

# Nutrient Recovery & Reuse (NR2) Project

City of St. Cloud, Minnesota, USA

**Lystek**  
Nothing wasted.  
Everything to gain.



*"The biggest, driving force behind the various upgrades to our biosolids program was that we were running out of storage," says Brian Shoenecker, Wastewater Services Manager for the City of St. Cloud*

## ABOUT

The City of St. Cloud is the 10<sup>th</sup> largest city in Minnesota. It is centrally located in the heart of the Midwest along the banks of the Mississippi River, and was the first to use the River as a drinking water source. [www.ci.stcloud.mn.us](http://www.ci.stcloud.mn.us)

## CHALLENGES

- Biosolids storage capacity under pressure due to community growth and wet weather events shortening the land application season
- Intention to increase co-digestion with third-party organics, adding further pressure to residual volumes and storage
- Anticipated future regulatory pressures to produce a Class A biosolids for land application
- Desire to maximize existing infrastructure and minimizing cost to their ratepayers



## SOLUTION

The City of St. Cloud selected Lystek THP as a biosolids treatment technology, providing these benefits:

- Dramatic reduction in storage and hauling requirements for biosolids
- Production of a high-quality Class A biosolids fertilizer product, which can be managed with the City's existing transportation and land application equipment

## RESULT

- Reduction in biosolids volumes of **70%** extending the capacity of the City's existing storage, reducing overtime and trucking requirements and minimizing wear and tear on equipment
- Estimated **cost savings of \$12 million** over a 20 year life cycle as compared to alternative solutions
- Maximizing the life and use of the Facility's existing infrastructure and equipment (no new buildings or storage required)

## KEY METRICS

**Population Served:** 68,000

**WWTP Rating:** 49,210 m<sup>3</sup> / day (13 MGD)

**Lystek THP Processing Footprint:** 149 m<sup>2</sup> (1600 ft<sup>2</sup>)

**Lystek THP Module Size:** 1 x **LY10** (1.0 dry tons / hr)

**Feedstock:** Municipal biosolids (aerobically digested)

The St. Cloud Nutrient, Energy and Water (NEW) Recovery Facility services a total population of about 120,000, including the City of St. Cloud and several area cities such as St. Augusta, St. Joseph, Sartell, Sauk Rapids, and Waite Park. As a recognized leader in resource recovery, the St. Cloud NEW Recovery Facility is one of only a few water utilities in the United States to be named a "Utility of the Future Today" by the National Association of Clean Water Agencies (NACWA) for four years in a row.

In 2017, the utility saw the opportunity to advance their Resource Recovery and Energy Efficiency Master Plan, when they received notification that state funding was available through the Clean Water Legacy Act. With this funding, the City embarked on an initiative they called the Nutrient Recovery and Reuse (NR2) Project, of which the main goals were phosphorus recovery and the production of a Class A biosolids at the facility.

The City was interested in pursuing a Class A treatment technology to prepare for possible changes in future regulatory requirements. Facing storage capacity issues with their low solids liquid Class B program, they were also looking to solutions that could reduce the volume of material. St. Cloud's Class B biosolids application program had been successfully managed and operated for many years by City staff, with a receptive farming community for the biosolids.

Evaluation of solutions and alternative technologies included several options, such as a producing a dewatered cake. According to Hodel, "We were in our facility planning phase when we first heard about Lystek. The timing was perfect. We were looking at various solutions and we are known for being innovative and taking some (measured) risk in our approach, including different technologies. It started with a conference call and evolved into a detailed review of the

Lystek THP system. What really impressed us was how well it fit with our existing infrastructure and equipment. Plus it enabled us to continue providing the type of end product our agricultural customers prefer and ask for."

Lystek THP was selected by the City of St. Cloud and provided through a technology supply agreement. Construction services were provided by Rice Lake Construction, and engineering was carried out by Donohue and Associates. Lystek THP was operational at the plant by September 2018. St. Cloud has continued to operate their successful land application program using their existing infrastructure and equipment, however, they have seen a dramatic reduction of over 70% in their biosolids volumes and the associated trucking, reducing their biosolids program's greenhouse gas emissions. In addition, the program itself has become less stressful to manage – the City saw decreases of 85% in their overtime hours associated with land application.

Finally, due to the multipurpose application of the Lystek THP technology, St. Cloud has the option to explore additional volume reduction and biogas recovery by integrating Lystek THP with their anaerobic digesters, through the LysteMize® process. On site research has also shown the ability for the Ostara WASSRIP® process, also implemented as part of their NR2 project, to utilize Lystek-processed biosolids as a carbon source for additional phosphorous removal at the plant.



## About Lystek

Lystek is a leading provider of Thermal Hydrolysis solutions for the sustainable management of biosolids and organics. The multi-use, award-winning Lystek system reduces costs, volumes and GHG's by converting municipal and industrial wastewater treatment facilities into resource recovery centers. The technology transforms organic waste streams into value-added products and services, such as the patented LysteMize® process for optimizing digester performance, reducing volumes and increasing biogas production; LysteGro®, a high-value, nutrient-rich fertilizer and LysteCarb®, an alternative source of carbon for BNR systems.