

# GREATER Innovation, Improvement and Excellence in St. Cloud

By Emma Larson, Liz Kramer, and Shanna Czeck

The phrases ‘Excellence in the Delivery of Public Service’ and ‘Passion for Clean Water and Resource Recovery’ have two things in common – they are the overarching mission and vision of the St. Cloud Public Utilities Department and they are clearly reflected in all department facets, from the day-to-day operations to long-term goals.

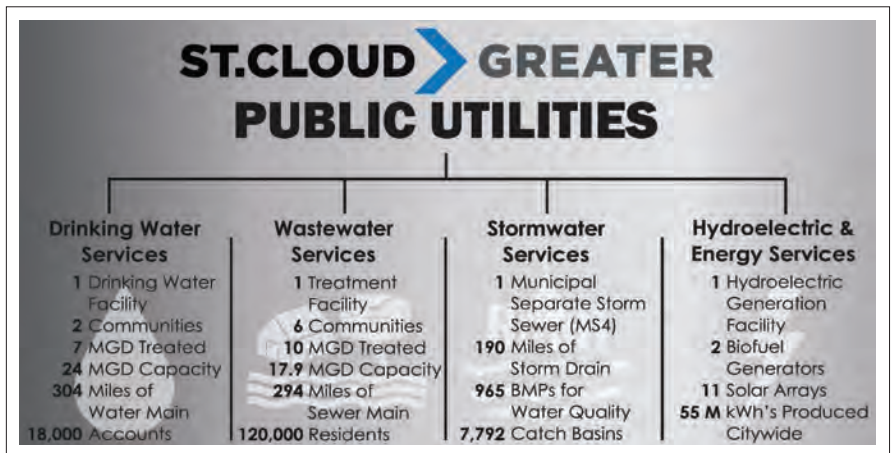
## INNOVATION > IMPROVEMENT > EXCELLENCE

The departmental vision of advocating innovation and continuous improvement in the services provided is well established. ‘Finding a better way’ is discussed and acted on daily. This mindset and culture is accepted, nurtured, implemented, and expanded to help St. Cloud become a national leader in providing innovative public services.

The Public Utilities Department includes drinking water treatment and distribution, wastewater conveyance and treatment, biofuel utilization, stormwater collection and treatment, nutrient recovery, and hydroelectric energy production. It casts a wide net and consists of 55 water quality and energy professionals.

“Co-digestion of high strength waste has a significant positive environmental impact. It takes waste that would typically harm the treatment process (through additional air demand for typical BNR treatment) and utilizes it as a fuel source. Local renewable energy is a huge step forward in sustainability.”

**Nicole Ringle,**  
Special Program Coordinator



The current organizational culture at St. Cloud Public Utilities was created by a group of professionals that have an enormous passion for the drinking water and wastewater industries, resource recovery and sustainable operations.

Hiring practices are focused on identifying individuals with strengths that fit well with the existing team. Often, individuals that have an internal drive for success, high emotional intelligence, a strong work ethic and who will strive to make a difference

“Every day there is a new challenge. Some may not like that, I embrace it.”  
**Jacob Ethen,**  
*Industrial Electronics Technician*

in what they do are given a place on the team. The driver behind all that the utility tackles and accomplishes is, and always will be, the people.

The leadership of St. Cloud Public Utilities is proud of the team that is developing and working together. Leadership recognizes the need for fulfillment and ownership in employees and has taken various steps towards ensuring a continuity of goals as well as services. Leadership training opportunities are provided to staff through third party and internal training programs; employees are encouraged and empowered to take leadership roles related to projects, programs, troubleshooting and optimization. Using the strengths of each team member has led to a culture of creativity and accountability regardless of job title. Innovation within the divisions continues to thrive and this has led to many successes by the St. Cloud Public Utilities team.

Collaboration of team members is consistent throughout. Project teams are developed for all large construction projects as well as smaller operational and maintenance projects. Complete transparency is provided to all team members throughout the projects, from planning to design through the construction period. This transparency and alliance has resulted in employee engagement in the process from project design to operation post construction. The St. Cloud Public Utilities team is exceptional at working together to optimize and improve operations following project completion. Excellence is achieved when everyone has pride in what they do and the ambition to get the job done.

