

Transforming Water Treatment with Green Oxidation



GOgen®

It starts **with water**, It ends **with water**

- 💧 Sustainable
- 💧 Safe
- 💧 Chemical-input free
- 💧 Easy to install and operate

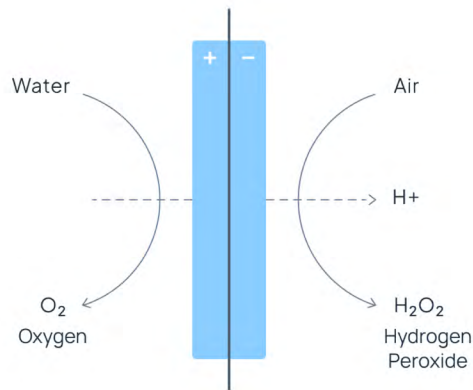
Introduction

The GOgen®, HPNow's groundbreaking onsite Green Oxidant generator, transforms water treatment practices. This cutting-edge innovation produces ultra-high purity hydrogen peroxide directly onsite, without the need for chemical inputs. It's safe, sustainable and easy-to-use. By harnessing HPNow's patented direct-electrochemical synthesis technology, the GOgen® offers a sustainable solution for multiple applications, including cooling and process water treatment, advanced oxidation, odor control, and irrigation water treatment.

Patented Electrochemical Process

HPNow's innovative hydrogen peroxide production technology employs a specialized form of electrolysis. In this process, water (H_2O) and oxygen (O_2) are converted into hydrogen peroxide (H_2O_2). This occurs within an electrolytic cell that houses two electrodes: an anode and a cathode.

When electricity is applied to the cell, oxygen gas is produced at the anode through the oxidation of water molecules. Simultaneously, at the cathode, a reduction reaction occurs, leading to the formation of hydrogen peroxide (H_2O_2). This distinct approach allows for the direct production of hydrogen peroxide at the cathode, while oxygen is liberated at the anode. Such a method is both effective and environmentally benign, enabling the immediate generation of hydrogen peroxide onsite and eliminating the necessity for hazardous chemical transport or storage.



Direct Electrochemical Synthesis

Using only water, electricity and air.
No liquid electrolyte.

We Developed the World's First Commercially Available Peroxide Generator

HPNow has been able to make onsite hydrogen peroxide commercially viable through technological breakthroughs, developing a patented electrochemical process for hydrogen peroxide generation. With over 150 installations worldwide spanning agriculture, water treatment, and industrial sectors, HPNow's technology has demonstrated its efficacy and reliability on a global scale.

Practical Setup

This is how GOgen® works: Imagine a simple setup where water, air, and electricity are the only inputs. Inside the GOgen® unit, these elements undergo a transformation. The magic happens as the GOgen® utilizes electricity to convert water and air into hydrogen peroxide.

This freshly produced hydrogen peroxide is then collected in a dedicated tank for safe storage. From this tank, a dosing pump is used to deliver the desired amount of peroxide to the water lines. The GOgen®'s ability to create hydrogen peroxide onsite, from readily available resources, makes it a versatile tool for various applications. Importantly, it is easy to install and to operate, as it functions autonomously.



Scalable Design

Highly scalable design with cells arranged in stacks, and systems supporting multiple stacks

Benefits of GOgen®

Green Oxidant

Hydrogen peroxide generated onsite is a green oxidant that does not produce harmful disinfection byproducts, becoming water and oxygen after use. It offers a sustainable, circular solution for water treatment, aligning with the growing demand for environmentally friendly practices and meeting regulatory standards for water quality. Because it is directly generated at the point of use, traditional supply chains, which are heavy on CO₂ emissions, are bypassed altogether.

The very high purity at which it is generated makes it intrinsically stable, with a storage life in the field of up to 6 weeks. This also means there are no stabilizers added, which increases compatibility with numerous processes.



Chemical-input free

The onsite generation of hydrogen peroxide eliminates the dependence on chemical inputs, since only water and air are used for production. Hydrogen peroxide produced through this method serves as an effective alternative, delivering superior disinfection and oxidation capabilities without the transportation, handling and storage hazards associated with chemical-based solutions such as chlorine or bulk peroxide. Since no chemicals are required for the onsite generation of peroxide, this also secures the supply and protects the operations against supply chain disruptions and price increases.



