Solar energy: desalinating sea water into fresh water

Innovative coastal adaptive & mitigation measure

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Introduction

Lack of fresh water is a general concern and will increasingly become a threat to societies in the future. The Southern European nations like Spain, Italy and Greece, have regions, which are already experiencing serious fresh water deficiencies. This problem is particularly acute during the summer holiday season in the Mediterranean region, when the number of people staying there increases considerably. The number of tourists is expected to double by 2025. Drinking water scarcity is likely to increase because of a changing climate. This represents a massive economic, social and environmental threat to semi-arid regions such as the Mediterranean.

An important technology to tackle this problem is desalination: making fresh drinking water from saline seawater. Most of current methods however are neither cost efficient nor environmentally friendly. Therefore, there is an urgent need to develop a technology that would fulfil both criteria.

As the name suggests, the DeSol (**De**salination by **Sol**ar heat) project will rely exclusively on solar energy to reach this strategic goal.

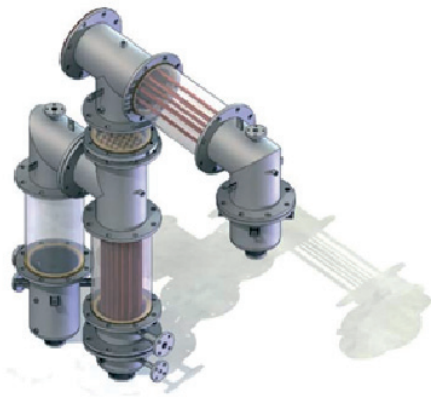
Objective of the DeSol project

EU - DeSol project (2006-2009) developed an environmentally friendly and efficient method that desalinates seawater using thermal energy provided by solar collectors. Efficiency is increased by running the processing at sub atmospheric pressure. The low, almost vacuum, pressure causes the water to evaporate at low temperature. This characteristic makes the system useful for low-grade heat sources, such as solar heat.

The vacuum is generated by gravity generated by a continue flow of the condensed fresh water falling from a predetermined height. No additional energy or equipment is required to obtain and preserve the vacuum. The desalination system is developed, tested and demonstrated in the Mediterranean climate.

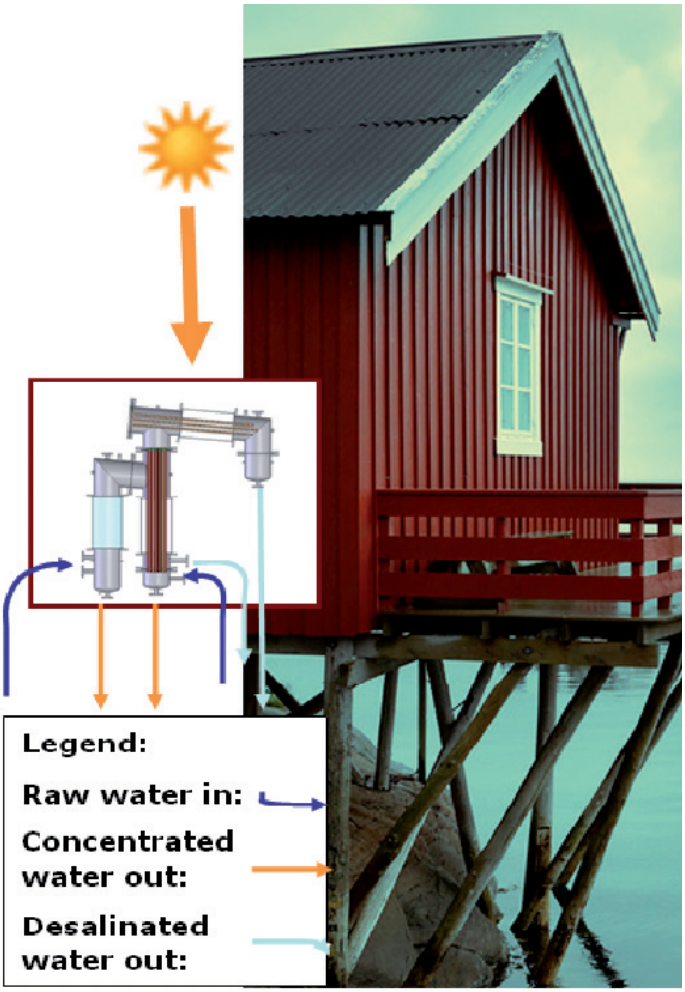
Status of the DeSol Project

The initial developments are completed. The system has been transferred from the two laboratories in Fraunhofer Institute of Physics, Stuttgart and CRIC-Wattpic, Barcelona and jointly installed near



DeSol –laboratory prototype.

DeSol test set-up. *(photo: H. Niesing)*



The DeSol prototype installed at the Mediterranean end-user. (source: H. Niesing)

Barcelona. Desalinated water production rates with the given prototype installation are between 20 to 35 litres per solar hour. A university study on the potential market for this technology, and its developments, has also been carried out. The EU-DeSol project consortium includes a potential end-user.

Future developments

Small-scale simple technologies that do not require fossil fuel can provide a significant contribution towards a more sustainable use of the Earth's natural resources. The DeSol consortium is confident in this technology and is seeking opportunities to optimise the system (components, costs), installation procedures, maintenance requirements (materials, knowledge availability), and the process (dependence of direct sun, heat storage, recovery etc.). Upgrading the system's current capacity to a production level of fresh water of 20 m^3/day is the next step. Applications in developing coastal countries deserve special attention as such technologies converting polluted - salt water into fresh drinking water will improve quality of life, without harming the local ecosystem.

For more information

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Websites

Cooperative Research projects for SMEs – Volume 3: "17928 DeSol Low-cost Low-energy Technology To Desalinate Water Into Potable Water": www.ec.europa.eu/research/sme-techweb/pdf/sme-coop_3.pdf

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