



# **Introduction to Ionic and our PFAS technology**

## **WaterVent May, 2020**



# Ionic Intro

- Ionic Water Technologies (Ionic) is developing a portfolio of electrocapacitive and chemical water purification technologies including desalination, PFAS and industrial water remediation.
- Our core technology is a novel, large scale seawater desalination approach for agricultural and drinking water that is similar to electrocapacitive deionization enabling lower initial capital cost, significantly lower operating cost and energy use, longer system life, small footprint and the ability to desalinate seawater to levels acceptable for drinking and agricultural applications.
- Our electrocapacitive technology can also remove chemical contaminants, lead and other heavy metals and phosphorus to remediate algae blooms.
- The subject of this presentation is the optimization of PFAS removal. Ionic has invented a technology to reduce the operational and capital cost and improve the disposal efficiency of removing PFAS compounds from water sources to return it to safe drinking water levels.
- The Ionic leadership team has deep experience. We founded a battery technology company 10 years ago and brought the technology from lab to scaled manufacturing with ~100 employees and commercial sales to some of the largest global utilities. We founded several profitable technology and asset development companies over the last 30 years that have either been funded or acquired – having aggregated significant value to our partners. We have secured initial funding for Ionic Water Technologies.
- The Ionic HQ and lab is located near Princeton, NJ. We have demonstrated our technology at lab scale, and are starting a performance validation test program with a major university. We are also starting to plan demonstration projects with strategic partners.



