GWT GROSS-WEN TECHNOLOGIES

Utilizing the Revolving Algal Biofilm (RAB) System to Meet Nutrient Reduction and Sustainability Goals

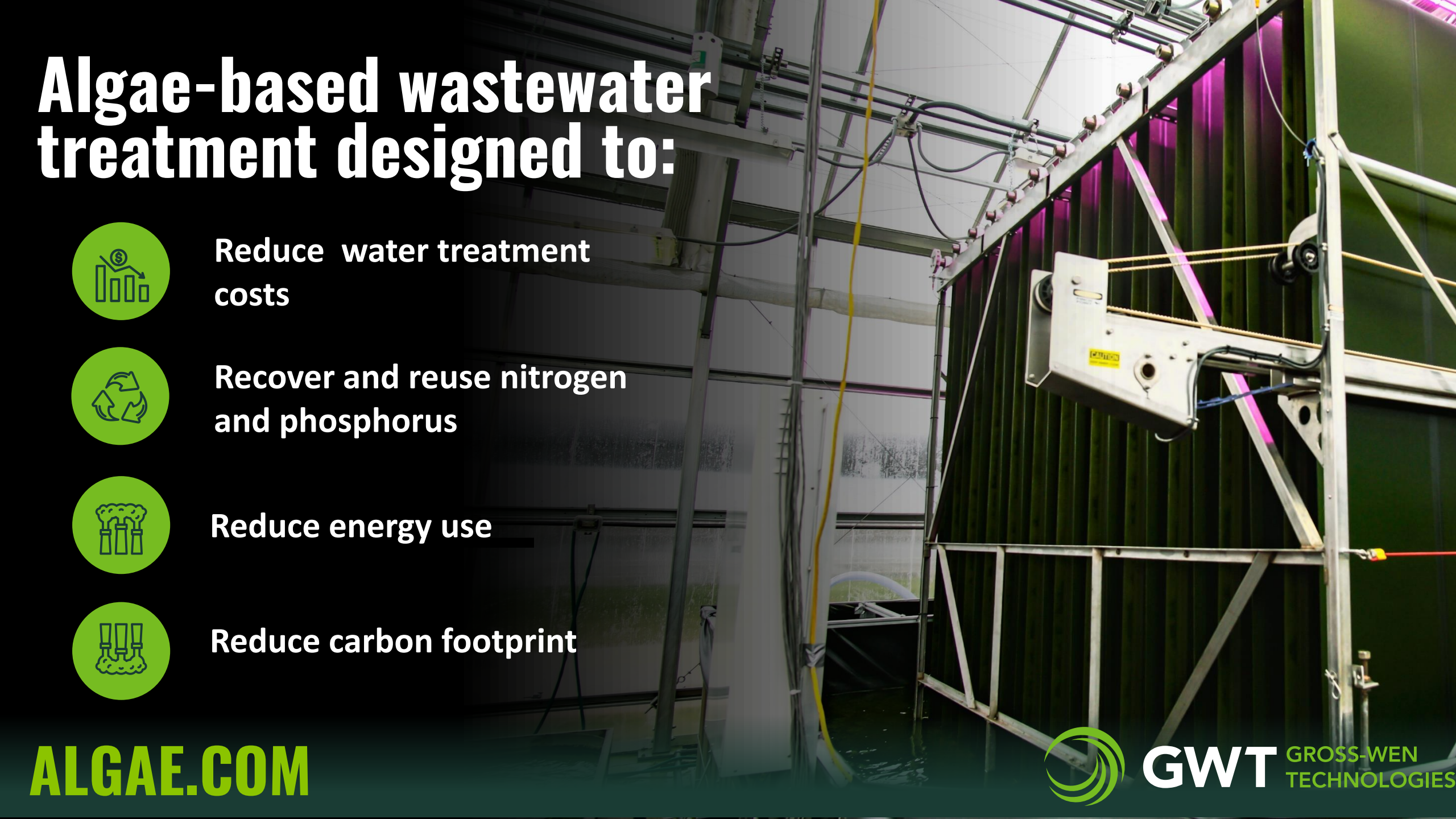
ALGAE.COM

Martin Gross PhD
President, Gross-Wen Technologies
martin@gross-wen.com

WE DON'T JUST THINK GREEN, WE GROW IT ™

Algae-based wastewater treatment designed to:

