

# **Sustainable water supply Värmdö**

## **Purpose**

The purpose with the project was to come up with a solution to a rising problem of finding pure drinking water in the Värmdö area in Stockholm, Sweden. The ground soil is often polluted with salty water from the nearby water which is a part of the Baltic sea (Östersjön). A system was to be designed and constructed using the membrane distillation technology for purification of water for a private residence at the Värmdö area.

## **Objective**

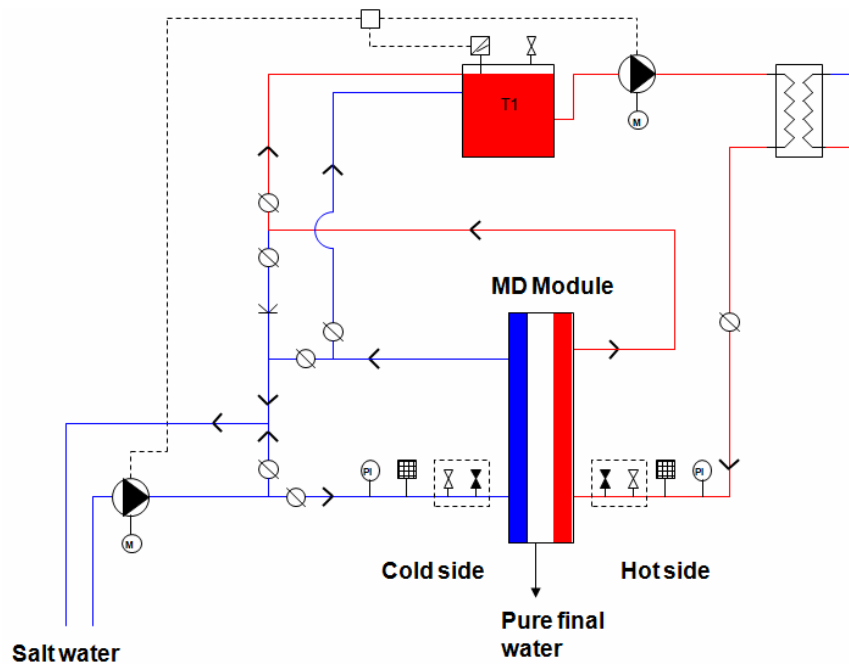
The objective was to use the membrane distillation technology for purification of water using renewable energy sources. The system developed for this application utilized the energy absorbed by solar panels located at the roof at the same residence that was going to be supplied with the clean water. Theoretically the same system could be set up everywhere where there is enough energy to drive the membrane distillation, which only needs a temperature difference for its operation.

## **Procedure**

The system was developed out of an preliminary design made by Branko Simanic (PhD student at KTH). Guidelines and directions about the project were obtained from the investor and the house owner, Mika Kettula and the SCARAB CEO Aapo Sääsk. Identification and sizing of the necessary components was then made for a satisfying operation of the system. Contacts were established with manufacturers and suppliers of the various components and after discussions with these and other involved parties the needed components were acquired. The system was set up with the help of workers that had the necessary skills and routine. A test run was made with satisfying result. During the project discussions were held with Henrik Dolfe from SCARAB that had experience from similar projects.

## **System overview**

The picture below shows an overview of the system. The warm water that enters the heat exchanger to the far right comes from the two accumulator tanks which in turn are heated with the solar collectors (also electrical cartridges are installed as a backup). Together with the cold sea water the warm water achieves the temperature difference over the MD Module which is needed to produce the pure water. Because of that when the pure water is produced the warm circuit is getting saltier all the time, extra sea water needs to be added and that is done in tank T1. Level indicators are installed in this tank to prevent flooding or that the system runs dry and the pumps will get wrecked.



### Results and conclusions

The system was tested at late august with a satisfying result. The purified water was analyzed and no traces of contaminants were found. At this point the system has some weaknesses as it is the first of its kind. Though it is shown here that the operation of the system utilizing renewable energy sources works well and could be developed further for a more optimizing operation and production of clean water.