

Biosolids reduction must be first priority

Source reduction is the first step toward achieving a circular economy. A partnership between the Hoyo Group in China and the US company Drylet, creator of an innovative biocatalyst solution that reduces sludge volumes by 50 percent, is helping Chinese cities such as Nanjing to cost effectively improve wastewater management. Drylet CEO Luka Erceg explains.

An entire industry has sprouted to provide solutions for managing sludge. The circular economy approach has been guiding efforts to convert that waste stream into a resource stream for energy generation, agricultural compost, and other applications. Extracting nutrients from biosolids is an important part of the wastewater treatment equation, but it is a long way from a complete solution. The 2017 edition of the *United Nations World Water Development Report*, "Wastewater: The Untapped Resource," points out that only 5 to 15 percent of the available nitrogen in wastewater can be recovered. Despite significant technological advances in nutrient recovery, the report shows that business opportunities remain limited, primarily due to lack of markets. Reuse can't be the first line of defense when there's too much waste to handle.

Low nutrient recovery and low demand combined with overwhelming volumes lead to the vast majority of wastewater sludge ending up in landfills, where it emits greenhouse gases (GHG). About half of the sewage sludge produced in the United States is landfilled – a large financial and environmental price that is unsustainable, with hauling transportation costs and landfill tipping fees in addition to their associated GHG emissions. In Europe, up to 80 percent of sludge is dumped in landfills or fields, or it is incinerated. Reuse is insufficient for the problem it's charged with remedying.

The waste management hierarchy is a guiding principle of industry, yet the current circular economy approach ignores its foundation: source reduction is the best first step. Minimizing the amount of biosolids that need to be processed reduces strain on infrastructure and addresses the root of the escalating problem. As the global population continues to grow, the volume of

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biosolids produced will continually exceed the world's capacity to reuse. There is no more prescient example than China, a country whose population is at 1.5 billion and growing, and whose wastewater management issues are intensifying.

Chinese cities adopt reduction strategy

China's wastewater treatment industry generates 22 million tons of sludge every year, which overwhelms its processing capacity. In fact, in 2013, Beijing's largest wastewater treatment plant was illegally dumping its biosolids waste in the city's outskirts, a problem replicated in other large urban areas such as Guangzhou, Shenzhen, and Shanghai. China has since taken steps to address its biosolids dumping problem. The city of Xiangyang in Central China is one of the few Chinese cities to build a biogas plant to generate energy from organic waste such as biosolids. This is a great first step, but most municipalities don't have the financial resources or infrastructure available to turn all of their biosolids into energy.

For this reason, cities in China are starting to see reduction as a primary biosolids management strategy and embracing innovations that help them implement it. The Nanjing Hoyo Municipal Utilities Investment Administration Group took steps toward making source reduction a priority by signing a

partnership with Drylet to create a joint venture to distribute in China their proprietary biocatalyst, which is manufactured in the United States. The biocatalyst boosts nature's processing power with a protective substrate for sludge-eating microbes, reducing biosolids volumes by up to 50 percent. These biocatalysts provide 12 football fields of solid area covered with microbes per pound of product, offering 100 times the colony-forming units per gram compared to a liquid culture. Protected by the substrate, the microbes reproduce at an accelerated rate, feeding off the organic waste in a frenzy, and converting solids into water and gas. By changing the microbial environment at the wastewater treatment plant with effective, non-toxic enhancements for activated sludge, the Aqua Assist product is an alternative to harsh chemicals, which helps customers shrink their environmental footprint without capital investment.

China's latest 5-year plan identified wastewater treatment as a top priority, and new regulations are increasing demand for technologies including biological denitrification and membrane filtration that support or integrate into wastewater treatment. Drylet's introduction to the Chinese market started through a United States Department of Commerce water-focused mission in June 2017, when the company began sharing its approach to biosolids reduction. The partnership with the Hoyo Group was formalized during the US trade mission to China in November 2017, which invited 29 US companies, including Drylet, among the 100 that applied to accompany Commerce Secretary Ross and President Trump to Beijing.

Based in the second largest city in the east region of China, Hoyo takes a holistic approach to urban planning, specializing in low

carbon, intelligent construction and operation of municipal infrastructure throughout the country. Hoyo sees the power of reduction as a sustainable solution and has also committed to joining Drylet as an equity investor. As part of its strategic relationship, Hoyo is setting up trials with Drylet's Aqua Assist product at the Nanjing wastewater utility, which fits into the organization's larger strategy. Hoyo is the leading public-private partnerships (PPP) player in the Chinese municipal utilities market and is actively expanding its PPP platform to include innovative technologies as water and wastewater treatment demand throughout the country becomes more acute. Drylet's partnership with Hoyo is expected to generate tens of millions of dollars in annual revenues in China and will help to address the remediation of sewage treatment plants, lakes, rivers, and other public water projects.

While treating waste as a resource helps create a closed loop system, the reality is that reduction is the first step to keeping waste out of landfills. The endorsement of Drylet's wastewater remediation technology by the Hoyo Group speaks volumes about China's readiness to embrace innovative solutions to managing its growing waste problems. Cities such as Nanjing that adopt a combined approach of reduction and recycling will facilitate a 100 percent diversion of biosolids. Wastewater utilities need to start embracing the policies and technologies that stop waste volumes from becoming an issue in the first place.

Author's Note



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