- Reduce water treatment costs
- Recover and reuse nitrogen and phosphorus
- Reduce energy use
- Reduce carbon footprint



ALGAE.COM

GWT GROSS-WEN TECHNOLOGIES

GWT Background

11
Issued Patents

2012
RAB Invented at Iowa State University

$19 million
In equity/grant funding to date

23 Employees
World leading algae wastewater team

>40
Projects at WWTP's

10,000+
Treatment data points

$14 million
in commercial projects under construction

$27 million
Projects in design

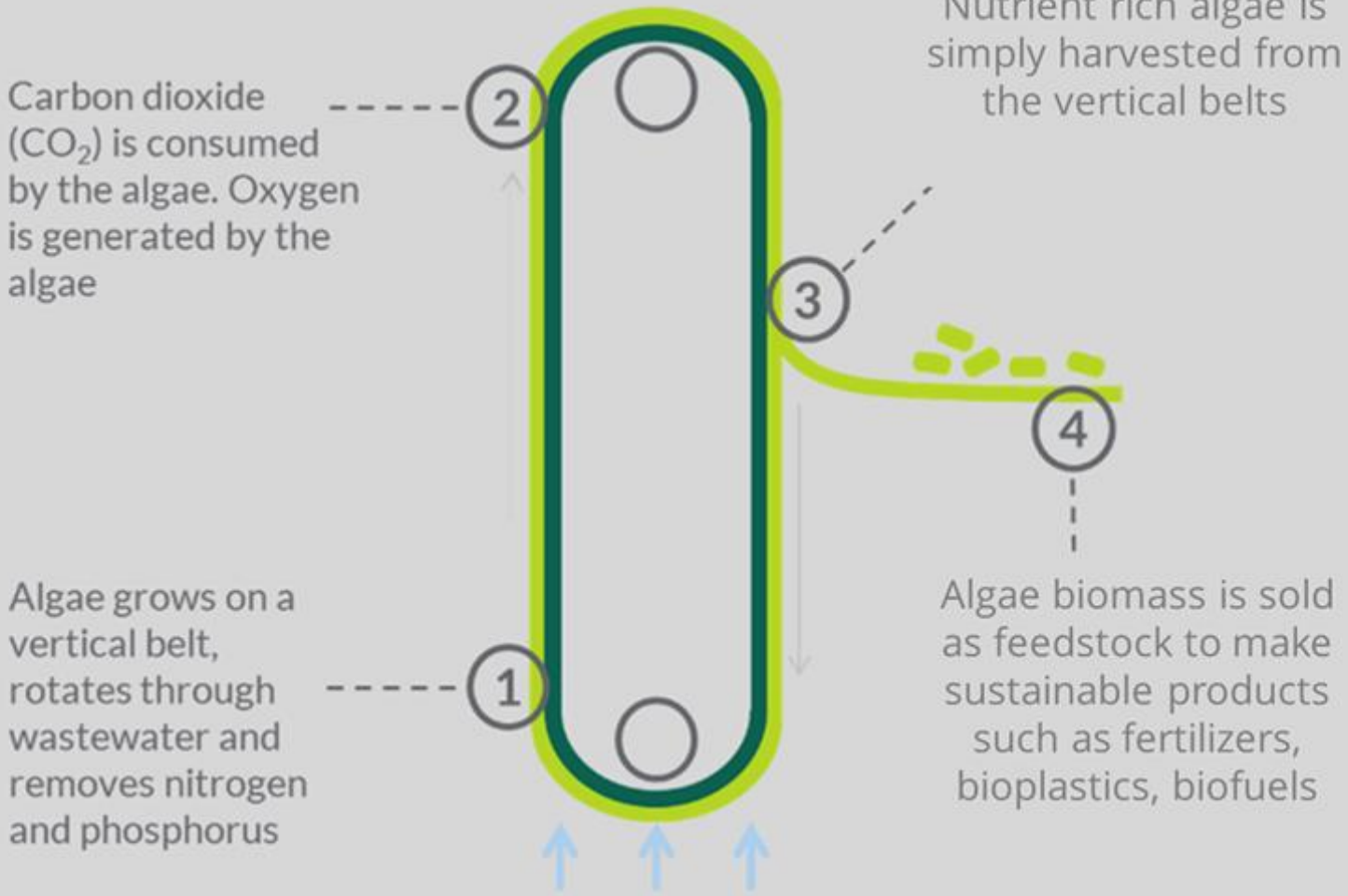
GWT GROSS-WEN TECHNOLOGIES

REVOLVING ALGAE BIOFILM SYSTEM

#1 Algae Treatment Tech

- GWT owns the Revolving Algal Biofilm (RAB®) 11 issued patents
- 12 years of development and knowhow
- The RAB® system has been identified as the **leading algae technology** by leading organizations and individuals at the US Department of Energy, Chevron, Xylem, Veolia and others