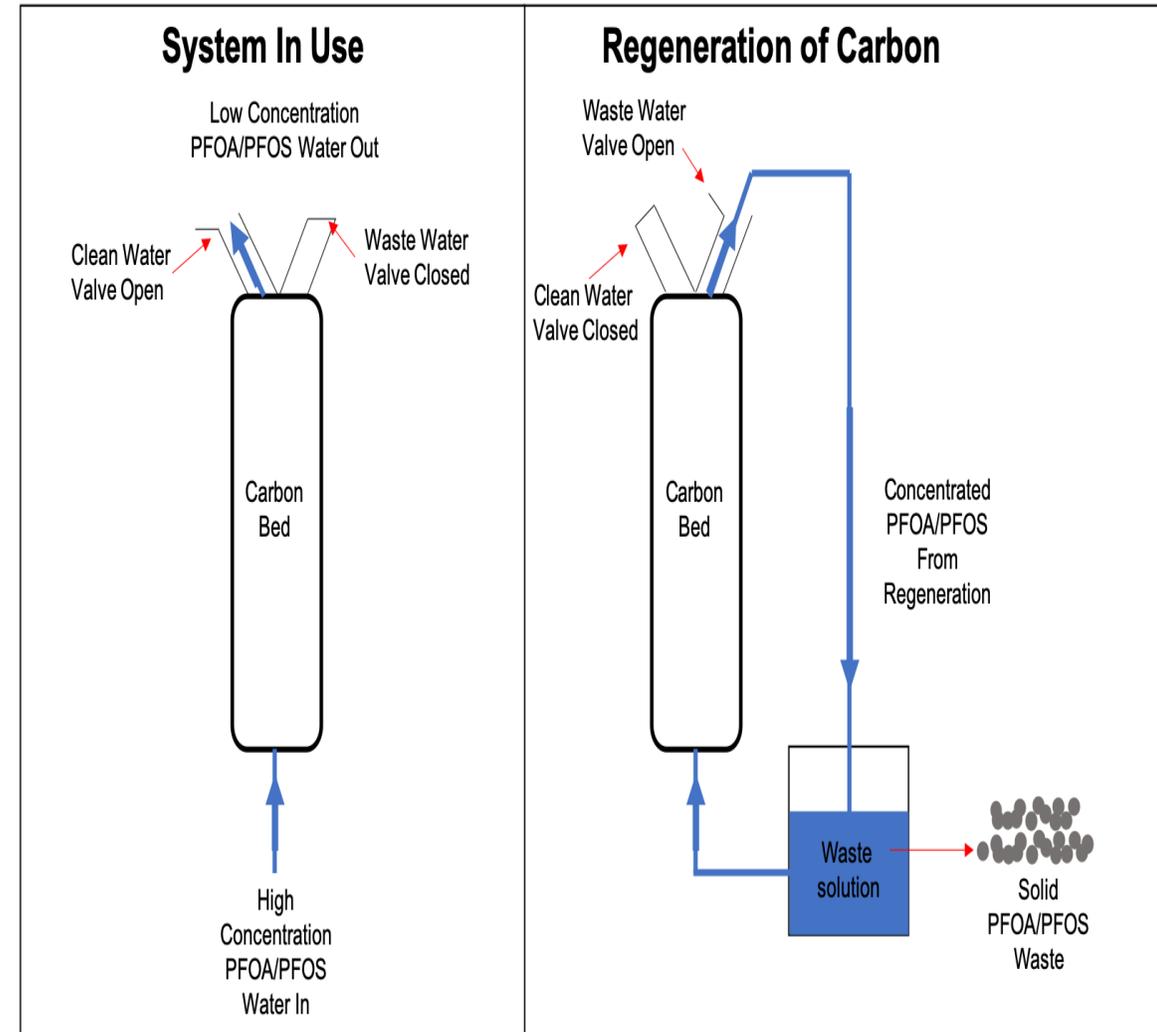
# PFAS Background

- “PFAS” (per- and polyfluoroalkyl substances) is a class of more than 5,000 highly toxic substances used in everyday consumer products. PFAS can cause cancer, decreased fertility, weakened immune system response, and growth and learning delays in infants and children – even at very low concentrations. While the compounds have been phased out, they persist in drinking water, the environment, and the human body for decades because they don’t easily break down and they accumulate over time. While hundreds of PFAS have been banned, there are thousands more in existence. The CDC estimates that 95% of the U.S. population has PFAS in their bodies.
- It is estimated that more than 610 locations in 43 US states are known to be affected by significant PFAS contamination, including drinking water systems serving an estimated 19 million people. Drinking water is one of the most common routes of exposure with PFAS having so far polluted the tap water in 33 states and groundwater in at least 38 states. The EWG estimates that PFAS is detectable in all major water supplies in the U.S. The EU estimates that PFAS is costing the European economy more than \$50 billion in health costs each year, and the Pentagon estimates \$2B just to remediate military installations.



# Ionic PFAS Absorption Technology

- Granular activated carbon (GAC) and resin are effective, low cost methods of PFAS removal for drinking water. The limitation that we address is their primary cost drivers:
  - the single use nature of the carbon/resin bed and the purchase of replacement GAC/resin;
  - the transport and destruction/disposal of PFAS-contaminated carbon and resin.
- Using materials safe for drinking water, Ionic's technology dislodges PFAS compounds from granular activated carbon (GAC) and resin water treatment beds in situ capturing it in a smaller more manageable concentrate, avoiding replacement or off-site regeneration of GAC/resin.
- The process concentrates the removed PFAS in a dry and compact form which facilitates less frequent and easier transport of safer, more compact and light-weight PFAS blocks for remote or on-site destruction, lowering cost of removal, transport & destruction.
- With regeneration of activated carbon in situ and able to be done more frequently and quickly, sizing of the bed can be optimized, lowering initial capital cost.
- Ionic is also developing a method to enhance absorption of PFAS into GAC or resin to improve performance and capital cost of PFAS removal systems.





# Summary and Strategic Cooperation

- Ionic's PFAS technology has been demonstrated in the lab and we are starting a testing and validation program with a major university.
- We are now in the process of finalizing system requirements together with strategic partners. We are also in initial discussions with potential partners and customers to plan demonstration projects and system/product development collaboration.
- We welcome the opportunity to engage with partners and customers to optimize our PFAS technology for their drinking water, industrial or military applications. Potential partners include water remediation system manufacturers, water utilities and industrial customers, and engineering firms.
- We are also interested to cooperate on our electrocapacitive deionization technology for industrial and agricultural water remediation and also for large scale brackish and seawater desalination.

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