

ENERGY & RESOURCE RECOVERY

Welcome to the *green* era of wastewater and biosolids management. The purpose for treating wastewater and biosolids has always been environmental protection. Today, there is new and growing emphasis to go further, to plan and operate treatment systems to achieve the most ecologically sound outcomes. There are opportunities for treatment systems to include energy and resource recovery. What's more, the rewards for these initiatives are not just environmental benefits, but cost saving as well.



Energy from Wastewater

The high volatile organic content of wastewater can be converted to a truly renewable energy source. Much of this organic content is captured in the waste biosolids, which requires further treatment to meet the regulations for its disposal. Land-applied biosolids must first be treated to reduce pathogens and vector attraction, minimizing its potential for spreading disease. Anaerobic digestion is a proven treatment technology for meeting the standards for land disposal and one that provides opportunities for energy recovery as well.

Treated in the absence of oxygen, biosolids generate a biogas that is 2/3 methane with an energy value of 600 BTU's per cubic foot. Two-stage digesters provide a complete system to manage this gas: a primary digester, which is mixed and heated to create the zone where the gas is released, and a secondary digester, which is furnished with a floating cover for gas storage and weight to produce the pressure that pushes the gas to points of use. The gas can be used for heating or generating power. The selection of the best use is based on several factors, including the need to clean the gas and the fluctuations in supply and demand.

Biosolids: A Product of Value, Not a Waste

The phosphorus and nitrogen removed in the wastewater treatment process become incorporated in the waste biosolids. These nutrients increase the biosolids' value as a fertilizer. If the biosolids are treated by a process for significant pathogen destruction, Class A status for pathogens is achieved, raising the product's value to land owners and other potential customers. If a dry Class A product is created without reducing its nutrient value, interest in the product can be optimized, even to the point where it may be sold either in bulk or packaged quantities. With diminishing reserves of phosphorus traditionally mined for fertilizer, wastewater biosolids may provide a reliable and cost-effective phosphorus source in the future.

Water Reclamation

We are not treating wastewater; we are reclaiming water. When we discharge well-treated wastewater to either a surface water or underground resource, we are replenishing that resource and making the water available for reuse. In some geographic areas and circumstances, recycling of effluent directly to users may be cost-effective, particularly if the user's demand for quality is not based on drinkable and pristine standards. Irrigation, lawn watering, cooling water, boiler make-up, and certain industrial uses are examples of where treated effluent is a low-cost water alternative. The benefits are both economical and environmental; users save costs in water purchase and the depletion of natural water sources is perhaps avoided.



Think Big. Go Beyond.

If you have any questions on the information provided in this handout or additional questions concerning wastewater, contact Jason Benson, PE at 763-463-5036 (Minneapolis), Shawn Gaddie, PE at 701-746-8087 (Grand Forks), Russell Sorenson, PE at 701-221-0530 (Bismarck), Eric Dodds, PE at 218-299-5610 (Fargo/Moorhead), or Nate Weisenburger at 406-268-0626 (Great Falls).