

MES - Systems

About DWC:

DWC, DecRen Water Consult is a German consulting company serving international clients in all areas of integrated and sustainable water supply and waste water management. By using decentralized, appropriate and renewable energies based technologies we can realize cost effective and individual solutions from a single source. The product described here is therefore one attractive option in solving water related problems.

Requirements

In the area of desalinating brackish or salt water the technical options are numerous. Decentralized and autonomous systems to supply fresh water or reclaimed water for irrigation in the farming or garden sector, the water supply of private housings or the tourist industry are important for a long term water supply. Energy autonomous, using and applying appropriate technologies and extremely robust and reliable desalination technologies are preferred in choosing the right solutions. Such systems should be scalable and powered by solar energies or other renewable heat sources like waste heat.

Functioning of MES Multi-Effect-Solar Desalination



The Multi-Effect-Solar (MES) Desalination Plant is a solar thermal plant, that converts seawater, brackish water or the brine discharge from existing desalination plants into high quality drinking water.

The key technology lies in the Hot

Advantages

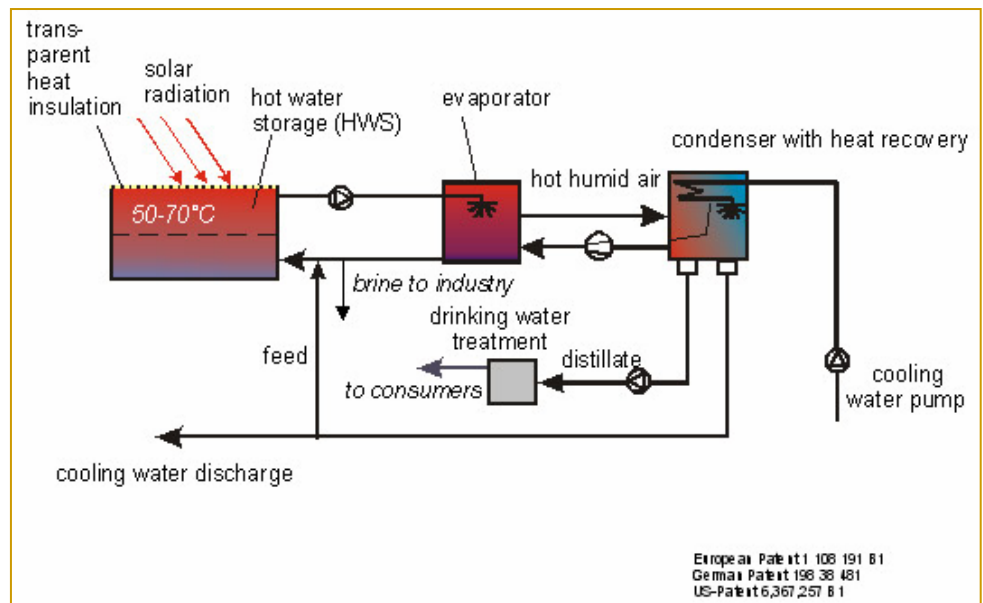
- Economical technology for desalination of sea water already with medium sized plants
- Modular system allows scale-up for all sizes
- High local value-added from construction and assembly
- Discharge-free operation avoids increasing salinity of ground water and the production of high concentrated brine as by-product
- Maintenance friendly technology
- Short assembly period
- The flexible design allows the integration in holiday resorts and towns
- Brine or salt production

Water Storage (HWS) and in the evaporation/ condensation process which allows the desalination of seawater with extreme high salt concentration in a closed circle. The HWS consists of one or more basins or an artificial lagoon filled with seawater. The solar radiation shines through the Transparent Heat Insulation (TWD) on top of the basins and heats up the water inside the HWS. The hot water enters the evaporator where a certain part of the water flow is transferred to steam while the rest of the hot water is pumped back to the HWS. The steam is condensed in the condenser. After this, minerals may be added to the distillate to produce best drinking water. The brine may either be pumped back to the sea or concentrated and delivered to a salt producer or user.

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European Patent 1 108 191 B1
German Patent 198 38 481
US-Patent 6,367,257 B1

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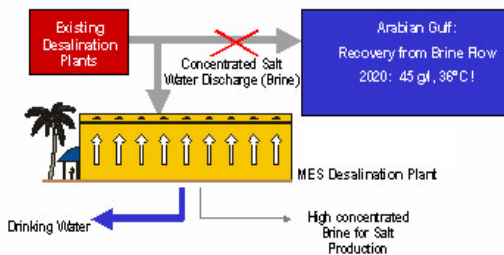
Multi- Effect- Solar (MES) Desalination Plants are based on a modular system and produce drinking water with a salt concentration of 20- 200 mg/l from:

- Brackish water (raw water salt concentration 1- 20 g/l)
- Seawater (raw water salt concentration 20- 50 g/l)
- Brine from existing desalination plants (raw water salt concentration 50- 80 g/l)
- Special projects (raw water salt concentration 80- 170 g/l)

Possible locations:

Onshore, Offshore or Salt flats (Sabkhas)

Possible Application of MES Multi-Effect-Solar Desalination



Problem:

Big quantities of brine discharge from existing desalination plants and salt-laden waste water from the oil production process is dumped into the Gulf and at the same time reduced sweet water flow from rivers lead to increasing salt content.

Solution:

MES Desalination Plants keep the brine in a closed circle and do not discharge any brine or chemicals into the sea. Thus each MES Desalination Plant will help to reduce the salinity and pollution of the gulf. MES plants may also convert the brine discharge from existing desalination plants into drinking water.

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Type of plant

Maximum Capacity in summer
Design Capacity
Minimum Capacity in winter
Salinity of raw water
Raw water temperature (range)
Hot water temperature (range)
Drinking water quality
Salinity of drinking water (TDS, max.)
Recovery rate (efficiency)
Solar area (flexible layout)
Electrical power demand
Electrical specific power demand

MES Module HP 740
(Multi-Effect-Solar)
m³/d 680
m³/d 500
m³/d 400
ppm 80.000
°C 15-30
°C 50-70
better than WHO
ppm 150
% 71,0
ha 2,5
kW 54
kWh/m³ 2,6

Economic production of thermal energy

- The specially developed Hot-Water-Storage (HWS) is a combination of a heat storage and a large-scale solar collector. It is worldwide the first time that heat generated with a solar application is cheaper than waste heat from thermal power plants.
- Therefore the MES- Technology provides very economically thermal energy for the desalination of seawater.

Low running costs lead to low total water costs

- The electrical energy consumption for the desalination of sea water and brine with MES Desalination Plants is in the range of 1,6-2,8 kWh/m³, which is extremely low, when considering the high salt concentration of the raw water up to 80 g/l.
- Instead of metals, only heat resistant plastic material is used for pipes and heat exchangers. Therefore no dosage of anticorrosion is necessary in MES Desalination Plants. This saves money for the owner and helps to protect the environment.
- Water production costs even of the largest existing desalination plants can be undercut with MES Desalination Plants.

This product could - in our view - be one attractive option to guarantee a decentralized, sustainable and renewable based water supply. Whether this product can be applicable for your personal circumstances either as a single product or in a combination with other technologies or processes to function within an integrated water management has always to be evaluated prior on an individual basis. Although every care has been taken in the correct preparation of this factsheet we cannot be held responsible for any errors or omissions.