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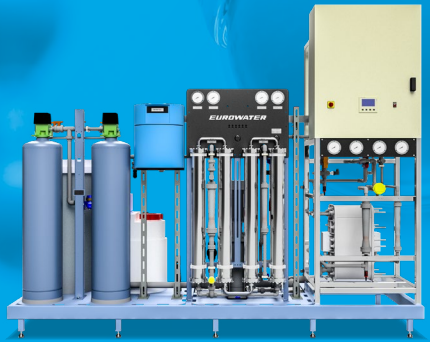
A GRUNDFOS COMPANY

Water treatment for green hydrogen



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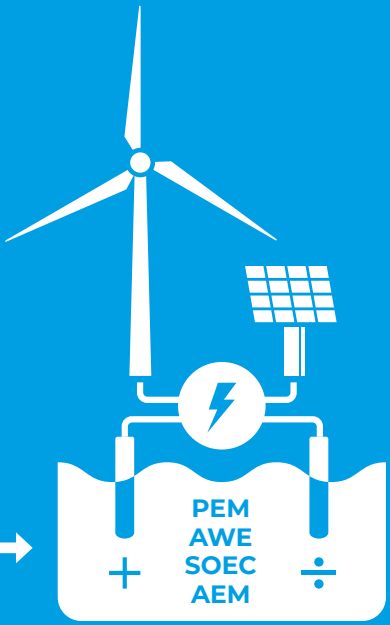
Water treatment plant



Water treatment is key

A stable hydrogen production requires proper water treatment. The specific electrolyser technology and water source determines the required water treatment.

EUROWATER has extensive experience in securing your solution with know-how, standard products and international service - from water source to the heart of the electrolyser.

Groundwater

Stable water source, but contains iron, manganese and ammonium.

City water

Easy access for smaller projects, but contains chlorine and chloramine.

Treated waste water

Variation in quality and potentially high load of organics.

Sea water

High salinity and content of metal ions.

The water source

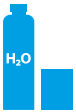
Depending on your location and size of project you may have different water sources available and each will come with different requirements for your water treatment system.

We help you choose the right water treatment solution based on your water source and electrolyser technology.

How much water to source?

It is a fact that it takes water to purify water, and the water source must be taken into consideration to determine the impact of a green hydrogen production facility on the local water system.

Example: a plant designed to produce 1,000 tons hydrogen, will require 9,000 m^3 of ultrapure water, and will need to extract 12,000 m^3 of groundwater, 13,000 m^3 of treated wastewater or 30,000 m^3 of seawater.



1.4 m³

Groundwater

1.5 m³

Treated wastewater or surface water

3.3 m³

Seawater

1 m³

Ultrapure water
ready for electrolysis

1 m³

Ultrapure water
ready for electrolysis

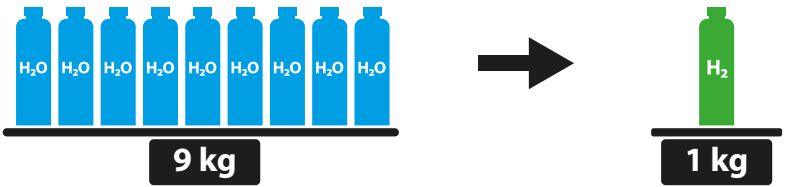
1 m³

Ultrapure water
ready for electrolysis

How much water to produce H_2?

Ultrapure water is the central feedstock for production of green hydrogen. Furthermore cooling water may be required in the process and system.

But how much water does it take to produce green hydrogen? The rule of thumb is 9 L ultrapure water for 1 kg of H_2.



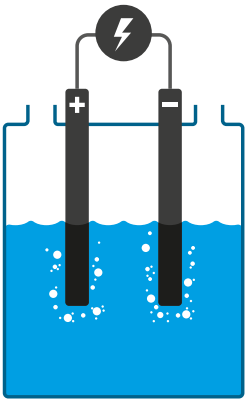
Electrolysis of 9 kg ultrapure water results in 1 kg hydrogen.

How much water per MW?

In order to design your water treatment system you need to know the consumption rate of ultrapure water. The amount of ultrapure water needed per MW depends on how much energy the electrolyser needs to convert the 9L of ultrapure water to 1 kg of hydrogen.

As we know that 9 L of water is required per kg hydrogen, it equals a consumption of 163-200 L/h of ultrapure water per MW electrolysis capacity.

