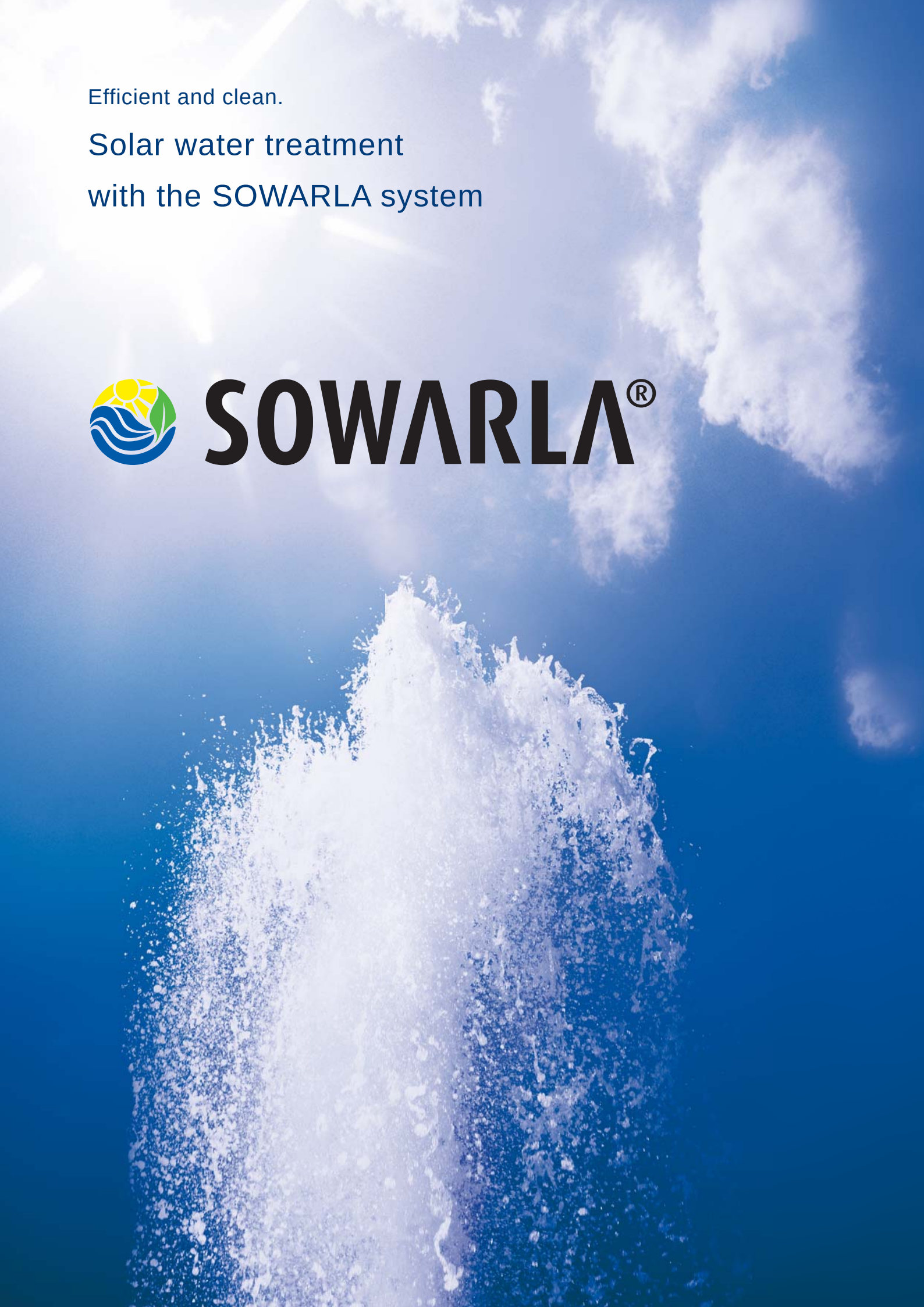
Efficient and clean.

Solar water treatment with the SOWARLA system

SOWARLA®



SOWARLA: The revolution in solar water treatment

Water being one of our most precious resources, it has to be free from pollution to prevent hazards to humans and to our environment. We see an increasing awareness of how important it is to have clean water available. Yet at the same time our conventional water treatment methods are not effective enough to eliminate a great number of water pollutants. This is why Hirschmann Laborgeräte GmbH & Co. KG and German Aerospace Center (DLR) have developed the SOWARLA system, which offers several advantages as compared to other processes:

The SOWARLA system is:

- extremely effective
- fully environmentally compatible
- resource-conserving
- cost-efficient
- versatile

Sunlight: the source of clean water

The advantages of the SOWARLA system are directly derived from the idea of using sunlight for water purification: Solar radiation delivers the required energy to eliminate water pollutants and, when equipped with an integrated photovoltaic system, it will also provide the full amount of electric energy required for plant operation. The completely solar-powered design version of the SOWARLA system offers optimized results for humans and for the environment while minimizing the consumption of valuable resources at the same time.

