

# Near-Term Algal Biorefineries for Co-Production of Clean Water, Bioproducts, and Biofuels

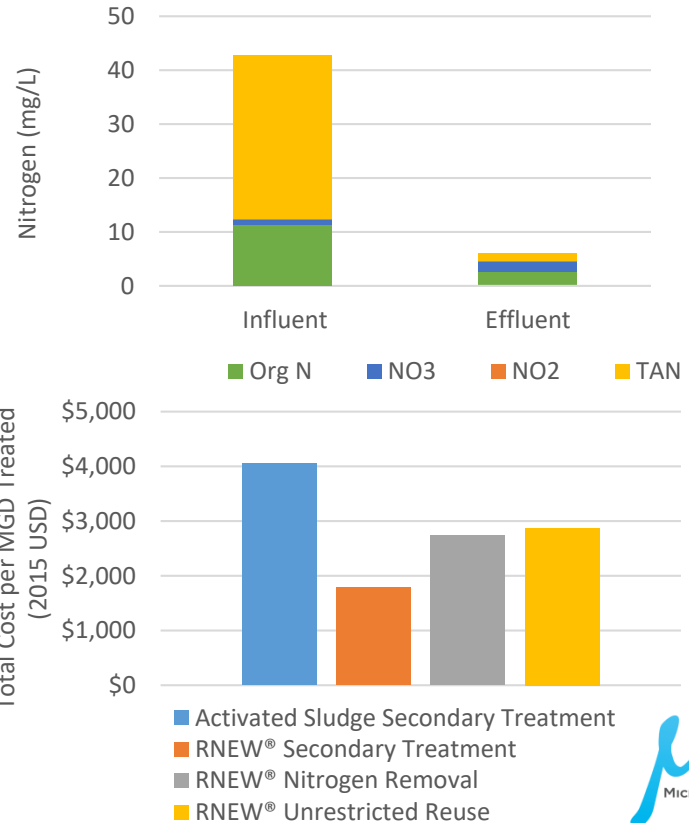
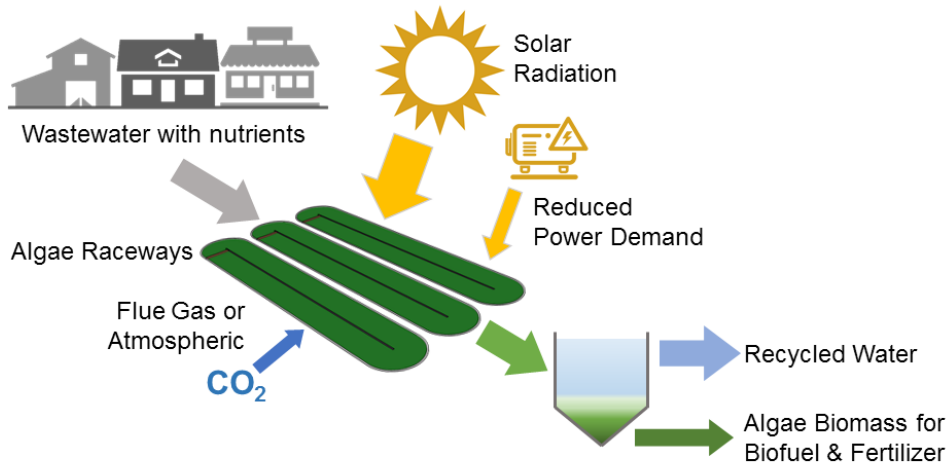
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# Breakthroughs Achieved but More Needed.

## Achieved

- Algae harvesting – Low effluent TSS



Raceway Influent & Effluent. Effluent after 15 minutes of settling.

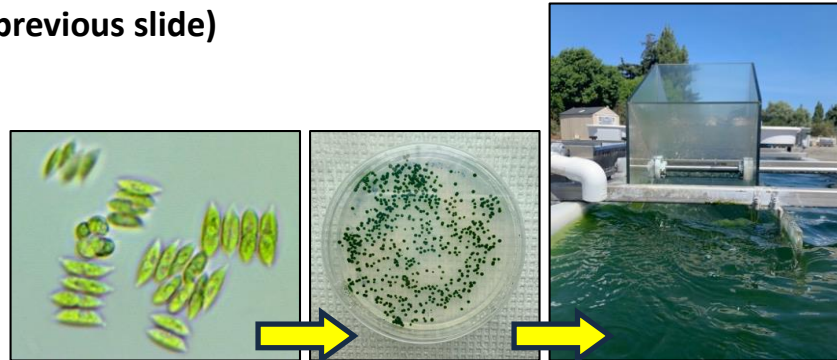
## Needed

- Year-round P removal
- Develop high-value strains
- Membrane filtration for re-use

