



## **Toxic water becomes clean with new filtration technology**

Clean water is something we more or less take for granted in the West, but this is not the case for large parts of the world's population. In Bangladesh, millions of people are compelled to drink water and use arsenic-poisoned and bacteria-filled water. In order to rectify this problem, water purification is required. In cooperation with researchers at KTH, the Swedish company Scarab Development AB has developed a water purification technique which provides absolutely clean water.

### **Membrane distillation is more cost-effective**

In cooperation with researchers at KTH, the Swedish company Scarab Development AB has developed a water purification technique which cleans the water from wells through membrane distillation. The toxic water is pumped through a machine and becomes pure water vapour which is then distilled and cooled down. While the water vapour is passing through the membrane, particles, ions and other pollutants pass through the membrane and laboratory tests show that the water becomes absolutely pure from all poisonous substances and bacteria.

The advantage with Scarab Development AB's membrane distillation technology is that it is more cost-effective. To heat up the water, high temperatures are not required, waste heat can be used, which makes it more resource-friendly.

- It is sufficient with 80-85° to purify the water, but because the membrane is so thin, it is important that it is not subjected to pressure, says Andrew Martin who is a senior university lecturer and researcher at the Faculty of Heat and Power Technology at KTH and one of the participants in the research project.

- It is the surface tension which makes the molecules of water vapour pass through. Gortex is the same type of membrane where the material breaths and water vapour can pass through. The technique works well with biogas or solar energy. The objective is to generate electricity and purify the water at the same time with the waste heat from a power plant, says Aapo Säask, founder of the company Scarab Development AB.

### **The established technology does not work in Bangladesh**

The biggest competitor in general is the already established technology, but cleaning water from arsenic in a cheap and simple manner is difficult, and in Bangladesh it is not possible to have such large purification plant in small villages. Many villages have no electricity either.

- Via membrane distillation, the heating costs are low. The key is to find a good heating source. For example, a gas plant. With waste heat, it is more efficient in terms of resources. It is more difficult to utilise waste heat from larger facilities, says Andrew Martin.

The present water purification project at Scarab Development AB was requested by the United Nations 10 years ago and the difficulty is not associated with water purification technology, but with its financing. The question has long been bandied about between the development agencies and the EU without any real commitment being made.

### **Grameen Shakti wants to participate**

But now the company Grameen Shakti has become aware of Scarab Development AB and requested four demonstration facilities for the purification of arsenious water. The founder of Grameen Shakti, Muhammad Yunus, received the Peace prize in 2006 for his micro-loans to women. Instead of an international development agency financing the building of a facility, the villagers themselves will be able to assume responsibility for its financing by paying for the water and electricity.

A typical facility for the co-generation of electricity and water would cost around SEK 500,000. To solve the arsenic problems and at the same time electrify rural areas, approximately 15,000 plants would be required. This would involve an investment cost of approximately SEK 7 billion over a seven-year period. The price of drinking water to the consumer has been estimated at SEK 0.10 per litre and the price of electricity at SEK 0.28 per kWh.

- But at the moment the situation is one of deadlock. The problem is that we cannot receive payment for the pilot plants. Previously Grameen has helped villages with micro-loans for existing products such as mobile telephones or solar panels which the villagers in turn resell as services, for example the electricity which is produced or the loan of a telephone - they would receive payment for each call - but now the villagers must invest in a completely new technique and this involves a major risk, demonstration plants have to be paid by somebody. We have now sent a proposal to the government of Bangladesh with regard to this, concludes Aapo Sääsk.

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