

# Using the rays of the sun to convert sea- to drinking water

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Fraunhofer ISE intends to contribute to the development of solar-powered water desalination plants such as the one shown here, in Gran Canaria. (© Fraunhofer ISE)

Many of the world's remote areas with water shortages also have three things in abundance: Sun, wind and sea. How renewable energies can be harnessed more effectively in the future to transform salty seawater and brackish water into drinking water is the subject of a current study issued by an EU initiative dubbed "ProDes".

Worldwide, more and more people are obtaining their drinking [water](#) either from the sea or from increasingly salty inland sources. Analysts at Global Water Intelligence, an industry service, estimate that in 2008, desalination facilities around the world produced nearly 52 million cubic

meters (12 billion gallons) of water each day - the equivalent of four or five times the daily production of water in Germany. This amount is expected to more than double by the year 2016. The bulk of this amount is attributable to the Arab countries around the Persian Gulf. Spain ranks fourth worldwide. Other European countries are increasingly turning to desalination as well, including France, Greece and Italy.

The goal: To secure the water supply for islands, settlements or entire cities, to supply water to tourist resorts, or to irrigate farmland. While most of the large desalination plants are fueled by oil or gas, smaller and medium-sized plants can run partly or even entirely on renewable energies. "Often, the people in charge aren't even aware of the opportunities they have here. They also don't know how reliable and efficient solar-powered desalination plants, or wind-powered and perhaps some day tidal-energy-driven plants, work", regrets Marcel Wieghaus of the Fraunhofer Institute for Solar Energy Systems ISE in Freiburg, Germany. The European "ProDes" initiative, of which ISE is a member, intends to change that. Its goal is to provide outreach while bringing all participants together to promote use of renewable energies for [water desalination](#): "ProDes" stands for "Promotion of Renewable Energy for Water Production through Desalination".

The initiative has established an array of processes for desalinating seawater and brackish water. Most major European desalination plants rely on reverse osmosis: High pressure and semipermeable membrane separate water from salt and unwanted organic constituents. Plants run on conventional energy forms can deliver up to around 400,000 cubic meters (91 million gallons) of [drinking water](#) each day. When it comes to desalination plants run on renewable energies, the spectrum ranges from simple solar distillation plants with a capacity of a few liters a day to wind-powered reverse-osmosis plants capable of desalinating up to nearly 2,000 cubic meters (half a million gallons).

Not every plant is suited to every location, however. The best technology for the task depends on the salinity of untreated water, the local infrastructure and the quantity of water required. "The more remote the location, the more worthwhile and profitable it is to use plant systems run on renewable energy and to set up a water treatment operation that is not dependent on an external energy supply", Wieghaus observes. Together with his team of researchers, he has installed solar-powered desalination plants on the Canary Islands of Gran Canaria and Tenerife.

A path-breaking overview of the [renewable-energy](#) technologies for desalination and the current state of technology is provided by the "ProDes-Roadmap", a document drawn up under the direction of ISE. The document also identifies strategies for overcoming legal, financial and political obstacles. The study can be found at the ProDes website ([prodes-project.org](http://prodes-project.org)). The website also offers information about activities such as its workshops and the initiative's e-learning course. "ProDes" was launched in October 2008 as an "Intelligent Energy" project of the EU Commission.

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