



Metropolitan Water Reclamation District of Greater Chicago

Press Release

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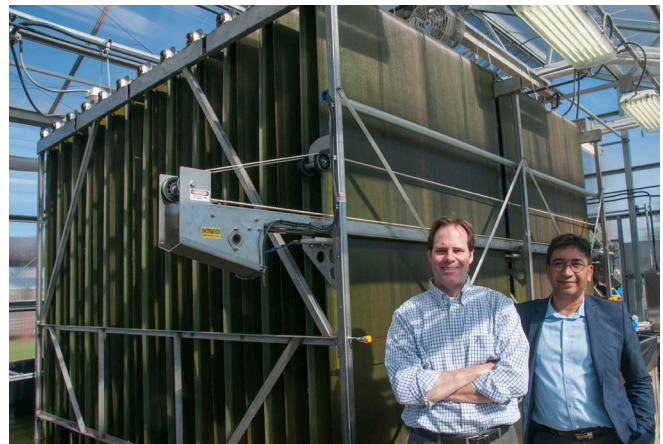
Patent technology from MWRD and partners removes dissolved pollutants from wastewater through algae harvesting

An official United States patent has been issued to the Metropolitan Water Reclamation District of Greater Chicago (MWRD) and its partners at Iowa State University Research Foundation (ISURF) for groundbreaking technology to remove dissolved solids from wastewater as part of a unique algae recovery system that aims to reduce carbon emissions and recover nutrients to improve water quality.

U.S. Patent No. 11,691,902 was officially granted to the MWRD and ISURF on July 4, 2023. Filed in 2020, the patent awards the MWRD and ISURF for its development of technology that removes dissolved solids from wastewater, as part of a larger apparatus known as the Revolving Algal Biofilm system (RAB). This burgeoning technology used for growing algae is owned by ISURF. But because of its many applications, numerous patents were subsequently filed, underscoring the range of impacts an RAB system could have on wastewater treatment, resource recovery and water quality. As part of the MWRD's collaborative research on nutrient removal using the RAB technology with partners at ISURF and Gross-Wen Technologies, Inc. (GWT), it led to another remarkable breakthrough: the MWRD discovered it could also remove dissolved pollutants from wastewater.

"This is a major accomplishment in water reclamation that could forever change the way we view nutrient recovery, carbon reduction and solids removal from wastewater," said MWRD President Kari K. Steele. "We congratulate our Monitoring and Research Department and partners at Iowa State University Research Foundation and Gross-Wen Technologies for their development of this project, our Maintenance and Operations Department for its installation and our Law Department for securing this momentous patent."

Originally conceived for agricultural purposes by GWT's founders, Dr. Martin Gross and Dr. Zhiyou Wen, while



The U.S. Patent and Trademark Office recognized the MWRD for its ability to remove dissolved solids in wastewater as part of an algae reactor that retired MWRD Assistant Director of Monitoring and Research Tom Kumetz (on the left) and MWRD Principal Environmental Scientist Kuldip Kumar developed with partners.

at Iowa State University, the reactor system uses vertical conveyor belts that revolve in a continual loop and cycle through wastewater, sunlight and air to grow multiple layers of algae. The algae are mechanically scraped from the belts and can then be utilized as a raw material in the manufacture of a variety of products, such as algae pellets as a slow-release fertilizer, sustainable aviation fuel and bioplastics. The MWRD and GWT are currently studying a second pilot project using the RAB at the MWRD's Stickney Water Reclamation Plant to focus on ammonia removal after a successful research trial at its O'Brien Water Reclamation Plant in Skokie that found a way to naturally uptake phosphorus and nitrogen from wastewater.

The successful utility-university-private partnership builds upon the project team's previous recognition in 2020 when they received the "Innovation Collaboration of the Year Award" from the Algae Biomass Organization and the "Ralph Fuhrman Medal for Outstanding Water Quality Academic-Practice Collaboration" (*continued*)

Patent technology from MWRD and partners removes pollutants, *cont.*



MWRD commissioners and executive staff display a plaque commemorating a United States patent the agency earned for inventing technology with partners from the Iowa State University Research Foundation, to remove dissolved solids from wastewater through an algae recovery system.



The U.S. Patent and Trademark Office recognized the MWRD for its ability to remove dissolved solids in wastewater as part of an algae reactor that retired MWRD Assistant Director of Monitoring and Research Tom Kunez and MWRD Principal Environmental Scientist Kuldip Kumar developed with partners.

from the Water Environment Federation. The project has also garnered \$100,000 in grant funding from Imagine H2O's Urban Water Challenge and a \$240,000 grant from the U.S. Department of Energy's (DOE's) Office of Technology Transitions (OTT). The patent also aligns with the MWRD's five-year Strategic Plan goals in resource management that calls for the MWRD to "develop an innovation ecosystem, driving innovation through partnerships with water associations, universities, labs, water technology firms."

"Congratulations to our engineers, scientists and partners at Iowa State University for receiving this well-earned patent," said MWRD Commissioner Eira L. Corral Sepúlveda. "In more than a century of progress and

advancements to treat our region's wastewater and protect our water resources, this is yet another milestone in our work to improve our water environment."

If the RAB technology is employed to remove total dissolved solids (TDS) from wastewater at treatment utilities in the U.S., the MWRD can negotiate royalty terms with the ISURE. While potential applications in water reuse are anticipated, the MWRD has not yet conducted a market analysis. While the technology may not currently find an application at the MWRD, it is reassuring to witness the organization's unwavering commitment to innovation, as their relentless contributions continue to drive the industry into uncharted territories.

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Recovering Resources, Transforming Water

Established in 1889, the Metropolitan Water Reclamation District of Greater Chicago (MWRD) is an award-winning, special purpose government agency responsible for wastewater treatment and stormwater management in Cook County, Illinois. Learn more at mwrld.org.