

ASSOCIATE MEMBER SPOTLIGHT

TRENDS IN BIOSOLIDS MANAGEMENT

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Managing biosolids each day and into the future is an essential part of every wastewater treatment facility. Based on a 2015 NYSDEC survey of 580 wastewater treatment facilities in New York State, the general trends have been towards more landfill disposal and less beneficial use and incineration. This article includes some results of that survey, explains Class A and Class B standards for land application, and introduces some sludge stabilization technologies to achieve these standards.

Since 1998, the trend shows a steady increase in the use of landfills for biosolids disposal, accounting for 68% of the total biosolids processed on a dry weight basis in NYS. This is primarily due to low tipping fees and limited infrastructure to send biosolids to a landfill. To landfill, a POTW is required to dewater sludge to 20% dry solids and stabilize the sludge with either lime or digestion or meet other criteria. Most all of the 27 municipal solid waste landfills in NYS still accept biosolids.

Beneficial use of biosolids (including composting, land application, and heat drying) accounts for about 16% of biosolids processed on a dry weight basis in NYS. Of these, composting is the most common including over half of the facilities. Compost is a Class A material used for landscaping, home gardens, municipal projects, and erosion control. Next most common is land application where the biosolids can be Class A or Class B and applied as either a liquid or semi-solid and injected into or spread on the ground and incorporated into the soil. For land application, rules and guidance define acceptable metals, pathogen reduction and stabilization. Metals rarely are limiting in beneficial use programs because pretreatment programs have been so effective. The remaining beneficial use treatment processes in NYS include a handful that use either mine reclamation, heat drying, alkaline stabilization, or thermophilic aerobic digestion.

Incineration accounts for the remaining 16% of biosolids processed on a dry weight basis in NYS. Due to new Title V air permit provisions, many incineration facilities became non-operational in 2016 and the trend continues. Most commonly, incineration is being replaced with anaerobic digestion and energy can be recovered from the digester gas generated. An example is the Oneida County WPCP that is transitioning from incineration to anaerobic digestion that will digest other organic wastes. The plant is using the biogas to operate a 600 kW Capstone microturbine-based combined heat and power (CHP) system to generate

power onsite and heat the digesters with waste heat. Albany County is also constructing anaerobic digestion for stabilizing both their and Saratoga's County's sludge in a Regional Anaerobic Digestion Facility.



Digester gas conditioning skid by Unison Solutions at the Oneida County WPCP.



Capstone 600kW microturbine supplied by GEM Energy at the Oneida County WPCP.

Sludge stabilization is a combination of processes of sludge treatment in order to reduce pathogens, eliminate odors, and meet US EPA or other applicable criteria for biosolids beneficial >>>

use. When it comes to sludge stabilization, aerobic digestion is employed by 260 of the surveyed facilities (>40%), followed by anaerobic digestion, used by 136 of the facilities (>20%). In general, plants smaller than 5 MGD are more suitable for aerobic digestion, septic tanks, lagoons, reed beds, sand filters, etc.

Pathogen reduction will be to Class A or Class B standards depending on the process technology. In NYS, all Class A biosolids management processes (composting, heat drying, etc) and Class B direct land application, must hold 6 NYCRR Part 361 solid waste permits. Class B biosolids generally are delivered at no cost or for a nominal fee and the land owner benefits from the fertilizer. Class B biosolids may contain some pathogens so product reuse has management practice limits to protect operator and public health. Further pathogen reduction is achieved by natural forces in the environment. Class A products may be marketed more aggressively and are sometimes sold to offset production costs, therefore quality may be more important. There are now no restrictions on food or feed crops when soil is amended with Class A biosolids product, to compliment federal EPA rules. However, for Class A products, additional testing is required to demonstrate additional pathogen reduction.

To transition from landfilling to beneficial reuse using land application, improved sludge stabilization may be required. To improve sludge stabilization using aerobic digestion and potentially achieve Class B biosolids, there are many treatment technologies offered by Ovivo.

- One can add pre-treatment with BioAlgaNyx™ which is a biological lysing process using low energy and significantly decreasing aerobic digestion time for stabilization.
- Thickening with gravity, mechanical, or silicon carbide membranes (SiLC-TAD™) can be retrofit into existing tanks and reduce aerobic digestion footprint and energy.



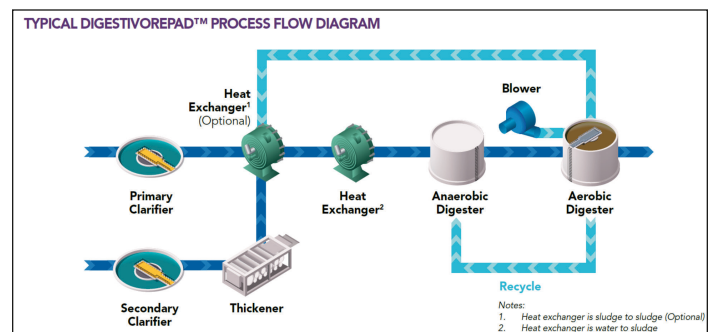
Power washing sludge off Ovivo's silicon carbide membrane used to thicken sludge without polymer that can be retrofit into existing tanks to achieve Class B stabilization.

To improve Class B or achieve Class A sludge stabilization using anaerobic digestion, there are also several treatment options.

- BioAlgaNyx™ is also a pre-treatment for anaerobic

digestion that significantly improves VSR, gas production, and dewatering of solids.

- A thermal hydrolysis process (THP) used for either pre-treatment or post-treatment is Ovivo's LysoTherm™. This product is unique among THP manufacturers because it does not use steam and is designed for small to mid-sized plants. You can achieve Class A or B biosolids with LysoTherm™ depending on the configuration, improve VSR, gas production, and dewatering results.
- If a facility has nutrient limits and anaerobic digestion, an aerobic digestion step can be added after anaerobic digestion coupled with a recycle stream. This technology, DigestivorePAD™, is very simple and offers additional VSR, reduced nutrients in sidestreams, improved dewatering, odor control, and is ideal for retrofits.
- One can also achieve Class A biosolids with a sludge dryer such as Ovivo's EloDry™.



Ovivo's Digestivore PAD™ for improving volatile solids reduction and dewatering, reducing nutrients in sidestreams, and odor control.

In conclusion, in NYS there are mostly small wastewater treatment facilities, using aerobic digestion and landfilling for biosolids disposal. To reduce the volume of biosolids hauled to a landfill or move to land application, one can implement technologies that can be retrofit into existing tanks. For plants using aerobic digestion, they can potentially achieve Class B biosolids with reduced footprint and energy. Similarly, for larger facilities using anaerobic digestion, there are technologies to improve sludge stabilization and achieve Class A or Class B biosolids that can be retrofit into a facility while achieving many other benefits.

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References:

- NYSDEC *Biosolids Management in New York State* March 2018
- WE&T December 2014 *What every operator should know about biosolids management for land application.* 💧💧💧