

## Case study

### Wastewater treatment, biosolids production and Combined Heat and Power – Milwaukee, USA

<b>Project Identification</b>	
<b>Where (country/City):</b>	Milwaukee, Wisconsin, USA
<b>When and contract length :</b>	Second 10-year public-private partnership with the Milwaukee Metropolitan Sewerage District. Under contract since 2008
<b>Goal: construction and or operations?</b>	Operations & Maintenance
<b>Scope: Water/ Wastewater?</b>	Wastewater Treatment/ Wastewater Collection/ Biosolids production /Combined Heat & Power / Combined Sewage Storage system
<b>Scope: Plant and or Network?</b>	Two water reclamation facilities on the banks of Lake Michigan, Jones Island and South Shore, which together can treat up to 660 MGD. Additionally, Veolia maintains a 320-mile collection system, biosolids production, and a unique 521 MG Combined Sewage Storage system known as the Deep Tunnel
<b>People served:</b>	1.1 million people in southeastern Wisconsin
<b>Brief description of the project</b>	
<p>Veolia signed on as Milwaukee Metropolitan Sewerage District's (MMSD) operations and maintenance partner in March 2008, creating one of the largest public-private wastewater partnerships in North America. A 10-year contract extension was signed in 2016, commencing in 2018.</p> <p>Veolia Water Milwaukee is the nation's largest wastewater partnership, serving 1.1 million people and 28 municipalities.</p>	
<b>Is this project unusual or different compared to others?</b>	
<p>This project enables the storage of up to 521 million Gallons of excess water with the deep tunnel network.</p> <p>As global climate change brings intermittent periods of drought and flood, keeping water where it's needed can be a monumental challenge. Every inch of rain that falls on the MMSD area brings 7.1 billion gallons of water. However, the two treatment plants, as powerful as they are, can only handle</p>	

up to 630 million gallons per day. If not stored somewhere, the excess water will cause basement backups and sewer overflows. That's where the Deep Tunnel network comes in. The Deep Tunnel is 25 feet on average, in diameter and 28.5 miles in length. The network, which is 300 feet underground in some places, can store up to 521 million gallons of stormwater and wastewater until the plants have the capacity to treat it. The Deep Tunnel has prevented more than 141 billion gallons of pollution from getting into Lake Michigan.

## What have been the major outcomes or success so far?

The partnership has achieved new levels of compliance, service, communication and innovation and offers a model for the Great Lakes region. Veolia is a recipient of the coveted U.S. Water Prize and many other awards.

Nothing goes to waste: After treatment, the sludge is transformed into a final product, which is called Milogarnite®, is sold throughout the US to fertilize lawns and golf courses. And the primary sludge is pumped 12 miles to anaerobic digester tanks at South Shore, where the methane gas is captured and used to help power the plants.

Veolia proposed, and MMSD implemented the installation of a 19-mile landfill gas pipeline and turbine generators at the Jones Island plant. That has allowed the use of a reusable resource for the production of energy to operate the plant.

## Has “working in partnership” helped to make the project successful?

Veolia has consistently operated the Jones Island and South Shore facilities in compliance with the Clean Water Act and has received awards from the National Association of Clean Water Agencies since 2008. MMSD and Veolia work hand in hand to maximize the use of reusable energy and hedging of natural gas for energy production at both plants. This has helped control costs for the 1.1 million people we serve and reduce GHG emissions.

## **Contribution to the United Nations 2023 Conference themes**

### 1) What Interactive Dialogue theme does the project contribute to?

Water for Health: Access to safe drinking water, hygiene and sanitation

YES

Yes, as the dominant feature of this project is sanitation and treatment of wastewater.

Veolia has consistently operated the Jones Island and South Shore facilities in compliance with the Clean Water Act and has received awards from the National Association of Clean Water Agencies since 2008. Veolia continues to meet discharge limits required by the agreement with MMSD which are significantly more stringent than those of the discharge permit.

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<p>Water for Development: Valuing Water, Water-Energy-Food Nexus and Sustainable Economic and Urban Development</p>	<p>YES</p> <p>Energy: Primary sludge is treated using anaerobic digesters at South Shore, where the methane gas is captured and used to help power the plants. Natural, digester, and landfill gas can be used as alternative power sources. Jones Island: (1) 15 MW GE Turbine Generator (3) 4.8 MW Solar Turbine Generators 29% of produced power was generated with Landfill Gas South Shore: Digester gas used for power production, digestion process &amp; building heat (4) 900 KW Engine Generators (1) 1.5 MW Engine Generator 65% of produced power was from digester gas</p> <p>The sludge from both plants is pumped to the dewatering and drying facility where the water is squeezed out and the product is heated and dryers that can reach temperatures of 1,200 degrees Fahrenheit. The final product, which is called Milogarnite®, is sold throughout the US to fertilize lawns and golf courses.</p>
<p>Water for Climate, Resilience and Environment: Source to Sea, Biodiversity, Climate, Resilience and Disaster Risk Reduction</p>	<p>YES</p> <p>Protection of the environment / Source to lake: We remain unmatched in our ability to capture and treat wastewater and stormwater. While most metropolitan areas struggle to capture and clean the national goal of 85 percent of all the rain and wastewater that enters their sewer systems, we have been able to treat and capture 98.5 percent.</p> <p>Biodiversity: By the 1960's, the peregrine falcons had become an endangered species due to the widespread use of DDT. In 1999, an adult pair of peregrines nested under the Hoan Bridge at the intersection of several massive steel girders. While successful at producing 4 young, generally bridges are unsafe nesting sites for peregrines because the young often end up in the water below and drown when they fledge and take their first flights.</p> <p>Veolia employees gave the peregrine falcons a helping hand by installing a nest box on the roof of the Milorganite® Building in 2008. The falcons took to their new home and have been nesting there ever since. To date, this site has produced a total of 35 young. There is a Live Falcon Cam to</p>