### RECENT PROJECTS OF REGIONAL AND NATIONAL SIGNIFICANCE

#### Biofuel Recovery, Utilization and High Strength Waste

This project was driven from the Resource Recovery and Energy Efficiency (R2E2) Master Planning that started in 2014. The foundation of this project included building and process improvements focused on immediate reductions in



energy consumption. Upgrades included; HVAC controls, lighting, and optimization of existing operations processes; aeration, and UV disinfection for example. All together these accounted for an energy savings of 1.6 million kilowatt-hours (kWh's) annually. Jacob Ethen, Industrial Electronics Technician, recently commented that the project he is most proud of being a part of was the aeration optimization. Because of this project, aeration valves now operate on a 'Most Open Valve

“Everyone working here is proud of what they do. We continue to share ideas with each other to keep improving. Working here feels like a small community of innovators wanting to seek more and overcome the next challenge that can arise, together as a team.”

**Rocio Durkot,**  
*Laboratory Technician*

Control' strategy, significantly increasing blower efficiency and operational stability. The R2E2 related work continued with a Guaranteed Savings Project (GSP), which enabled the purchase of the facility's first biofuel generator. Methane gas produced during anaerobic digestion is the fuel for the engine, after the removal of hydrogen sulfide and siloxanes.

The desire of staff to reach 'net zero,' generating all energy needed to power the NEW Recovery facility onsite, drove the now active High Strength Waste Program. Using pretreatment program knowledge, word of mouth, and multiple site visits and

tours, the facility is now accepting products once sent for disposal as a waste product to increase methane production in the digesters to previously unseen levels. This enabled the purchase of a second biofuel generator, which is expected to be online by December 2019. These staff led efforts have been successful in generating over 80% of the energy demand onsite at the Nutrient, Energy and Water (NEW) Recovery Facility.

### NUTRIENT RECOVERY AND REUSE (NR2)

The determination to go one step further with everything we do continued when reviewing options for the future of biosolids recycling in St. Cloud. The NEW Recovery Facility faced the common challenge of storage limitations for the well-established Class B Liquid Biosolids Program. Instead of expanding storage, drying or caking the product, the team looked for new and innovative technology options. Lystek Class A Biosolids technology enabled the continued use of liquid storage as well as utilizing the recent investments in hauling and injection equipment. The process uses high speed sheer mixing, steam and an alkali base in the Lystek reactor to produce a 15% total solids 'liquid'.

Ongoing production of liquid biosolids has enabled the program to continue to provide a highly valued agricultural product to local farmers.

In addition, the choice of a liquid product over a cake or dried product reduced the total capital costs for the NR2 Project by \$12 million due to the ability to reuse existing buildings, infrastructure and recycling equipment.

The digested solids are sent to a centrifuge before the solids portion reaches the Lystek reactor. The centrifuge and the Lystek process has led to a 70% volume reduction in product stored at the facility. The centrate, which is captured from the centrifuge, provided another opportunity for St. Cloud to be a leader.

Ostara Nutrient Management Solutions is technology used to produce a pearl™ of magnesium ammonium phosphate. By removing nutrients, including dissolved phosphorous, from the return stream to the headworks, a lower-

“I love the concept of recovering wasted phosphorus, refining it and sending it to depleted regions. With the limited supply of minable phosphorus, the Ostara process has more than just environmental impacts.”

**Shanna Czeck,**  
Environmental Compliance Specialist

nutrient, higher quality effluent is returned to the Mississippi River. The centrate, already rich in phosphorus and ammonia, is captured and processed with added magnesium to produce the struvite pearl in a controlled environment. This fertilizer component is then shipped out for further processing. Recovering phosphorus improves water quality in the effluent and reduces the demand on the earth’s finite phosphorus supply, which is mainly obtained through mining operations. Staff has openly embraced the new

technologies and processes because they see the big picture and are excited for the future of the biosolids program. Creating a product that is environmentally friendly, sustainable and what local farmers want means something to our staff and gives a sense of achievement.

### DRINKING WATER TREATMENT ADVANCED PROCESS AND IMPROVEMENTS

The Water Treatment Facility Advanced Process and Improvements project, currently in the design phase, is expected to break ground in 2020. The facility upgrades will include an Advanced Oxidation Process of ozone treatment and ultraviolet light disinfection. The conventional gravity flow filters will be upgraded to utilize biologically activated carbon. This project will enable increased taste and odor treatment as well as the reduction in disinfection by-product generation. The mentality of teamwork from design through construction continues and has only strengthened the project. As Jillian Pauls, Water Services Specialist, emphasized, “Our diverse avenues in life allow us to view and retain things differently, which permit all of the fine details to be covered and deliberated.”

The team working on this project, and their combined expertise, will lead St. Cloud to “have advanced technologies, to be able to provide safe drinking water for future regulation limitations, and to be able to share our knowledge and facility with others, to help provide a safe solution.” The St. Cloud Public Utilities

department is continuously looking to the future and taking the necessary actions now that will provide for generations to come.

