



Resourcing the world



Operational optimization for water and wastewater systems

Veolia develops comprehensive O&M programs to help municipalities and industry efficiently and safely manage utilities.



Building innovative water and wastewater partnerships



Changing regulations, aging infrastructure, limited resources and extreme weather events present many obstacles to providing safe, reliable and efficient water and wastewater services. By partnering with utility experts, communities and industry can mitigate risk, achieve improved operational efficiency and generate cost savings, while also protecting our natural resources.

Transferring management to utility experts - while still maintaining control of the physical assets - enables industry and municipalities to focus on core business functions. Through Veolia's experienced management and

operators, our customized water and wastewater solutions comply with federal and local environmental standards, improve operational and cost efficiencies and extend the useful life of existing assets.



1

Operating Public Water and Wastewater Systems

Our long-term partnerships with municipalities have yielded improved operational efficiency and minimized risk and environmental compliance, while extending the life of city infrastructure.

- Operations partnerships
- Operations optimization programs



2

Managing efficient process water and treatment solutions to streamline operations

By engineering risk out of the system and optimizing the use of water in industrial processes, Veolia is able to provide comprehensive long-term performance guarantees that protect our customers' capital investment and maximize operational uptime.

- Operations and maintenance (O&M)
- Innovative water treatment technologies



3

Recovering value and reducing environmental impact from produced water

Our produced water management solutions maximize water reuse, recover valuable resources (such as fresh water) and minimize induced seismicity.

- Produced water services
- Water reuse
- Water discharge



By implementing strategic programs that streamline operations, improve efficiency and increase reliability, we build long-term relationships and investments in the communities and industries we serve.

1.8 BGD
wastewater treatment capacity managed

793 MGD
water treatment capacity managed

180,510
biosolids processed (dry tons per year)

9,203 miles
underground water assets managed





Why Veolia?



Deep industry and technical expertise

Our experienced O&M teams utilize advanced technologies to accurately detect leaks - saving water, operating efficiencies and costs. In addition, our water treatment technologies include over 350 solutions to manage, optimize and recover water and wastewater for industrial operations.



Integrated in communities we serve

With contributions to hundreds of local organizations in North America, partnering with Veolia represents an investment in the communities we serve. In addition, we implement community programs like Generation STEM which has provided internship opportunities for students to learn more about the fields of science, technology, engineering and mathematics.

serving a population of over

18.5m

630

communities served in North America



Flexible partnership models

Veolia offers a flexible and cross-functional approach to water and wastewater outsourcing – from traditional contract O&M of an entire system or individual asset, to incorporating financing through a concession agreement and/or performance guarantees. We support customers at every stage of the project lifecycle, including option assessment, master planning and implementation, through to the O&M of assets.



Creating value for our customers

Midwest Refinery



5-year oily residuals O&M contract for a Midwest refinery

Management of **330,000+ barrels** of oily residuals/day, maximizing operational uptime

Conversion of oil-bearing solids for reuse as waste-derived fuel or re-blended with oil and/or water for use in coker injection

By re-blending the solids for reuse, the operator can sell the product and avoid landfill waste

Tampa Bay Water, FL



Design, build, operate (DBO) project

120 million gallons per day (MGD) surface water plant

Long term O&M agreement

Award winning public-private partnership (P3)

San Ardo, CA



Long-term O&M contract for **Chevron's water reclamation facility**

Treatment and discharge of **50,000 barrels of produced water/day**

Treatment and reuse of **75,000 barrels of produced water/day for steam generation**

Veolia's OPUS® (Optimized Pretreatment and Unique Separation) technology offers a reliable and robust process for successfully treating produced water for surface discharge