Ultrapure water
0.2 m³/h

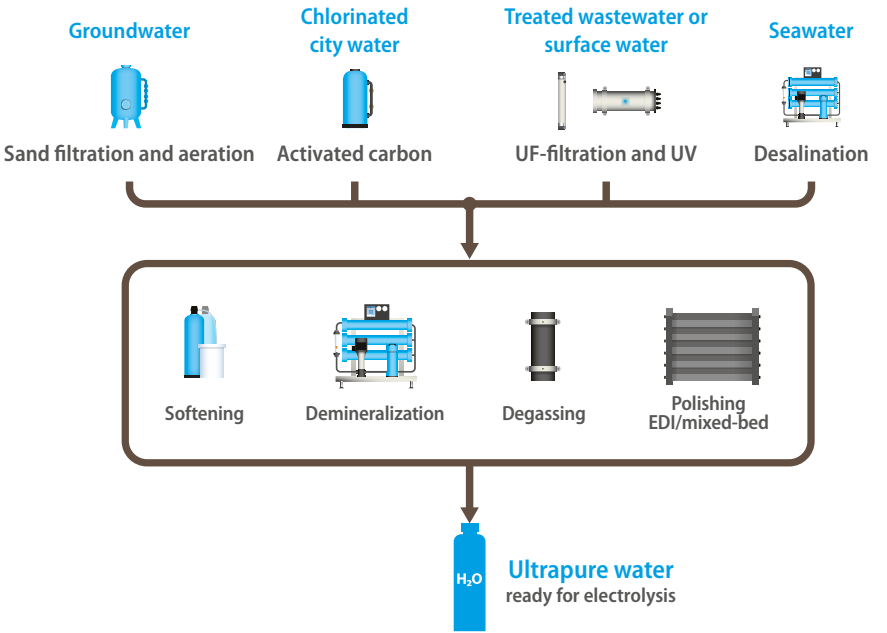


Electrolyser
1 MW

Water treatment for PtX

Water treatment for hydrogen production consists of a pretreatment step, determine by sourced water, followed by polishing.

Depending on the electrolyser technology the polishing steps can differ, but will consist of one or more treatments steps from softening to deionization.



PEM Electrolysis | 1.2 MW

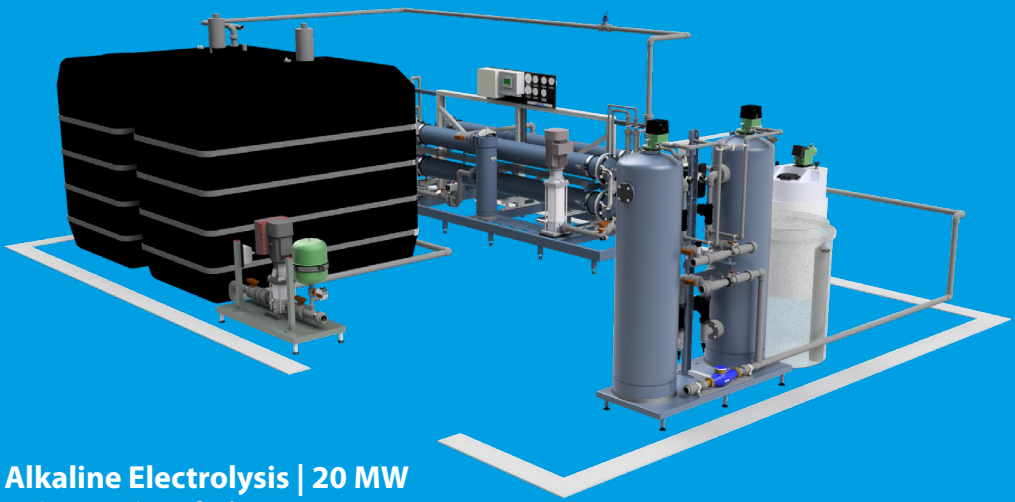
HyBalance

Water source: City water without chlorine
Plant capacity: 800 L/h
Conductivity: < 0.2 µS/cm

PEM Electrolysis | 5 MW

Standard unit

Water source:	City water without chlorine
Plant capacity:	1,200 L/h
Conductivity:	< 0.2 µS/cm



Alkaline Electrolysis | 20 MW

HySynergy / Everfuel 2022

Water source:	City water without chlorine
Plant capacity:	4,500 L/h
Conductivity:	< 5 µS/cm

A possible water treatment solution for a 300 MW system

What EUROWATER offers

ASSET MANAGEMENT

The right water treatment protects the electrolyser by preventing clogging and deactivation of membranes.

KNOW-HOW

Extensive process knowledge of water treatment for electrolysis technologies, such as AWE, PEM, SOEC and AEM.

STANDARD UNITS

In-house production of standard and modified units for fast delivery, thorough documentation and spare parts.

SERVICE

International service organisation with on-call service in more than 15 countries in Europe.

Pure water treatment - since 1936

EUROWATER develops and manufactures reliable water treatment plants – and has been doing so since 1936. Our plants are designed and manufactured on a quality principle of longevity and minimal need for maintenance.

Since 2020, EUROWATER has been part of the Grundfos Group and embraces Grundfos' global ambition to pioneer solutions to the world's water and climate challenges and improve quality of life for people.

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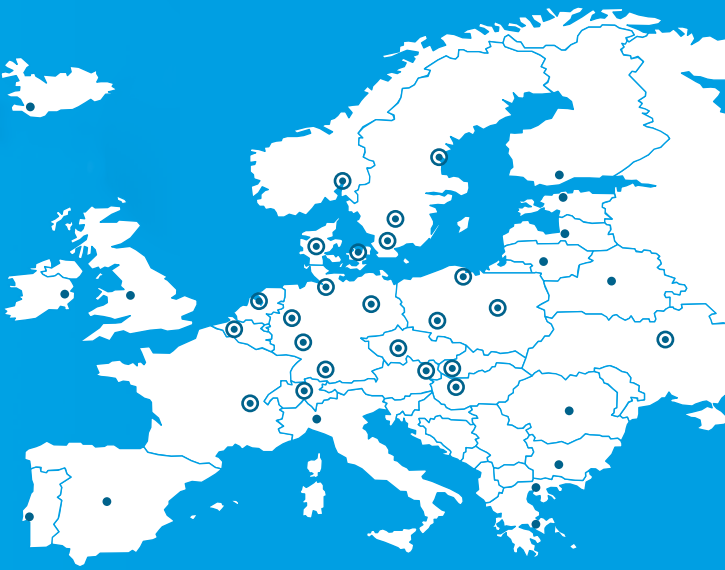

Pure Water Treatment