

ST. CLOUD NUTRIENT AND ENERGY RECOVERY PROJECT

STATE PROGRAM: Minnesota Public Facilities

Authority ASSISTANCE RECIPIENT: City of St. Cloud

ASSISTANCE AMOUNT: \$16.7M



PROJECT DESCRIPTION

The St. Cloud Nutrient and Energy Recovery Project is a wide-ranging initiative to efficiently capture, manage, and recycle nutrients from wastewater and to generate renewable energy. The St. Cloud facility received a \$16.7 million CWSRF loan for the installation of a nutrient recovery reactor, a biogas membrane, a combined heat and power engine-generator, and the conversion of a storage digester to a primary digester. With these new technologies, biosolids will be used to enhance the nutrient recovery process and increase biogas production. This increase in biogas production allows the facility to expand its customer base by accepting additional high strength waste streams which results in a new source of revenue. This is done while spending less on energy needed to purchase from the grid. These innovative technologies decreased the facility's biosolids by 70 percent, reducing staff processing time and hauling costs. The nutrient recovery reactor, the first installed in Minnesota, 7th in the nation, and the 10th worldwide, generates over 100 tons of struvite product to be sold as agricultural fertilizer. In 2019, the annual financial benefit from the project was over \$1 million (\$587,000 in energy savings, \$24,000 in fertilizer product revenue, and \$400,000 in revenue for high-strength waste treatment). Energy production increased from 3.7 million kilowatts in 2017 to 5.1 million in 2019 and the facility is expected to be a net zero operation by 2021.

The St. Cloud project also involves unique community partnerships. The City entered into a long-term agreement with a local brewing company in which the City will convert byproducts from the brewery into energy, which will be processed in the engine-generator at the recovery facility. The brewery contributed \$391,000 of capital toward the new engine-generator and will pay tipping fees to offset any additional operation and maintenance costs. Through the success of the St. Cloud project, the facility is also partnering with school districts, prisons,

The logo features a stylized white dollar sign (\$) with a fish swimming inside the top curve and another fish swimming inside the bottom curve, symbolizing the intersection of water and finance.

Clean Water State Revolving Fund

counties and healthcare facilities to divert food waste from landfills and instead, convert this waste into energy at the treatment facility. Investing in multiple innovative technologies installed at one site allows the facility to utilize the resources stored in the waste products. The new revenue from fertilizer sales and from processing high strength waste products, in addition to the reduction in the facility's energy expenses, are factors that contribute to keeping rates low for residents and businesses making this project an excellent example of innovative financing.

To read more about this case study, please visit https://www.epa.gov/sites/default/files/2021-02/documents/2020_pisces_compendium.pdf.