### CITY WIDE WATER METER UPGRADES

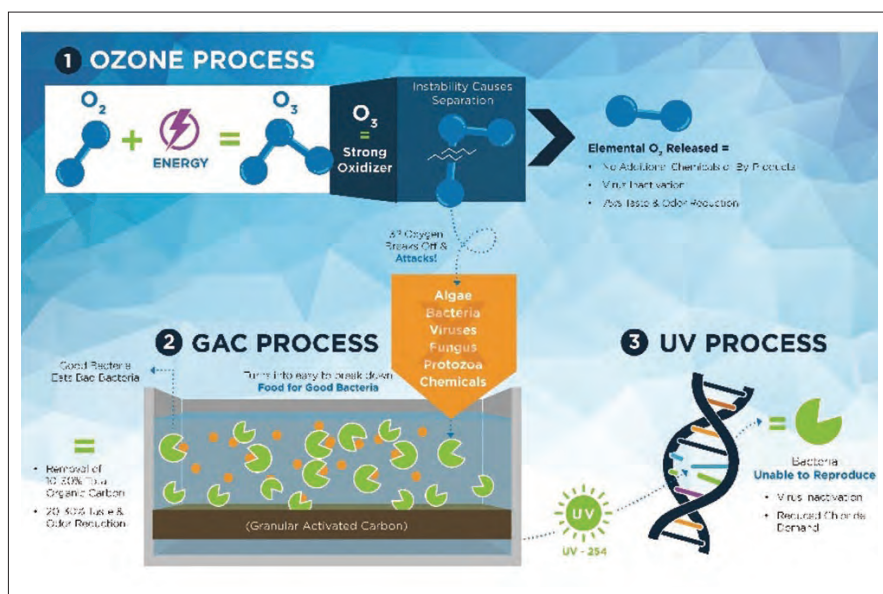
St. Cloud residents have long been accustomed to waiting for a bimonthly bill to see their water use. This is changing because St. Cloud Public Utilities has committed to updating all residential water meters over a four-year window to an Advanced Metering Infrastructure (AMI) fixed network reading system. The new metering system will take hourly readings, which will be available to residents via the WaterSmart platform scheduled to go live in 2020. The platform will allow residents to set notifications for leak detection, monthly use, and billing projections. These valuable improvements will provide knowledge to residents, empowering them to make wise water use choices. The early leak detection system will facilitate early repairs and decreased water loss throughout the distribution system. These improvements are part of a customer-focused culture and provide customers with a high-quality service that will improve customer satisfaction and communication with the City.

### SOUTH TOWER CONSTRUCTION

The city of St. Cloud is a growing community that is spread out over a distribution system area of 30 square miles. The southern part of St. Cloud is growing particularly fast – a new high school was constructed, and the industrial, commercial, and residential sectors have seen increased growth. The need to provide adequate storage, pressure regulation and fire suppression led to the construction of a 1.5 million-gallon water tower in 2016/17. The distribution system now consists of two ground storage tanks

“A great example of science and technology coming together... extracting value from something that was once an environmental pollutant and threat to public health... We’re acting as a filter for the environment by being able to return water back to its source, only cleaner than when we collected it. It is inspiring to see department leadership be stewards of a resource, taking on the responsibility to improve its condition for those that follow us.”

**Matthew Erickson,**  
Utility Service Operator



and four towers that offer a combined capacity of 10 million gallons. Providing safe, reliable water to customers is of the utmost importance and a task that the staff does not take lightly. This project required collaboration across the divisions of Public Utilities and a commitment by all involved.

### NORTH EAST REGIONAL TREATMENT SYSTEM

Stormwater treatment within the City has accelerated in the past 10 years, including the development of a 15-year implementation project for the reduction of solids discharged from an industrial area covering 367-acres in northeast St. Cloud. Since then, seven individual projects have been installed resulting in 33,120 pounds of solids being prevented from entering the Mississippi River annually. The Stormwater Division works alongside Public Works, Parks, Engineering, and Community Development (Planning) to ensure stormwater is included as a priority in Capital Improvement Projects. Grants totaling \$1,361,000 have contributed to these projects that all involve collaboration with counties, watershed districts, and other stake holders.

“The best part of my job is the ownership I’ve been given over the things I do every day. Helping shape energy management and energy education has been a great experience for me.”

