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Aug. 5, 2020 — DOE has awarded $1.9 Million to a team led by the Biological Engineering Department’s Sustainable Waste to Bioproducts Engineering Center for “Waste to Energy Strategies for the Bioeconomy.” With Dr. Ron Sims serving as the principal investigator and Dr. Charles Miller as Co-PI, collaborators include the Pacific Northwest National Laboratory, Central Valley Water Reclamation Facility, which is the largest municipal facility in the State of Utah, WesTech-Inc., the international environmental engineering firm, and ALGIX, Inc., a clean technology company.

The strategy of the project is to protect against the occurrence of algae blooms in lakes and reservoirs by engineering algae blooms within a water reclamation facility so that the algae and associated nutrients used for growth are not released to the environment. Rather the algae biomass is utilized as feedstock for conversion into bioproducts, including biofuels and bioproducts including bio-oil, bioplastic materials, and fertilizer using a variety of industry processes.

The project will employ the rotating algae biofilm reactor (RABR) developed by SWBEC in partnership with WesTech-Inc. that is an outdoor technology for treating municipal wastewater through cultivation of algae as a biofilm that is rotated to alternately expose the biofilm to the wastewater and to the atmosphere. The RABR utilizes the nutrients phosphorus and nitrogen in the water, carbon dioxide that is supplied by microbial processes in the water and that occurs in the atmosphere, and sunlight to cultivate microalgae biomass. This biomass can be utilized in downstream processing into biofuel and bioproducts. The RABR operates as two unit processes in one by both cultivating and separating biomass from the wastewater, has good gas exchange (no O2 toxicity), can operate in turbid water, and is not limited to shallow depths of water as with alternative technologies.

Ron Sims said that “The RABR technology and the bioproducts identified have potential to help accomplish DOE’s long-term vision of expanding the domestic resource potential of the bioeconomy through creation of a low cost supply of algae biomass utilizing existing infrastructure at water reclamation facilities nationwide that are motivated by regulation to meet new standards for water quality utilizing low-cost, recycle, and carbon-capture approaches. What has been considered waste is today and for the future really a resource viewed from a different perspective that can enhance the bioeconomy while protecting the environment.”

The project has a 3-year schedule and will support undergraduate and graduate students in the BE Department, as well as engineers and staff at the collaborating institutions.

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