

# Gradiant’s Treatment Tech Draws Water-Stressed Industrials

Part of the [‘Opportunity Blossoms’](#) series on real economy investments in nature

Industrial use accounts for around 20% of annual freshwater withdrawals globally. About half of large companies are bringing water-related concerns to discussions with their supply chain, as access to water becomes an increasingly salient nature risk. Firms that use water intensively face supply disruptions that could impact their operations and revenue, while wastewater discharge poses hazards to aquatic ecosystems. Wastewater treatment and recycling systems can alleviate both of these risks.

US-based Gradiant Corp. designs and builds custom wastewater treatment systems that lower industrial customers’ operating expenses by recovering water and using less energy, and decrease capital expenses by keeping pressure low enough to avoid specialized equipment. In turn, companies withdraw less freshwater and limit pollution from discharged water. Demand for Gradiant’s products has been strong, leading to it securing \$500 million in new orders in the first half of 2024. The company surpassed a valuation of \$1 billion when it closed its Series D round in 2023.

## The nature-friendly product

Founded in 2013, Gradiant is a spinout from the Massachusetts Institute of Technology. It built its first US plant to treat and recycle industrial wastewater in 2014, before expanding into China and India in 2017.

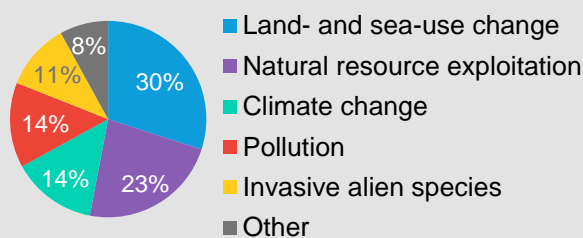
Industrial wastewater treatment is difficult and costly. Each stream requires custom solutions to remove contaminants and to reach the level of purity required for the water to be reused in an industrial process or discharged to the environment.

Gradiant’s wastewater systems employ several technologies depending on customer needs.

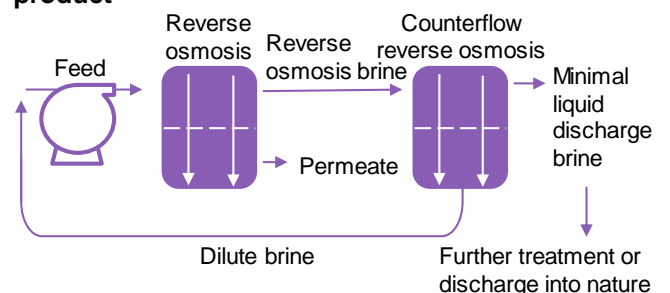
Counterflow reverse osmosis (CFRO), for example, improves on existing reverse osmosis technology. Reverse osmosis uses pressure to push brine through a membrane, drawing clean water through and leaving more contaminants behind. CFRO improves on this process by circulating a diluted salt solution to lower the concentration differential across the membranes. This in turn lowers the pressure required to move water through the membranes. CFRO has lower capex and opex than an analogous ultra-high-pressure system, lowering costs by 44% for the same recovery rate and brine concentration.

### Mitigating nature loss

Five drivers account for over 90% of global biodiversity and ecosystem decline. Gradiant’s technology addresses natural resource exploitation and pollution.



### Process flow diagram for Gradiant’s RO Infinity product



Source: BloombergNEF, [Gradiant](#).

Gradiant’s customers include semiconductor makers and pharmaceutical and mining companies, all of which need reliable sources of freshwater – and all of which can negatively impact natural resources through their discharge. In addition to design and building work, Gradiant offers two further project financing models, affording clients flexibility in terms of the plant’s operation, maintenance and ownership.

Gradiant has recently expanded into different markets, highlighted by its acquisitions of [WaterPark Environmental](#) and [H+E Group](#) in 2022 and 2023, respectively, both of which sell services to the semiconductor industry.

### Nature impact of industrial water usage

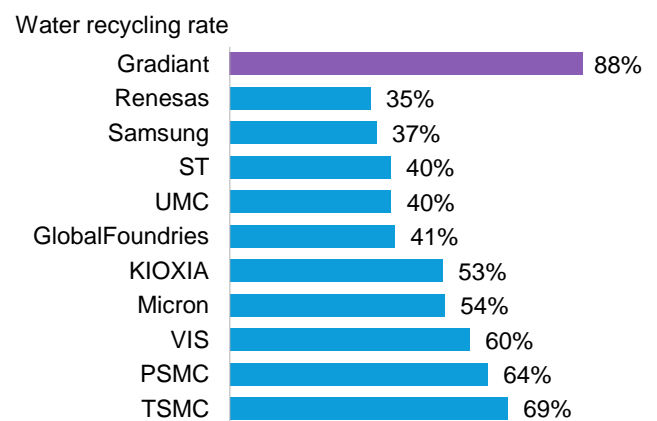
The large volume of water required by industrial processes can contribute to local water supply stress. The [\\$527 billion](#) semiconductor industry is a particularly intensive user, requiring ultrapure water with low amounts of contaminants to clean the silicon wafers.

Water risk in the sector is becoming more pronounced. In response to a severe drought, Taiwan – which accounts for [92%](#) of advanced chip manufacturing capacity globally – in 2021 restricted water supply to some industrial users by [15%](#), including a semiconductor manufacturing hub. Taiwan Semiconductor Manufacturing Company (TSMC) [plans](#) to open three chip manufacturing facilities in Arizona, a region in the United States that faces persistent [droughts](#).