**Liz Kramer,**  
Public Services Analyst

### FOREVER GREEN INITIATIVE

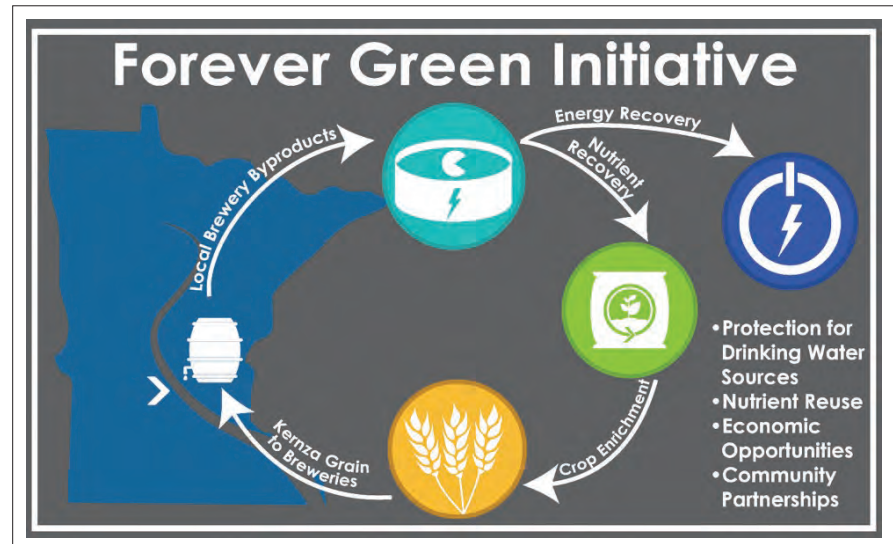
The Public Utilities Department is working with the University of Minnesota, the Environment and Natural Resources Trust Fund, Stearns County Soil and Water Conservation District, the Upper Mississippi River Source Water Protection Program, the Clean Water Land and Legacy Amendment, and local businesses to facilitate a demonstration plot for the Forever Green Initiative. The Forever Green Initiative consists of a team of experts in the areas of genomics, breeding, agronomics and commercialization who are developing new crops and high efficiency cropping systems. In Fall 2019, the City planted ten acres of Kernza, a perennial grain with

a deep root system, as part of a series of demonstration plots. The site selected is an MPCA approved biosolids land application site that has been receiving St. Cloud Biosolids for decades. The ancient grain’s deep roots help with soil remediation efforts including decreasing soil erosion and preventing the release of nitrates into groundwater. The plants have year-round soil coverage, providing erosion protection throughout every season, something that is difficult to come by in Minnesota’s climate. The Kernza grain planted in St. Cloud will be harvested and a local brewery has committed to create a custom, unique kernza beer. The brewery in this partnership is one of the businesses that utilize the St. Cloud High Strength Waste Program for disposal of their waste yeast and hops. The Forever Green Initiative, as well as the St. Cloud Kernza demonstration site, is aimed at creating a sustainable cycle of growth that will help provide clean

water and renewable resources in the area. St. Cloud Public Utilities is proud and excited to be a part of such a synergistic research group.

### HYDRO TRIP GATE REPLACEMENT

St. Cloud Public Utilities installed an Obermeyer spillway gate system at the St. Cloud Dam and Hydroelectric Facility. The system has a row of steel gate panels supported by inflatable air bladders. The elevation of the reservoir is adjusted and maintained by controlling the air pressure in the bladders. Obermeyer gates can be set at many positions between fully raised and fully lowered. The gates use no high-precision parts or bearings, enhancing the service life and requiring minimal maintenance. These gates result in reduced fluctuations in Mississippi River levels – increasing opportunities for recreational use and improving conditions for nearby fish populations.





The gates also enable increased and consistent energy production, reduced gate icing, and improved safety conditions for staff. Completion of this project further promoted the City’s dedication to renewable energy while protecting staff safety and the natural resources that are vital to our community.

### RENEWABLE ENERGY

The City of St. Cloud began developing their Renewable Energy Efficiency Initiative (REEI) in 2014. The REEI was initiated to meet St. Cloud’s energy and sustainability goals. Since work on the Renewable Energy Efficiency Initiative began, St. Cloud has completed several energy efficiency projects; solar arrays have been constructed on City property and the City subscribes to over 30 community solar gardens. Currently, 62% of the City’s electrical energy demand required to provide city services is generated from renewable energy sources. St. Cloud has become a national leader in innovative, cost-effective and sustainable practices. Every division in St. Cloud’s Public Services Department has played a part in accomplishing the renewable energy goals.