Performance guaranteed services

Milwaukee, WI



Long-term O&M contract

660 MGD wastewater treatment

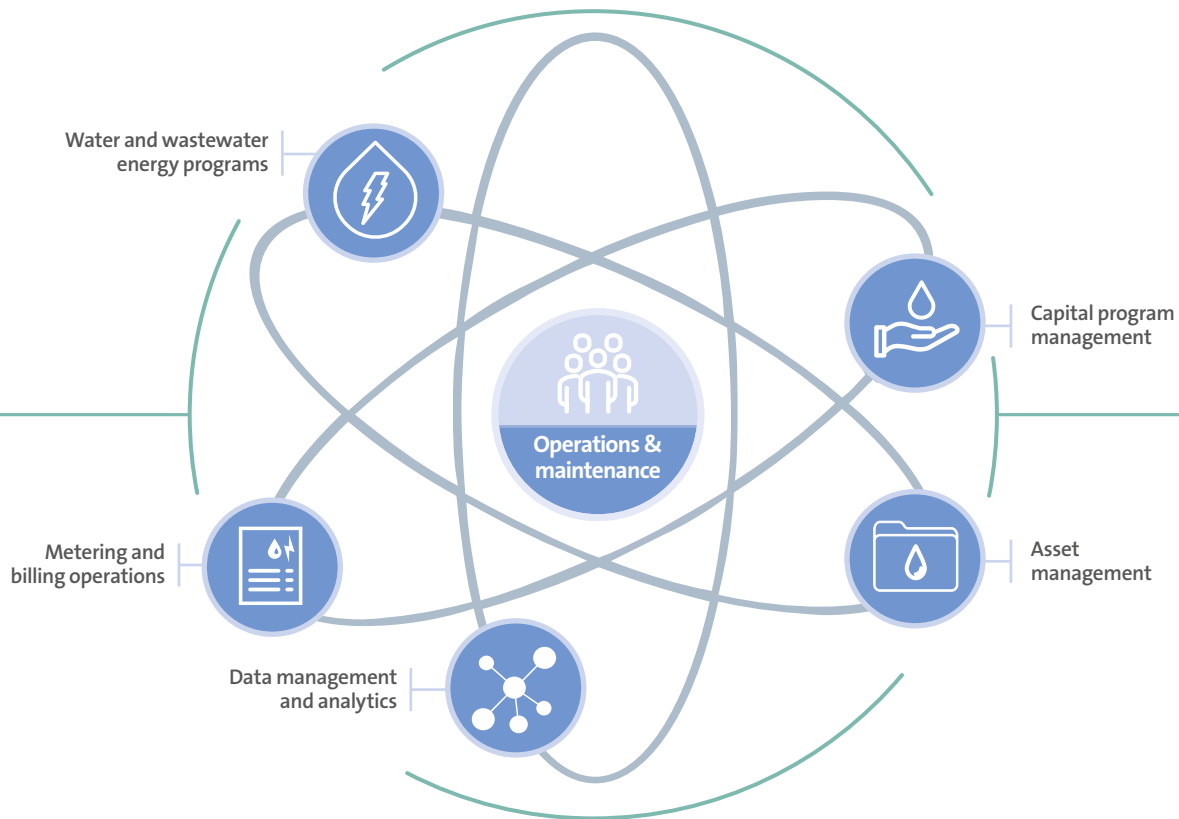
500 MG deep tunnel system

Biosolids management





Public water and wastewater treatment



Operations partnerships

We provide experienced management and labor to operate water and wastewater systems - shifting operational responsibility and risk to Veolia, while ownership of the physical assets are maintained by the owner. Our expertise in operations, staffing and training, capital improvement projects, energy efficiency and process control techniques, enable local governments and industries to focus on core competencies while accruing savings through our operational best practices. Assets we operate and maintain include:

- Water and wastewater treatment plants
- Collection and distribution systems
- Desalination plants
- Biosolids facilities
- Reuse and reclamation systems

Operations optimization programs

Our optimization services help municipal water and wastewater utilities achieve improved levels of efficiency, effectiveness and customer service. Veolia's operators and technical experts optimize treatment processes and implement a range of efficiency measures that, when combined, reduce operating expenses by 15-20 percent on average. Optimization services we provide include:

- Capital program management
- Asset management
- Data management and analytics
- Metering and billing operations
- Water and wastewater energy programs





Process water and wastewater treatment



Operations and maintenance

Water is a valuable resource that is central to many industrial processes. Staffed by experienced O&M personnel, we partner with industry to provide experienced personnel and customized O&M solutions for water treatment and wastewater reuse. With no pre-set staffing level or limited scope of maintenance services, we meet system performance requirements and long-term reliability goals. Our fit-for-purpose solutions and experts provide our customers with:

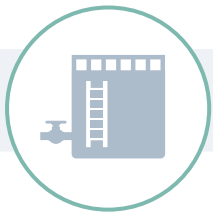
- Insights to navigate and reduce operating risks, yielding long-term reliability
- A holistic view of process operations to better improve total cost of ownership
- Prescriptive measures to avoid/mitigate unanticipated overhauls or expense
- Prevention of unplanned downtime that can lead to lost production

Innovative water treatment technologies

With experience ranging from process water to wastewater, resource management, product recovery and recycling spent material, we've developed an arsenal of proprietary technologies to enhance process water and wastewater treatment infrastructure. Our 350+ technologies are providing long-term reliability, avoided downtime and minimized costs. By engineering risk out of the system and maintaining long-term responsibility, we're able to provide comprehensive performance guarantees that protect our customers' capital investment. Our technologies include:

- Physical/chemical processes
- Biological treatment
- Anaerobic wastewater treatment
- Filtration and separation
- Evaporation and crystallization
- Mobile water treatment
- Treatment chemicals and membrane-based solution





Produced water treatment

Produced water services

As a critical component to oil and gas production, we offer cost effective solutions for the removal of particulates, scale formers, dissolved salts, organics and gases from produced water. Our comprehensive portfolio of technology solutions for treatment of produced water are designed to minimize injection, maximize oil and gas production, reduce environmental impacts and meet all federal, regulatory and local water requirements. By maximizing water reuse and minimizing induced seismicity, we help minimize our customers' operational costs and lease operating expenses. Our produced water services feature:

- Performance guarantees, including risk management, quality, uptime, volume, etc.
- Flexible commercial models
- Investment in technology developments
- Recovery of valuable resources, such as fresh water

Water reuse

Treatment of produced water for reuse involves removal of particulates (oil, solids and bacteria), scale formers (iron, barium, strontium, silica, calcium and magnesium) and dissolved gases (H₂S). Treated water can then be reused in hydraulic fracturing, steam generation and waterflooding applications. Benefits include:

- Recovery rates greater than 98 percent
- Minimized generation of liquid waste
- Reduced demand for freshwater by more than 40 percent

Water discharge

As another disposal alternative, the treatment of produced water for discharge involves total dissolved solids (TDS) removal, zero liquid waste and oil and water separation. Discharged water can then be used for irrigation and as process water for industries. Our method ensures that:

- 95 percent of the effluent, or greater, is recovered for reuse
- Local waterways are recharged, resulting in increased foliage, reduced water stagnation and improved fish and waterfowl populations



By maximizing water reuse and minimizing induced seismicity, we help minimize our customers' operational costs and lease operating expenses.



Resourcing the world



Veolia North America
veolionorthamerica.com | veolia.ca.com
tel: +1 833-4-VEOLIA
LinkedIn: Veolia North America
@Veolia_NA