The wastewater produced by industrial sources can have [negative impacts on local aquatic ecosystems](#). Industrial wastewater discharge can reduce the concentration of dissolved oxygen, affecting the disease immunity of fish and impede their swimming ability. Wastewater that is significantly different in temperature to that of aquatic systems can directly harm wildlife, and discharge with suspended solids can limit penetration of sunlight to the detriment of various ecological processes, particularly those involving photosynthesis.

To improve their resilience to water scarcity and comply with environmental regulations, semiconductor companies employ wastewater recycling, reuse and treatment. Recycling and reuse of wastewater reduces freshwater withdrawals, while treatment reduces the pollutants present in wastewater before it is discharged to the environment. A few semiconductor manufacturers have water recycling rates above 50%, but [most do not](#). Gradiant’s technology can recycle as much as 88% of water for some semiconductor processes, and its deployment could improve the wastewater recycling rate for semiconductor firms.

### Water recycling rates of select semiconductor companies and Gradiant’s technology



Source: BloombergNEF, [Wang et al.](#), Gradiant. Note: The Gradiant datapoint shows local scrubber reclaim system recovery rate at a semiconductor plant in Singapore. Recycling includes reuse for different purposes. TSMC refers to Taiwan Semiconductor Manufacturing Company. PSMC is Powerchip Semiconductor Manufacturing Corporation. VIS is Vanguard International Semiconductor Corporation. Micron is Micron Technology. UMC is United Microelectronics Corporation. ST is STMicroelectronics.

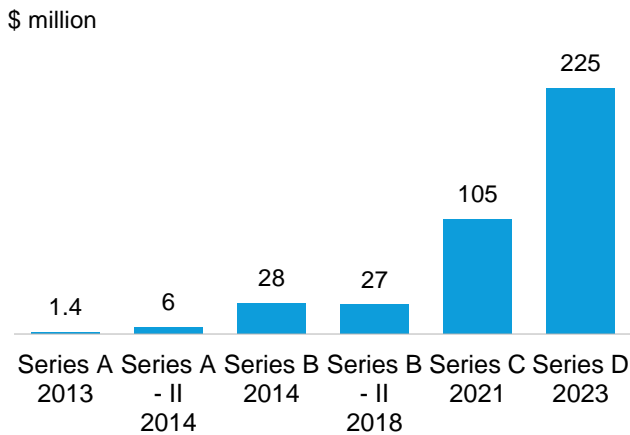
### Financial performance

Gradiant has successfully grown its business over the past decade, reflecting industrial demand for solutions that save both money and scarce resources. The company has [doubled](#) its annual sales in each of the past five years. In the first half of 2024, it closed more than \$500 million in new orders from giants including Micron, AB InBev, STMicroelectronics, Coca-Cola and

Rio Tinto. The clients' water treatment and wastewater recycling plants will be built in the US, Europe, Middle East, Africa and Asia, highlighting global demand for improved water processing.

Gradiant has raised over \$400 million from investors including SLB, BoltRock Holdings and Centaurus Capital. The company was valued at \$1 billion in May 2023 when it closed a \$225 million Series D round. Gradiant plans to use its latest funding for additional research and development, and expansion into new geographies.

### Gradiant's publicly disclosed equity funding rounds



Source: BloombergNEF, CB Insights.

### Broader opportunities within the sector

The water treatment industry is large, with several established companies providing services and earning billions of dollars in annual revenue.

The semiconductor industry is not alone in trying to minimize its freshwater withdrawals and environmental impacts. Agriculture, textiles and mining are among those sectors most dependent on water for their operations. Each is likely to grow as a result of rising population, increased computing needs and heightened demand for critical minerals.

Governments are also investing in water infrastructure as climate change's impacts on water supply become more pressing. Taiwan's Water Resources Agency,

awarded a contract for a \$545 million desalination plant that can produce 100,000 cubic meters of drinking water per day.

### Notable water treatment competitors

Company	Description	Financial gain
<b>Veolia</b>	France-based Veolia (PAR: VIE) provides water, waste and energy management services, of which water has been the largest revenue driver for the past decade. The company provides technologies for clarification, purification, disinfection and desalination.	\$18 billion in revenue in 2023 attributed to its water segment, 41% of its total revenue.
<b>Xylem</b>	Xylem (NYSE: XYL) is an equipment manufacturer and service provider for water and wastewater applications. Xylem acquired Evoqua, a water treatment company, at a <u>valuation of about \$7.5 billion</u> in 2023.	<u>\$7.4 billion in revenue in 2023</u> , in part driven through its acquisition of Evoqua.
<b>Suez</b>	Suez provides drinking water and sanitation services globally, including leak detection, water production plants and wastewater treatment.	<u>€8.9 billion (\$9.4 billion) in revenue in 2023</u> , a 30% increase from the previous year.

Source: Bloomberg Terminal, company filings and reports.

### Analyst take

Companies such as Gradiant have realized an opportunity to commercialize technologies that minimize water use and preserve water quality. A growing number of venture capital investors have an interest in this market, with Cycle Capital, Burnt Island Ventures and Natural Ventures all closing funds in the past few years. Indeed, water and ocean technologies have become a larger part of investment theses; however, larger funds are struggling with a lack of investment opportunities in the sector.

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[Climate-Tech VC/PE Investment Database \(web | terminal\)](#)

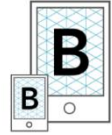
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