A strong combination

Increasing population, higher living standards, growing demand for clean water, pollution and climate change are all exerting pressure on the shrinking water resources and forcing up the cost of freshwater. In addition, many industries require large quantities of freshwater for their processes and are realising the benefits of becoming self-sufficient in terms of water supply.

Governments, municipalities and industries worldwide are increasingly turning to desalination as a way of addressing water shortages, so the portion of water supply derived from sea water, brackish water or other raw water desalination is rapidly growing.

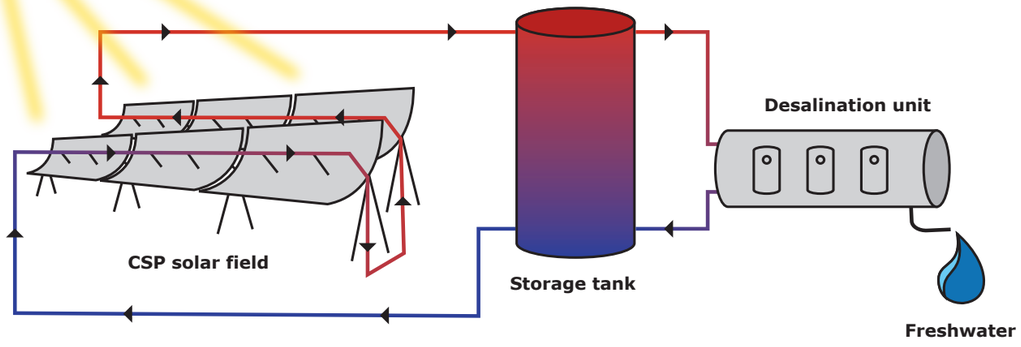
As the world's water resources are running out, so are the fossil fuels, and the world is constantly looking for new ways of replacing the traditional power supplies with environmentally friendly energy sources. Looking up, you will see the greatest energy source of them all – the sun! Every single day enough energy from the sun falls on the earth to power every single household and business for approximately 30 years, and it will keep doing so every day.

With a co-operation going back decades, it was a natural step for Alfa Laval and Aalborg CSP to join together in the development of a solar desalination system using their experience respectively from the desalination industry and the solar power industry.

Having worked with desalination systems, both onshore and offshore, for more than 50 years, Alfa Laval is one of the technology leaders in the desalination field. This enormous knowledge made the foundation when engineers from both companies joined together with a plan to creating a system that could produce clean water from solar energy.

It was with 25 years of experience within the traditional boiler industry that Aalborg CSP started working with concentrated solar power (CSP). The development of the solar field for the solar desalination plant is based on their work and experience with CSP as a component supplier to some of the world's biggest CSP plants and as the developer of a full turn-key CSP system for industrial use.

Please feel free to contact Alfa Laval or Aalborg CSP for more information about the solar desalination system.



A principal illustration of the solar desalination plant

Solar desalination

- Clean water from solar energy

www.alfalaval.com

www.AalborgCSP.com

AALBORG CSP
- Changing Energy

Freshwater production

The solar desalination plant can produce potable water, process water and boiler feed water for various industries including:

- Power industry
- Mining industry
- Food industry

A green solution

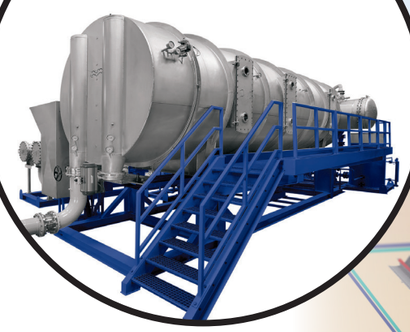
The constant radiation of an enormous amount of energy to the earth makes the sun the most environmentally friendly and future-proof energy source. Using solar power for clean water production will cut down the need to purchase energy from an external energy supplier and in that way reduce both production cost and CO_2 emission.

A complete solution

The solar desalination system is a fully integrated system based on well-known and proven technology.
The low maintenance system has a long production life and the educational requirement level for the operators is very low. As all plants are custom-made, the system is highly flexible in regard to size, installation and utilization of land.