11 city facilities host onsite solar arrays, including two arrays at the Wastewater Treatment Facility and one at the Drinking Water Treatment Facility. The annual



production capacity of the arrays will total nearly two million kilowatt-hours (kWh’s) of energy. The biofuel generator at the NEW Recovery Facility generates over four million kWh’s of renewable energy each year. The solar and biofuel projects at this facility combined with energy efficiency work have helped the facility achieve many ‘net-zero’ days, when all the energy required to run the treatment facility for that day is produced onsite. On some days the facility even exports surplus renewable energy back to the electric grid. A second biofuel generator will be online and generating renewable energy at the NEW Recovery Facility in 2019.

“I chose to apply for this position because I have always wanted to work for a place that contributed in a positive way to the community.”

**Natalie Bartell,**  
*Laboratory Assistant*

In addition to producing renewable energy, the Public Utilities Department has worked with other departments across the City to ensure that every building, lighting system, and piece of equipment in the City is helping utilize renewable energy. Every eligible electrical account is subscribed



to community solar gardens, which are subscription based renewable energy credit programs. The credits help facilitate the use of renewable energy while saving money for rate and tax payers. Energy efficiency efforts have also reduced costs across the city of St. Cloud and provided additional value to the services provided to residents. Efficiency efforts have saved over 1.6 million kWh's a year at the Nutrient, Energy & Water Recovery Facility alone, and a combined four million kWh's annually across the City.

### COMMUNITY INVOLVEMENT

St. Cloud has encouraged sustainability actions for residents and rate payers, as well as City departments and divisions. The St. Cloud community has been involved in City energy

decisions and residents are encouraged to make educated energy decisions for themselves through educational programs and a community energy

*"Interacting with the public, especially when I'm out televising... I like showing them one of the things we do to maintain the 'invisible' parts of the City."*

**Amanda Hoeschen,**  
*Utility Service Operator*

action plan. These community efforts allow renewable energy and energy efficiency efforts to expand beyond the scope of what the City can directly control. The Public Utilities Department has encouraged this through facilitating the St. Cloud's Partners in Energy

program in partnership with the electric supplier, establishing energy goals, and subsequent action plans.

Tours and Open Houses at the NEW Recovery Facility and the Water Treatment Facility are available and encouraged for all age groups. Staff have seen the results of these efforts.

"The largest beneficial environmental impact is our energy savings projects," says Rocio Durkot, Laboratory Technician, "reducing the carbon foot print, lowering greenhouse gas emissions, and being sustainable. I think if the community sees that a municipal utility department, a large energy consumer in the City, can cut back – they can too."

### CAPACITY, MANAGEMENT, OPERATIONS AND MAINTENANCE (CMOM)

The Infrastructure Services staff undertook the mission of master planning for the collection system in 2011. Strategic planning led to setting the goals of televising and inspecting 20% of the system a year and implementing a five-year inspection cycle. The dedication of staff to ensure televising and inspection quality, which can identify potential and sometimes vital maintenance, has given a true picture of the infrastructure integrity. These inspections are an important part of maintaining the infrastructure because it provides indicators that show how a main is functioning or if there are concerns. It also helps conserve resources by directing efforts to the areas of the collection system that are most in need of

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maintenance, rather than providing redundant cleaning to areas that are in good shape and potentially missing areas that need more urgent attention. This has become a favorite job task for some team members, who enjoy getting to communicate the importance of maintenance to residents. Visibility is a common problem that is faced when trying to communicate with community members regarding the need for infrastructure replacement. St. Cloud Public Utilities staff embrace the challenge and use their visibility in the public eye to promote the services that they provide and the resources that are needed.

“The best part about my job is seeing so many people within the City working together to accomplish a common goal of protecting our water resources. As someone who is new to this career field, I find it immensely inspiring to see the hard work and dedication of our employees.”

*Chyann Erickson,  
Environmental Compliance  
Assistant*

### THE FUTURE IS BRIGHT

The Utility has taken the initiative to take part in external optimization and accountability programs such as the Partnership for Safe Water, Partnership for Clean Water, and the National Biosolids Partnership Environmental Manager System. The team approach to management has continued throughout these programs as well and all have been led by specialist level staff, allowing a team with autonomy, ownership, leadership experience, buy in and synergy to flourish. As well as these optimization programs, the Utility has been recognized as a Utility of the Future Today three years in a row by the National Association of Clean Water Agencies (NACWA), the Water Environment Federation (WEF), and the Water Environment Research Foundation (WERF). With a team committed to being GREATER, the future in St. Cloud is bright and full of innovation, improvement and excellence. **CS**

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