

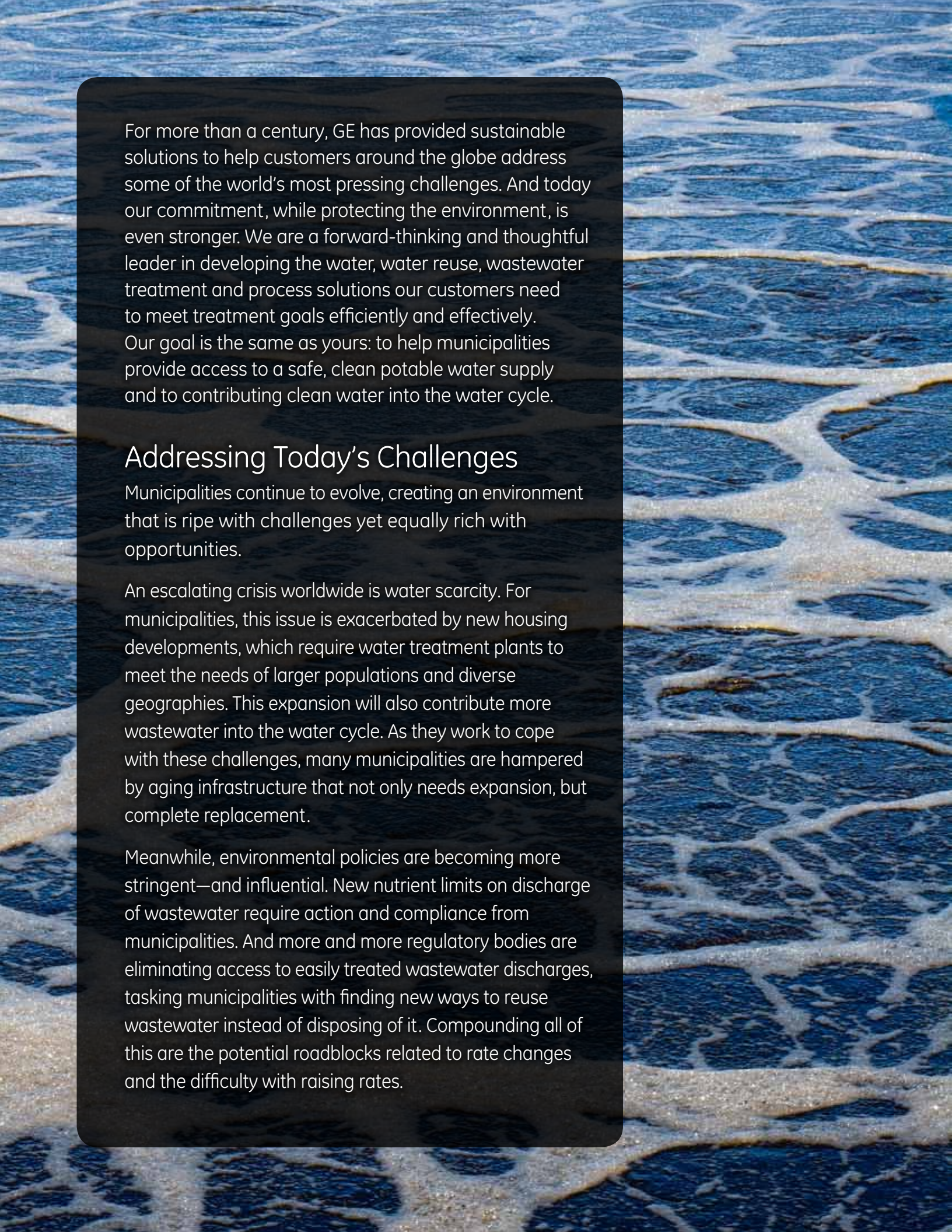
GE Power & Water
Water & Process Technologies



Municipal Water and Wastewater **Solutions**



imagination at work



For more than a century, GE has provided sustainable solutions to help customers around the globe address some of the world's most pressing challenges. And today our commitment, while protecting the environment, is even stronger. We are a forward-thinking and thoughtful leader in developing the water, water reuse, wastewater treatment and process solutions our customers need to meet treatment goals efficiently and effectively. Our goal is the same as yours: to help municipalities provide access to a safe, clean potable water supply and to contributing clean water into the water cycle.

Addressing Today's Challenges

Municipalities continue to evolve, creating an environment that is ripe with challenges yet equally rich with opportunities.

An escalating crisis worldwide is water scarcity. For municipalities, this issue is exacerbated by new housing developments, which require water treatment plants to meet the needs of larger populations and diverse geographies. This expansion will also contribute more wastewater into the water cycle. As they work to cope with these challenges, many municipalities are hampered by aging infrastructure that not only needs expansion, but complete replacement.

Meanwhile, environmental policies are becoming more stringent—and influential. New nutrient limits on discharge of wastewater require action and compliance from municipalities. And more and more regulatory bodies are eliminating access to easily treated wastewater discharges, tasking municipalities with finding new ways to reuse wastewater instead of disposing of it. Compounding all of this are the potential roadblocks related to rate changes and the difficulty with raising rates.



Municipal Water and Wastewater Solutions

GE understands the challenges and recognizes the opportunities of creating sustainable and reusable water sources for today's municipalities. As a strategic business partner, GE can provide a complete set of solutions (chemical and equipment) and services (aftermarket support) to help manage and optimize water resources—enabling your municipality to meet growing population needs, overcome scarcity challenges and comply with regulatory requirements for your municipal water and wastewater treatment plant.

