Waste heat and membrane distillation help Maldives produce drinking water

The Aquiva Foundation has entered into a joint venture with electricity company State Electric Co Ltd in the Maldives to provide drinking water on the country's inhabited islands. Using waste heat from generators, water is produced through membrane distillation.

The small coral Island of Guhli, which measures approximately 600 by 300 metres, is home to about 1200 inhabitants, a shipyard and a growing number of guest houses. There are no natural sources of sweet water other than seasonal rain, and therefore, it is reliant on water imports.

Technology that combines waste heat and membrane distillation is now being used to reliably provide water for drinking, cooking and hygienic purposes.

The project was developed by the local power company State Electric Co Ltd (STELCO) in a joint venture with Aquiva Foundation, which won a tender in 2013 asking to desalinate water using the waste heat available on all Maldivian Islands.

The desalination plant taps into the cooling cycle of local diesel generators to retrieve the thermal energy that is otherwise wasted. This waste heat – at a temperature of about 85°C – drives a desalination process under vacuum using membrane distillation modules developed by German/Singaporean company Memsys. This robust process follows, in essence, the natural water cycle and results in distillate water of the highest purity, says the firm. This distillate is then mineralised using local coral sand for a "good Maldivian taste". It is distributed under the brand AQUIVA Fushi – fushi standing for the pure island taste created by coral sand used in the mineralisation process.

The water is only available in reusable containers in order to prevent the pristine Maldivian environment from being polluted by plastic waste from "one-way" bottles.

'This project shows our efforts to provide environmentally sustainable systems, which improve the conditions for our people using breakthrough technologies,' said Maldivian Energy Minister Thoriq Ibrahim.

Florian Bollen, CEO, Aquiva Foundation, noted: 'We say thank you for the joint effort of all parties involved in this project: the Maldivian authorities, the Guhli Island Council, STELCO for providing waste heat and land, our local integrator Static, and our technology suppliers Aquaver and Memsys.'

'We believe that this is a good example of how water problems can be solved sustainably on a local level, even in situations where no sweet water is available. We are already working to apply this concept to many of the 200 inhabited islands of the Maldives, a number of Resort Islands, plus other nations.'

UN water expert Jehaan Saleem added: 'A good supply of safe drinking-water has to be on top of the agenda of many small island nations since water-borne diseases are still one of the largest threats to the health of the people on earth.'

Water-related diseases

Water-related diseases are common in the Maldives. Apart from its geographic isolation, factors that contribute to the disease burden include a shortage of clean water, general lack of awareness amongst the public regarding the links between environment, clean water and personal health, water treatment and water sources. Therefore, improving access to safe water by developing sustainable systems that can be maintained by the island communities, such as AQUIVA Fushi, is crucial to improve health and well-being, particularly amongst the population in the atolls.

Florian Bollen, CEO, Aquiva Foundation, explains the desalination system to Dr Shakeela, Health Minister, Maldives.

Wolfgang Heinzl, developer of the Memsys technology, added: 'Today, the Memsys process is applied in many industries for wastewater treatment, ethanol separation and cooling processes. In light of the growing water problems worldwide, sustainable desalination was one of the most important issues on our minds when developing the process.'

Edgar Konijnendijk, who is responsible for the drinking-water programme at Aquaver, commented: 'It is a privilege to be part of such an exciting and challenging project. Working with the local population makes you realise the urgency for clean, fresh water today, and their will to develop the islands further. Providing remote communities with clean drinking-water requires a simple and robust system – low in maintenance and easy to use. This is exactly what we have achieved with our plants. Their unique ability to use waste heat makes them suitable for other remote communities all around the world.'

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