OPEN+ Energy-Water Technologies Cohort

PROJECT DESCRIPTIONS

Columbia University – New York, NY

Expanding the Boundaries of Autotrophic Nitrogen Removal for Energy-Efficient Clean Water Production – $1,620,136

Columbia University will produce clean water by removing nitrogen from wastewater streams through a process that uses up to 60% less energy and up to 80% less organic carbon, compared to conventional approaches. The new approach cleanses water through a bacterial process and advanced control solutions. The treated water streams can achieve the most stringent effluent water quality standards in the United States with a new cost-efficient, energy-positive model. The team will work with major public water treatment providers to develop and test its technology.

Oregon State University – Corvallis, OR

Freshwater Recovery System for Hydraulic Fracturing (FRESH-Frac) Using a Thermally-Actuated Nozzle-Demister – $2,972,000

Oregon State University (OSU) is developing a system for extracting clean irrigation water from hydraulic fracturing wastewater using low-grade solar or industrial waste heat. The system would efficiently separate, condense, and reclaim water vapor from wastewater using a heat-activated swirling nozzle combined with an in-line demister. OSU's technology would be modular, portable, scalable, and deployable at a fraction of the cost of existing treatment systems.

University of Oklahoma – Norman, OK

An Innovative Zero-Liquid Discharge Intermediate-Cold-Liquid Eutectic-Freeze Desalination System – $608,333

The University of Oklahoma will develop a novel, zero-liquid discharge freeze system to remove dissolved salt from contaminated water, such as is produced by industrial processes like oil and gas production and fracking. The project will take advantage of how salt and water separate as water freezes, using a cooling approach that maximizes efficiency and avoids the need for energy-intensive evaporation methods. The system is constructed of low-cost material, operates under atmospheric pressure, and is suitable for highly concentrated/contaminated water.