RAB



GWT GROSS-WEN TECHNOLOGIES

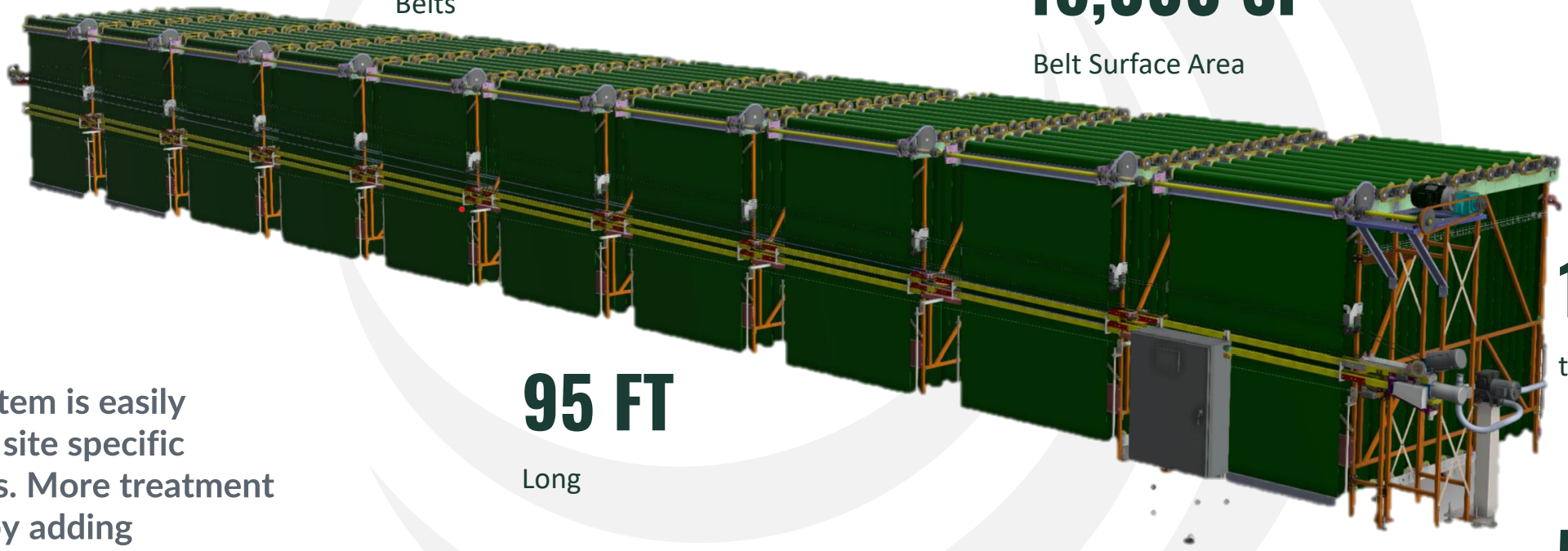

RAB

The RAB is Modular

10
Belts