The success of this concept draws on the use of carefully selected photocatalysts. Conventional, light-based water purification systems use UV-light for costly electrical processes (photolysis). Contrary to that, photocatalysts make it possible to use sunlight directly. This method is free of charge and, as compared to other purification methods, saves approx. 90% energy. Moreover, photocatalytic processes require significantly reduced amounts of oxidants; in some cases, even atmospheric oxygen is sufficient to achieve best results.

Patented technology

The core of the SOWARLA system is an innovative solar receiver, developed by the glass experts from Hirschmann Laborgeräte GmbH & Co. KG. The solar receiver acts as the reactor for the photocatalytic decomposition of water-polluting substances. Owing to its modular design the receiver can be perfectly adapted to the water volume and easily expanded as necessary.

Patented solar collectors with tubes from sturdy and extra-translucent special glass ensure maximum exploitation of the solar radiation. While the contaminated water mixed with photocatalysts is flowing through the glass tubes of the receiver, which is exposed to sunlight, a sophisticated control system adapts the flow rate exactly to the actually irradiated solar power: high solar radiation allows a high flow rate, whereas the flow rate decreases with lower solar radiation levels. As soon as the water has reached the desired level of purity, the photocatalyst is separated and the clean water is discharged.

SOWARLA Receiver by Hirschmann®

Plant control

Energy-independent

The full amount of energy required for operation and control can be supplied by a photovoltaic plant. In this case, the pumps which move the water through the receiver are also powered by solar energy. In this way, the entire plant is independent of fossil fuels and thus, CO_2-neutral. Rising energy prices will have no effect on the operating costs of the SOWARLA system, which makes the combination of photocatalysis and photovoltaics an absolutely unbeatable team.

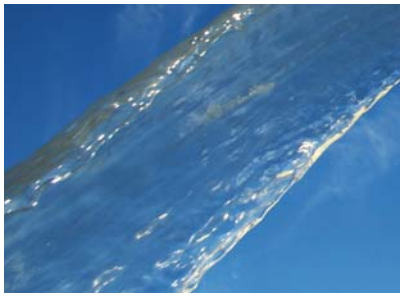
Flexible applications

The SOWARLA system is suitable for a host of different applications: from pre-treatment processes right through to full water treatment and the discharge of purified water into natural waters. In addition, the system can be adapted to a great variety of further applications and problematic substances. Tests with contaminants from antibiotics, radio-contrast agents, chlorinated hydrocarbons and exhaust air cleaning residues were conducted successfully. In general, it can be stated that this method is capable of eliminating organic or inorganic pollutants in waste waters for the most part. The modules are easy to install and easy to maintain, thus ensuring quick on-site installation and connection.

SOWARLA®

Selected fields of application


Decontamination of ground water




Pre-treatment of special waste waters (e.g. from the pharmaceutical, chemical, textile and pesticide industry)


Purification of sewage water (e.g. from landfill and waste-disposal sites)


Determination in recreational or touristic environments.

Demonstration plant

The SOWARLA system is based on an innovative process, which has been designed within the scope of extensive scientific studies and tests. It comprises a patented solar receiver design, a sophisticated control system and an energy-efficient catalyst separation and recycle system. The system was successfully tested on the degradation of a variety of oxidizable compounds. As a first full-scale application, the elimination of hazardous compounds from a biologically untreatable cooling water was realized in a demonstration plant at the DLR location in Lampoldshausen. Originally, UV-lamp technology was used to purify the contaminated cooling water - a purification principle that caused high operation and maintenance costs. Today, the demonstration plant is run under continuous operating conditions and available to the expert community as a reference project.

The research project, which has been named SOWARLA, was supported by the German Federal Environmental Foundation (DBU) and initiated in cooperation with the Technology Transfer Center in Lampoldshausen (TTZ).

Profile

Location

Lampoldshausen, Baden Württemberg, Germany

Year of commissioning

2009

Solar receiver area

240 m^2

Total area required

350 m^2

Daily volume of purified waste water

13,7 m^3

Pollutants

Cyanide, nitrite, hydrazine derivates

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Partners

The innovative solar water treatment unit with the SOWARLA System was developed by Hirschmann Laborgeräte GmbH & Co. KG in collaboration with the German Aerospace Center (DLR) Hirschmann Laborgeräte is a company which is active worldwide in the fields of medical and chemical laboratories, research, and industry. Many years of manufacturing high quality products have enabled Hirschmann Laborgeräte to acquire specialized know-how regarding the possible applications and processing of superior types of glass and plastic. Scientific support for the development came from the DLR in Cologne and at the project center in Lampoldshausen. The solar receiver, the heart of the system, was jointly patented.

Award

In 2008, the SOWARLA system – at that time still known as the SOWARLA pilot project – was awarded the Energy Globe Award, “The world award for sustainability“. This prize is awarded by the European Parliament in recognition of particularly sustainable projects. Out of 853 competitors, SOWARLA was able to come out on top of the “National Winner” category.

Contact

The SOWARLA system is a resource-conserving purification process, adaptable to a great variety of different applications. Please feel free to contact us for further information and advice.

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