



Combining the best of both toilet worlds

March 11, 2014 | Andri Bryner

Topics: Wastewater

The Blue Diversion toilet, developed by Eawag - the Swiss Federal Institute of Aquatic Science and Technology, together with the Vienna-based design firm EOOS, has been awarded the innovation prize for the best applied research by the International Water Association (IWA). Now the team is looking for an industrial partner and investors, so that Blue Diversion can be mass produced.

The International Water Association (IWA) has chosen Blue Diversion as the most innovative project in the applied research category in the Europe/West Asia sector. The project thus qualifies for the IWA's worldwide competition, with prizes being awarded at the World Water Congress in Portugal this September. The innovation prizes are awarded every two years, whereby the IWA seeks to honour water management approaches with a focus on sustainability.

Flush and forget is not a panacea

The WC – the flush toilet – is well established in the industrialised world. But this seemingly elegant solution to all sanitary problems is deceptive: in many contexts there is no access to a reliable water supply or there is simply not enough water available for flushing, let alone costly sewerage or central waste treatment plants. On the other hand, pit latrines have not seen any progress for the last 200 years. As a result, 2.5 billion people around the globe have no access to a proper toilet. Urine and faeces are polluting the environment and compromising hygiene instead of the useful products and nutrients contained in them being reused.

Introducing the dry flush toilet

In response to the Reinvent the Toilet Challenge (RTTC) initiated by the Bill & Melinda Gates Foundation in 2011, a team consisting of Swiss aquatic researchers and Austrian designers has now developed a radically new toilet – the Blue Diversion. The basic concept is a grid-free, dry toilet with separate urine collection. Because existing models are neither hygienically adequate, nor have they proven to be very popular, the team developed the concept to give the toilet its own water cycle. This means that there is water available to keep the toilet bowl clean, for hand washing and also for the purpose of anal hygiene with the use of a shower head, a practice which is common in many Asian and Arab countries. The water is biologically treated in situ, and pathogens are removed by the gravity-driven passage of the water through a membrane. The production of chlorine by solar-powered electrolysis prevents the re-growth of undesirable bacteria in the recycled water.

High and low tech combined

Blue Diversion is thus a departure from both the low-tech solutions that have existed so far, as well as sophisticated systems that rely on sewerage and a mains water connection. The involvement of designers at an early stage, and the broad support for the project, both at Eawag and at international level, were key factors in the highly user-centred design and development of this product. Instead of pitting the high and low-tech approaches against each other, Blue Diversion combines the advantages of both, making possible both the reliability and sustainability of the design. Great effort was invested to ensure that the toilet can easily be produced at an industrial scale. The support of Tribecraft (former ETH spin-off firm) has been very valuable in this regard. At the same time, a business model ensures that Blue Diversion will also work in countries with poor infrastructure. The concept includes, among other things, a collection system for urine and faeces, along with semi-centralised recycling plants for producing fertilisers and energy.

Initial field tests have successfully been carried out in Uganda with a first working model. Further tests with newly developed prototypes are ongoing, as are optimisations as regards the manufacturing process and the overall energy consumption. The Bill & Melinda Gates Foundation will decide this month whether it will continue to support the project in the context of the RTTC. The Blue Diversion research and development team is independently seeking industrial partners and investors, in order to mass produce this ingenious toilet and to gather further know-how.

Pictures to download: click on Media, then on the pictures. (© Eawag/EOOS; free use only in connection with this communication; no archiving.)



Transport for a field test in



Kampala/Uganda. (© Eawag/EOOS)

Retrofit of an existing pit latrine with two Blue Diversion toilets. (Montage; ©EOOS)



The Blue Diversion toilet in size comparison. In the middle the handwashbasin. (© Eawag/EOOS)

Further Information



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