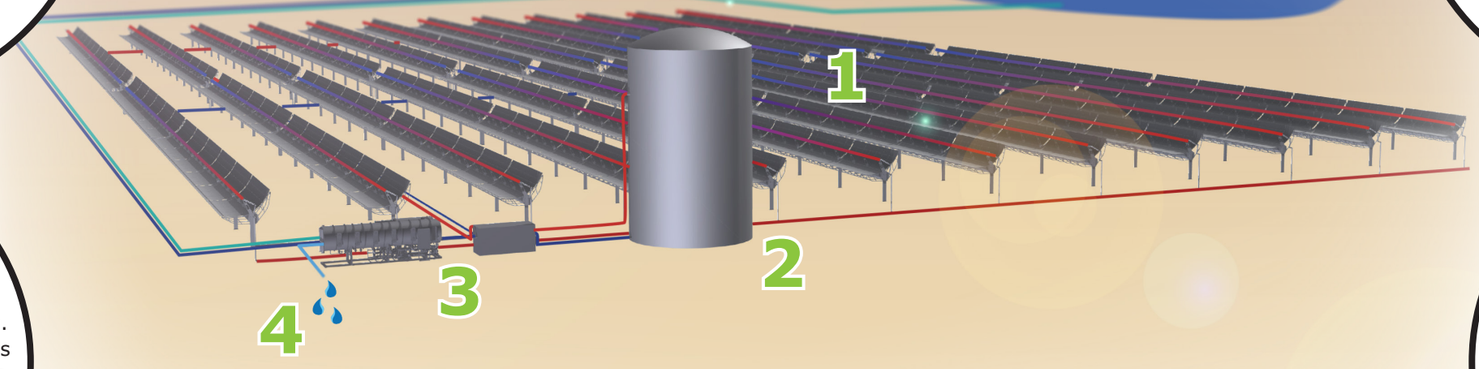
The parabolic troughs

Multi-effect plate destiller



The solar field

The CSP solar field consists of 12 metre parabolic trough modules placed in 144 metre rows.
Sun tracking technology tracks the position of the sun and rotates the troughs accordingly. This ensures the full exploitation of the sun from sunrise to sunset.
Due to the large amount of radiation throughout the day, the solar field has very high efficiency per m^2 mirrors.

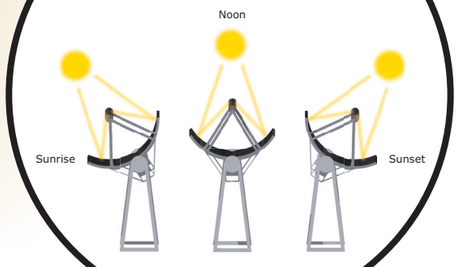


- Clean water from solar energy

The desalination unit

Using plate type evaporators and condensers in the desalination unit ensures the system a high performance. The unit is made of non-coated materials that are resistant to seawater and brines. Operation and maintenance of the unit is very simple with full access to evaporator heat transfer surfaces for manual cleaning if needed.

Following the sun's path



1 The CSP (*concentrated solar power*) solar field produces thermal energy to run the desalination unit. The solar field consists of parabolic trough-shaped mirrors that concentrate sunlight onto a receiver pipe placed at the focus of the troughs. The concentration of solar energy heats water flowing through the pipe.

By using sun tracking technology, the parabolic troughs are rotated, following the path of the sun, to ensure an optimal collection of the solar energy.

2 After the water is heated in the solar field, the hot water is pumped through a pumping station and into a storage tank. Besides supplying thermal energy directly to the desalination unit, the solar field produces enough heat to fill the storage tank with heated water, making sure that there is enough energy stored for the desalination unit to operate 24 hours a day.

At night time circulation to the solar field is stopped and the desalination unit runs solely on energy from the storage tank.

3 Seawater is led into the MEP desalination unit (*Multi-Effect Plate Distiller*) where the thermal energy from the solar heated water is used to evaporate the seawater. In the distillation process, seawater is being evaporated and condensed multiple times. After the distillation process, the brine is led back to the sea and the distilled water is used for various purposes.

It is preferred to use seawater for freshwater production, but other kinds of raw water like riverwater etc. can also be used.

4 The freshwater produced at the solar desalination plant is of high quality and can be used for potable water, process water and boiler feed water.

Using the sun's energy in the production of clean water is both future-proof and environmentally friendly, and since many of the areas in need of clean water round the world are located in areas with high solar radiation, solar energy is an obvious choice for running the production.