Enhanced safety

Water treatment professionals can significantly enhance safety by avoiding the handling and storage of hazardous chemicals. Onsite generation of hydrogen peroxide eliminates the risks associated with chemicals, ensuring a safer working environment for operators and reducing the potential for accidents and exposure incidents. Staff do not have to handle concentrated hazardous substances such as chlorine or highly concentrated hydrogen peroxide, contributing to a safer workplace.



Cost-effective

Onsite hydrogen peroxide generation reduces costs associated with chemical procurement, transportation, storage and regulatory compliance. Water treatment professionals can produce the required amount of hydrogen peroxide as needed, eliminating the need for chemical purchases and reducing the risk of chemical degradation over time. With the HPNow system, the ongoing operational expenses associated with bulk chemicals are a thing of the past. The machine itself runs on ambient air, water, and electricity.



Easy to install and to operate

GOgen® is easy to install and to operate. The unit is self-contained, and only requires water and power to function, ensuring it can be effortlessly integrated into various settings. Once set up, it operates autonomously, eliminating the need for constant manual intervention and making it a hassle-free solution for users seeking efficiency and convenience.

How GOgen® Measures up Against Other Solutions

The GOgen® from HPNow presents an innovative approach to water treatment, offering a multitude of benefits over traditional solutions.

	UV	Ozone	Chlorine	Bulk Peroxide	GOgen®
Sustainable	✓	✓	✗	✗	✓
Downstream effect	✗	✗	✓	✓	✓
Chemical-input free	✓	✓	✗	✗	✓



Sustainable

When it comes to sustainability, GOgen® stands out from traditional disinfection methods like chlorine and bulk peroxide.

- ➔ Chlorine: Chlorine is widely used but its use leads to the formation of harmful disinfection byproducts such as chlorates and trihalomethanes.
- ➔ Bulk Peroxide: Producing, and transporting bulk hydrogen peroxide is CO₂-intensive, as natural gas remains the main ingredient in its production process.

GOgen® offers a compelling alternative. It generates hydrogen peroxide onsite, eliminating transportation and storage needs. It only uses water, air and electricity as inputs, and there are no byproducts after its use. Green electricity can be used to have a CO₂-emissions free process.



Downstream effect

When considering downstream effects, GOgen® shines compared to traditional disinfection methods like UV and ozone.

- ➔ UV: While effective at inactivating microorganisms in direct contact with the light, UV offers no residual protection as it is a point of contact method. Any microorganisms that go through unharmed will be able to grow further down the water line. In addition, UV is largely affected by water turbidity.
- ➔ Ozone: Similar to UV, ozone effectively targets microorganisms in the water at the point of contact, but as it is a very unstable gas it will not have a downstream residual effect.

GOgen®'s onsite generation of hydrogen peroxide provides an effect throughout the whole length of the water piping, not only at the point of use. Peroxide is a liquid that mixes very well with water, and while it reacts fast with organics providing the desired effect it is stable in the water.



Chemical-input free

When it comes to chemical-free operation, GOgen® stands out from chlorine and bulk peroxide.

- Chlorine: Relies heavily on chemical inputs, either chlorine bulk or precursors to a form of chlorine that is then generated onsite. These are hazardous substances, and special safety precautions are needed for its storage and use. In addition, all forms of chlorine degrade over time, resulting in decreased effectivity and a higher number of undesired byproducts.
- Bulk Peroxide: Requires transportation and storage of the chemical. This leads to safety concerns associated with storage of high concentration peroxide onsite, which is classified as a strong oxidizer.

GOgen® shines in this category. The process relies on water, air, and electricity, eliminating the need for any additional chemical inputs. This minimizes the risk of chemical spills, contamination, and exposure throughout the process, from generation to application. Additionally, GOgen®'s onsite generation eliminates the need for chemical transportation and storage, making it an operationally very safe option.

About HPNow

HPNow is a technology and market leader in onsite green oxidation through its range of safe, sustainable, onsite hydrogen peroxide generation solutions. HPNow's solutions address growing global challenges in clean water and sanitation through autonomous, safe and sustainable green-oxidation solutions. Headquartered in Copenhagen, and with representation across Europe, the Americas and Asia, HPNow addresses their clients' water treatment needs in market segments ranging from agriculture and aquaculture, to industrial and drinking water treatment.

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