



## HARNESSING THE POWER OF NATURE INTO DISRUPTIVE APPLICATIONS INCREASES THE SUSTAINABILITY OF INDUSTRIAL PROCESSES

As the climate warms and the world population grows, water demand has surged, but supplies of freshwater are static or dropping. Water conservation has become essential in all regions of the world, even where water seems abundant. That's because the world's water resources are finite, and are getting smaller every year, an assessment of what is emerging as the dominant issue in decades ahead.

Keeping this assessment in mind, H2oVortex's Swedish scientists have been working since 2009 on a dedicated technology, Vortex Process Technology (VPT) enabling the reduction of water-energy consumption within industrial applications, which currently represent in some areas of the world up to 59% of all of the annual water usage (United Nations World Water Development Report).

Increasing water efficiency within industrial applications will significantly contribute to reducing water-related problems in areas of the world where water has become a significant concern. Regulatory pressure fostered by consumer awareness will slowly impose and enforce more stringent environmental regulation, while promoting a reduction in chemical dependency in many areas. In addition, companies are starting to feel increased pressure by shareholders, banks and business partners – as well as the general public perception – to comply with ever more stringent ESG standards around the world.

H2oVortex's VPT is based on biomimetic principles, where technology imitates nature and duplicates its most efficient processes. This natural process, as generated by the VPT, is the artificial spinning of water into a controlled vortex/spiral movement at minimal pressure within a confined patented device made out of composite materials. This unique purely physical technology device is called Industrial Vortex Generator or IVG and constitutes the backbone of the entire VPT. The water, passing through the IVG, does undergo some changes, of which the most important are: air bubbles inside the water are completely removed, the viscosity of the water is decreased by up to 20%, increase in heat capacity up to 5% due to higher density. One of the main char-

acteristics of IVG is that it is completely 3D printed, enabling a cost-effective production process. Key market drivers for the VPT solutions are water, energy and chemical savings, expected to become mandatory over time.

### Applications

The IVG technology is used in various water-intensive industrial applications to dramatically decrease water and energy use. There is already a large range of existing VPT applications in areas such as cooling tower operation, ice making, irrigation, wastewater management, aquaculture, river aeration just to name a few, as well as others still in very promising R&D stages, such as but not limited to water purification, etc.

One of H2oVortex's most promising applications is the IVG-CT, specifically aimed at industrial cooling towers (> 7MW or 2000 tons of cooling) which substantially increases cooling tower sustainability, while decreasing its CO<sub>2</sub> footprint, reducing water consumption by 50%, reducing energy consumption by 10% and eliminating 100% of all chemical usage.

Under normal circumstances, water in cooling towers needs to be treated in some way to control microbial growth, scale formation, and metal corrosion. Approximately 98% of the U.S. cooling towers use only chemical water treatment provided by an established market channel of chemical companies and service providers. The use of physical water treatment i.e., non-chemical technologies for water-cooled cooling towers is growing in the U.S. and has been widely used primarily in the EU, where restrictions on chemical discharge and environmental policies encouraging lower chemical usage are widespread.

The Industrial Vortex Technology (IVG) for cooling towers is a market proven chemical-free solution. Given these fantastic results H2oVortex aims at becoming one of the world's leading high-value water enhancement technology companies.

**The market will demand more effective solutions to reduce the usage of water, energy and chemicals within industrial applications**