and poor design. The technology has evolved and is now available in compact, closed vessel units that can be installed in a pipeline. In this showcase an integral comparison on costs over the life span between chlorine and UV will be documented.

Ideas for showcases are floating continuously and new ones that are proposed include killing algae with sound waves, developing of water apps and flowers from waste water amongst many others.

5. WATER UNLOCKED?

It has been quite difficult to introduce new technology into the South African market. Supply chain management limitations, a lack of capacity and skill as well as unfamiliarity with (and sometimes even a genuine disbelief) in new technology has put a brake on innovation. On the other side, innovations like granular activate sludge treatment are entering the market.

To really unlock the market a lot needs to be done and the Centre of Expertise can only do its part. To tackle the challenges in skills development a collaboration with training provides is needed. Training at the vocational level is often absent or poorly executed. The Centre of Expertise workshops ('learning exchanges') will focus on specialist topics for experts within the water utilities. To get any new technology fully accepted staff training on all levels is needed. Parallel initiatives on increasing the quantity and quality of (vocational) training will therefore be supported or facilitated within the Centre of Expertise.

The key to unlocking the market? Collaboration! There are simply too many challenges ahead and too little capacity and skill to tackle them as individual utilities. By combining our efforts and sharing our expertise we can increase and improve our service delivery and implement the needed turn around strategies. Let's innovate and collaborate towards impeccable water supply and sanitation services for all our customers.