	observe the peregrines. This project created strong enthusiasm from the surrounding communities.
<b>What topic of the “Global Acceleration Framework” does the project contribute to?</b>	
1. Optimized financing – did you improve targeting or utilize existing resources more efficiently, or mobilize additional funds	<p>YES</p> <p>Over the course of our partnership with MMSD Veolia has used its expertise and technical resources to reduce the cost of consumables. At the time of the contract extension, Veolia included the reduction in consumables and cost savings in our Fee to MMSD.</p>
2. Improved data and information – how did you use data and information to improve the service and increase accountability and transparency	<p>YES</p> <p>Examples:</p> <p>Fleet vehicles have been outfitted with a computerized fuelling system that tracks vehicle miles, fuel consumption and vehicle hours. GPS is also installed on vehicles to monitor idling time, speed and routes taken. The data from these systems is analysed on an ongoing basis for fuel consumption rates as an indicator of vehicle operations (driving behaviours) and engine condition.</p> <p>Operators that monitor the plant 24/7 analyse weather and flow data to run the plants more efficiently and ensure that all equipment and processes are working correctly and uninterrupted.</p>
3. Capacity development - did you create new jobs or developed local people’s skills and talents?	<p>YES</p> <p>There are 216 Veolia Milwaukee employees between the 2 facilities. There is a specific website dedicated for talent recruitment in Milwaukee, as well as a summer internship program.</p> <p>In addition, Milwaukee has a strong “Education &amp; Tours” program, which creates an interest for environmental careers. As we know in the US, recruitment in the water &amp; wastewater industry is challenging and the main pain point of our teams.</p>
4. Innovation – how have you used innovation and technologies to make the service better?	<p>YES</p> <p>A unique 521 MG stormwater storage system known as the Deep Tunnel.</p>

	<p>Veolia has consistently operated the Jones Island and South Shore facilities in compliance with the Clean Water Act and has received awards from the National Association of Clean Water Agencies since 2008.</p> <p>Veolia approached the District to suggest using landfill gas as an alternative energy source. In 2008, Veolia suggested to the District that they harvest and reuse landfill gas (LFG) – previously flared off to the atmosphere – to produce Milorganite.</p> <p>Veolia evaluated feasibility and cost and performed preliminary design for the LFG pipeline and conversion of the Milorganite dryer burners to LFG. MMSD embraced the idea and built a 19-mile pipeline to bring LFG to the Jones Island Plant. They also elected to use the LFG to produce electricity, installing (3) 4.8 megawatt turbines. The waste heat from the turbines can be used as an aid to drying biosolids. The system was put in service in 2014.</p> <p>Subsequently, the combustion systems on 4 of 12 driers at the biosolids facility were converted dual fuel, using LFG or natural gas in their burners. The upgrade reduces greenhouse gas significantly, the biogas is part of the circular economy, and this offset of natural gas usage creates significant financial savings to the customer as well.</p>
<p>5. Governance – what have you done to maintain and strengthen governance around the project?</p>	<p>YES</p> <p>Milwaukee Team has developed a strong relationship with its surrounding communities, particularly by making it accessible to tours/visits and by sharing its different initiatives. Veolia is part of the Water Equity Task Force along with several governmental agencies including MMSD, the Wisconsin Department of Resources, and Milwaukee County- Water Works. To date, Veolia has been instrumental in coordinating 3 community-based recruiting efforts as part of this collaboration.</p>
<p><b>Has the project in any way supported the development and involvement of young people and/or supported gender equality, and if yes, how ?</b></p>	
<p>Education &amp; Tours: Veolia Water Milwaukee offers group tours of the Jones Island Water Reclamation Plant for schools and other interested groups. In a typical year, over 4000 visitors tour the Jones Island Plant. Tour content includes information on the wastewater treatment process, the making of Milorganite, how wastewater is cleaned and returned to Lake Michigan, and how individuals can do their part to help protect this precious resource. In addition, students of all ages</p>	

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learn about careers that are available within the water industry as well as the skilled trades that are necessary to support plant operations.

Education: Veolia has developed a curriculum that helps educate 5th grade students about the water cycle, water treatment, and the environment at large. The electronic files provide all the necessary information that a teacher needs to conduct 25 hands-on experiments and activities (supplies not included), a teacher's manual and information on the water cycle, water treatment, and the environment at large. The 25 experiments have been aligned with the Next Generation Science Standards.