- Year-round N removal (previous slide)

- Strain improvement via selective enrichment

31% increased productivity vs. wild type



Wild Type

Improved

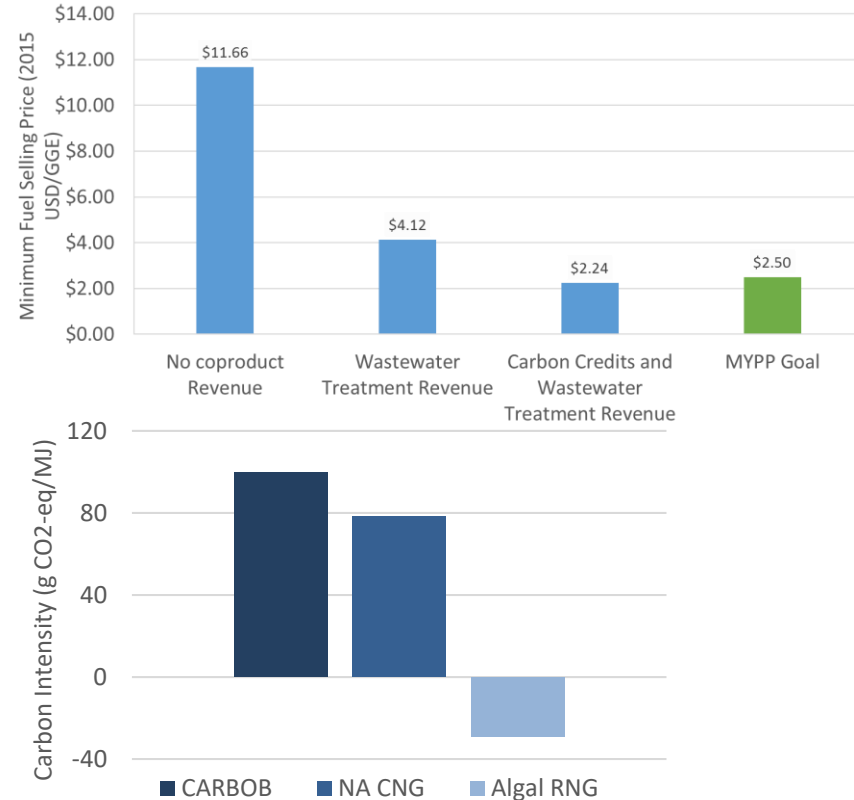
Outdoor Testing

# Billions will be spent on WWT infrastructure – an opportunity to install sustainable algae raceway treatment.

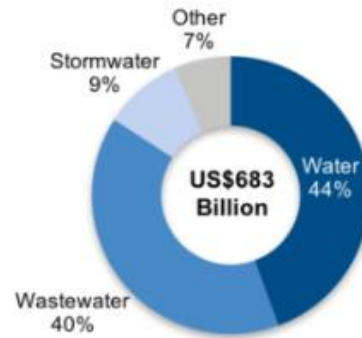
Approximately 8,000 wastewater treatment systems in the U.S. (50% of all systems) that use ponds/lagoons in the treatment process

Matthew E. Verbyla, University of South Florida

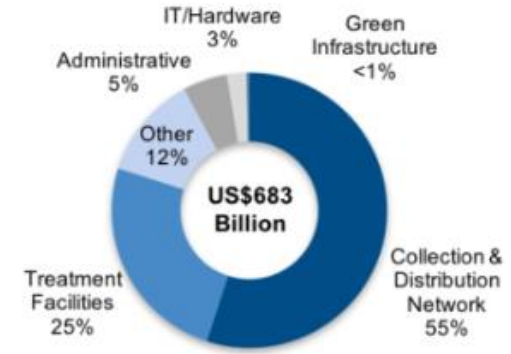
(Data used to create this figure comes from the 2000 and 2008 U.S. Environmental Protection Agency's Clean



Forecasted CAPEX, 2018-2027



Total CAPEX Spend by Segment, 2018-2027



2018. U.S. Municipal Water Infrastructure: Utility Strategies & CAPEX Forecasts, 2018-2027. Bluefield Research.



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