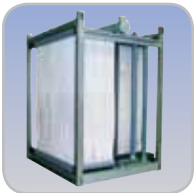


Technology and Solutions

With ever increasing regulatory, environmental and financial pressures on today's municipalities, GE provides innovations in chemical and equipment technology to enhance municipalities' efficiency and excellence in wastewater treatment and reuse, and drinking water treatment while safeguarding natural resources.



- **ZeeWeed membrane bioreactor (MBR) systems** combine proven ultrafiltration (UF) technology with biological treatment for municipal wastewater treatment and water reuse, resulting in consistent, high quality effluent suitable for any discharge or reuse application.



- **ZeeWeed ultrafiltration (UF) systems** are proven to consistently outperform conventional filtration technology while meeting or exceeding regulatory requirements, regardless of source water quality.



- **Electrodialysis reversal (EDR) products** are ideal to desalinate challenging brackish waters such as surface water and wastewater. Applications for EDR technology include municipal drinking water and wastewater treatment and reuse projects.



- **Reverse osmosis systems** deliver high performance water purification at the lowest life-cycle costs. The pre-engineered systems are built with high-quality components such as GE's spiral-wound membranes—cost-effective thin-film elements used to remove salts and separate organic material by molecular weight or particle charge.



Case Studies

Drinking Water

Record-Breaking Treatment Plant Serves 700,000 with Year-Round Drinking Water

In 2002, a combination of factors, including Ontario's Safe Drinking Water Act—a need to preserve drinking water aesthetic quality and the declining cost of membrane systems—influenced the Region of Peel, Ontario, Canada, to embark on a proactive strategy to add capacity to its Lakeview Water Treatment Plant, which draws its water from Lake Ontario's northern shore.

The \$144 million expansion was completed in June 2007. By implementing a multi-barrier approach using immersed ultrafiltration membranes with ozonation and biologically active carbon contactors, the renovated plant consistently delivers high-quality water regardless of raw water conditions and exceeds regulatory requirements.

The expansion increased the plant's total capacity from 560 mld (148 mgd) to 821 mld (217 mgd), making it the largest low pressure, immersed ultrafiltration membrane plant in the world, as well as the first to use ozone and biologically active carbon pretreatment on such a large scale. And since space limitations necessitate that this and future expansions remain within the plant's existing boundary, the compact plant footprint preserves green spaces around the plant and allows continued use of Peel property at the site for public recreational purposes.

Wastewater

Innovative Wastewater Treatment Technology Enables Widespread Reuse

In King County, Washington, reclaimed water doesn't go to waste. King County's Brightwater Treatment Plant—like other innovative plants throughout California, Colorado, Michigan, Georgia, Florida, Ontario and elsewhere around the world—uses an advanced treatment technology called a membrane bioreactor (MBR) system to exceed stringent water quality standards for effluent discharge and reclaimed water production. It produces better water quality than traditional wastewater treatment while requiring less space and simplifying odor control.

MBR technology enables tiny particulate matter and even individual bacteria to be filtered out of wastewater, making it safe to reuse in many applications. After treatments, the wastewater can be safely used as a drought-proof source for landscape and agricultural irrigation, in heating and cooling processes, for wetland enhancement and in industrial processing.

Producing wastewater that is seven to ten times cleaner than typical secondary treated wastewater, it also meets tough environmental requirements of the state departments of Ecology and Health for use in non-drinking purposes. It even meets strict standards for safe discharge into freshwater, including the Puget Sound.

Industrial Reuse

Singapore's Bedok NEWater Factory Fuels Local Industry With Reclaimed Wastewater

The Public Utilities Board (PUB), the sole water authority of Singapore, promotes the value of water as a scarce, natural resource through its Bedok NEWater factory, the first of four reuse plants it initiated. Through water reclamation, the Bedok plant allows communities to reuse a portion of wastewater effluent for industrial applications, thereby reducing the amount of potable water consumed for non-potable purposes.

The Bedok plant uses a multi-barrier approach consisting of ultrafiltration (UF), reverse osmosis (RO) and ultraviolet (UV) treatment. A critical technology in the process is GE's ZeeWeed UF membrane, which removes suspended solids and colloidal material more reliably and with the use of fewer chemicals than conventional pre-treatment. It also provides the RO system with a higher sustainable flux, smaller system size and lower cleaning frequency, thereby significantly reducing operating and capital costs.

The final product from the multi-barrier approach is termed "NEWater." It is used primarily as a feed for the electronics industry, water fabrication plants, and commercial building cooling towers. A small percentage is released back into local reservoirs for indirect potable reuse applications.



A Trusted Business Partner

A name synonymous with quality around the world, GE is a trusted global partner for municipalities. With a broad range of products and services for municipal water authorities, GE's integrated solutions and unique expertise help manage and overcome important challenges in an ever evolving industry, while ensuring the responsible and sustainable resource savings our customers across the globe have come to expect. Through innovation, breakthrough technology and dedicated teams of global experts, we help you successfully build safe, healthy and economical communities for your citizens.

We can help municipal customers to:

- Address needs related to infrastructure expansion and replacement
- Effectively treat wastewater and redirect it for reuse
- Adhere to policies and regulatory requirements
- Create a sustainable and high-quality water supply
- Meet the increased water demands of a growing population





Learn how GE is helping customers solve their greatest challenges by visiting www.ge.com/water

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