



BLUE LAKE WASTEWATER TREATMENT PLANT FACTS

Introduction

Blue Lake is the third largest among seven wastewater treatment plants in the Twin Cities owned and operated by the Metropolitan Council, which manages the regional system.

Located in Shakopee, Blue Lake is the fourth largest wastewater treatment plant in Minnesota. It treats an average of 29 million gallons of wastewater per day (mgd) from 285,000 residents in 27 communities. The plant provides mechanical, biological and chemical treatment to the wastewater before discharging it into the Minnesota River.

An on-site solids treatment facility opened in 2000 as a joint venture between the Council and the New England Fertilizer Company (NEFCO). Biosolids produced at Blue Lake are dewatered, dried, pelletized and then used as organic agricultural fertilizer.

Energy conservation across the system

Metropolitan Council Environmental Services (MCES), the Council division that manages the wastewater system, launched an energy-savings campaign in 2006 to minimize the economic and environmental impact of its current and future energy demand.

The work focused first on process efficiency, lighting redesign and other facility improvements, and it worked. In 2009 and 2010, MCES received the Efficiency Partner Award from Xcel Energy. In 2011 MCES received the Gold Award from Xcel for the most electrical energy saved in an 18-month period.

Progress on energy conservation projects continues and yields additional savings that increase each year. By the end of 2010, annual purchased-energy consumption was reduced by 17% from the 2006 base year, saving rate payers \$2.5 million each year in energy-related costs.

With many of the easier projects implemented, MCES is adding to its primary conservation focus on maintenance and operations projects to provide conservation and renewable energy from capital projects.

Building on its success, MCES set new energy conservation goals in 2011. MCES now is targeting a reduction of 25% by 2015 and a very aggressive reduction of 50% by 2020 compared to 2006 levels.

Solids processing at Blue Lake

In the mid-2000s, plans were made to add a new solids processing facility at Blue Lake that could produce energy to replace purchased natural gas used to operate the solids facility. Construction of the new system began in 2009 and was completed in 2012. Methane biogas recovered from the digester facility is now used to replace 9 million BTU/hour of fossil fuel (natural gas) that powers the solids facility.

Environmental improvements and financial savings from the project at Blue Lake include:

- The conversion from natural gas to biogas for fueling the dryer will save an estimated \$500,000 per year. MCES's private partner, NEFCO agreed to substantial contract changes and is responsible of the use of the biogas.
- When the dryer is offline, the biogas fuels hot water boilers that heat a digester control building, providing an estimated \$50,000 in savings.



- During sludge drying operations, hot water used to scrub odors from dryer exhaust is used to preheat the sludge, leading to more savings.
- The new facility reduces the mass (amount) of solids during treatment, which increases the capacity and lifespan of the solids facility.
- The project received \$2 million in grant funds (as well as discounted loan interest for the remainder of the capital cost) through the Minnesota Public Facilities Authority from the American Reinvestment and Recovery Act.

Other recent improvements made at Blue Lake yield additional savings. These include new premium efficiency pump motors and motor drives. Air diffusers were replaced and additional valves now provide better control over dissolved oxygen and improved oxygen transfer.

Future plans will continue excellent permit compliance

Despite major construction for expansion, Blue Lake continued its excellent permit compliance record. For its performance through December 2011, the plant earned a prestigious Platinum Award from the National Association of Clean Water Agencies for six consecutive years of perfect compliance with its discharge permits.

The Council is currently studying options for a proposed on-site solar facility that would eliminate the need for some energy from fossil fuels to meet Blue Lake's electricity needs. If built, the proposed facility could generate up to 1.25 megawatts per year from a renewable energy source.

Energy-saving collaborations

MCES is collaborating with many other partners to pursue future energy savings, including the International Climate Registry, the State of Minnesota, Metro Counties Energy Policy Coalition, the University of Minnesota and Xcel Energy.

Read more about MCES Energy Conservation and Renewable Energy at <u>www.</u> <u>metrocouncil.org</u>

The Council's wastewater collection and treatment system has an outstanding record of compliance with its federal clean water discharge permits.

At the same time, the Council charges its customers among the lowest rates in the nation for similarsized systems.





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BLUE LAKE WASTEWATER TREATMENT PLANT SUPPLEMENTAL FACTS





This supplement to the Blue Lake Fact Sheet provides more technical detail about the plant's solids handling system than is provided in the general fact sheet.

WASTEWATER SOLIDS TREATMENT GOES GREEN!

Biosolids converted to fertilizer pellets

Blended primary and secondary biosolids are thickened, dewatered and dried in a rotary drum dryer to produce fertilizer pellets which are applied to cropland as slow release, organic fertilizer.

The product meets EPA's "Exceptional Quality" requirements for low levels of heavy metals and contaminants.

Capacity increase

MCES Facility Planning in 2005 determined that the dryer was approaching its capacity. Addition of the anaerobic digestion process would reduce the mass and volume of solids by about 30%, thereby increasing the capacity and extending the life of the dryer equipment.

What is anaerobic digestion?



The biosolids are decomposed in three 1.4 million gallon concrete tanks by microorganisms (naturally contained in the waste) in the absence of oxygen. The organic material in the waste is converted to water, residual solids and biogas composed of carbon dioxide and methane.

Green energy features

- The biogas produced by the digesters at about 60% methane replaces 90% of the 9 million BTU/ HR. of purchased natural gas to fuel the pelletizer, saving about \$500,000 annually.
- When the dryer is offline, biogas fuels hot water boilers that heat the 20,000 sf digester control building, with estimated savings of 1.2 billion BTU annually.
- During dryer operation, hot water used to scrub odors from dryer exhaust is used to preheat the sludge.
- When the dryer is offline, hot water from the boilers is used to preheat the sludge.

FACTS - BLUE LAKE WASTEWATER TREATMENT PLANT (WWTP)

Location Shakopee, Minn.

Capacity 38 million gallons per day (mgd)
Average daily flow 28 million gallons per day (mgd)



Population served 285,000 people in 27 communities

Service Area Lake Minnetonka area, Shakopee,

Prior Lake and Chaska

Biosolids pellet production About 30 dry tons per day (dtpd) before digester startup

About 17 dtpd after digester startup

FACTS - ANAEROBIC DIGESTION PROCESS

Process tanks 3 tanks with fixed steel covers

Storage tank 1 tank with membrane cover for gas storage

Tank Size 90-feet diameter, 35-feet deep cast in place concrete

Volume 1.4 million gallons

Process 2 stage mesophillic digestion, 98 F, 26 days retention

Gas production About 26,000 scf/hour

57-61% methane 12 million BTU

FACTS - CONSTRUCTION

Construction Period Sept. 2009 – April 2012 (32 months)

Project Cost \$27.8 million

Financing Minnesota State Revolving Loan, \$25.8 million

American Recovery "Green" Infrastructure, \$2 million





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