16,000 SF
Belt Surface Area

13 FT
Wide



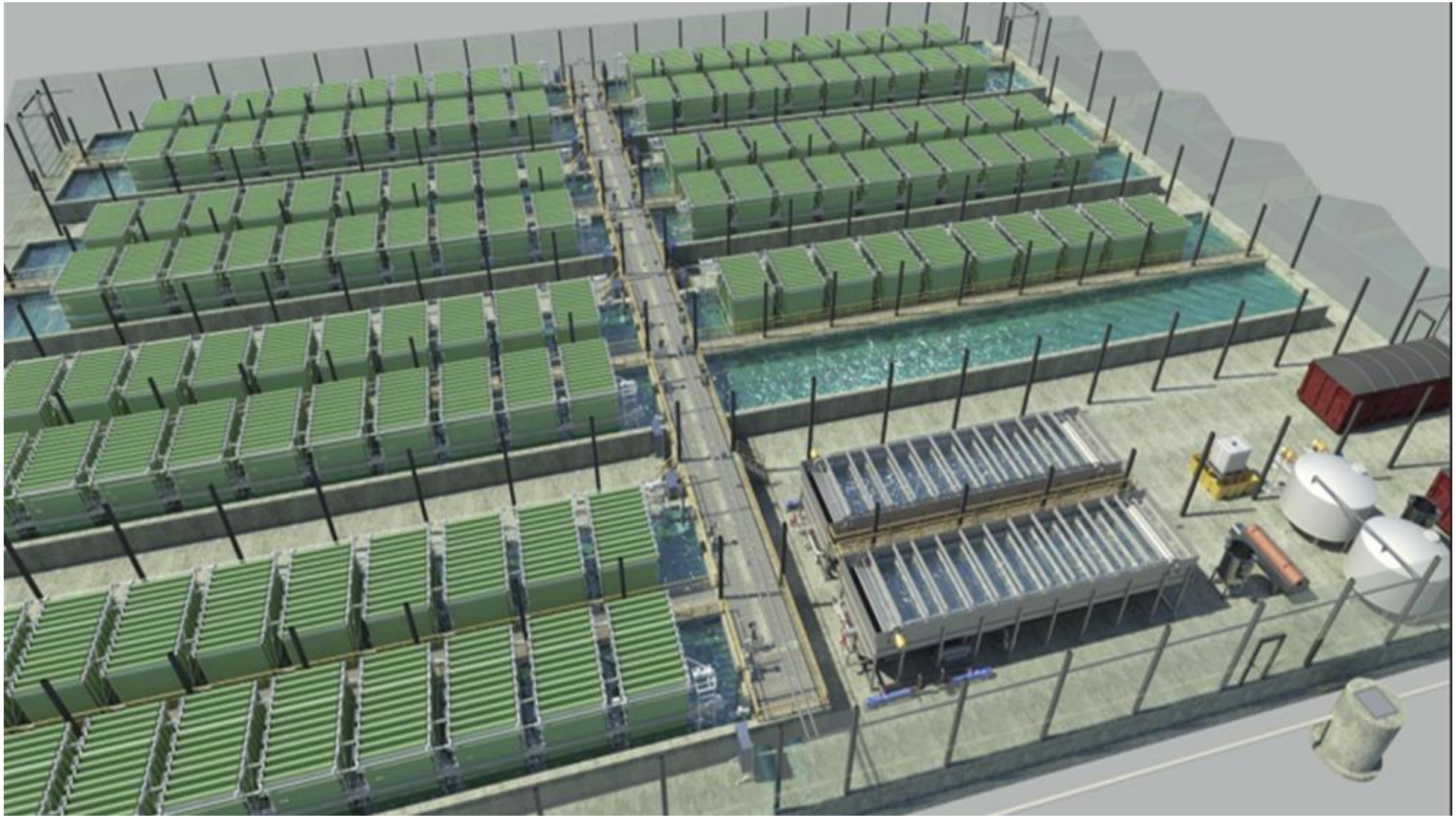
10 FT
tall

95 FT
Long

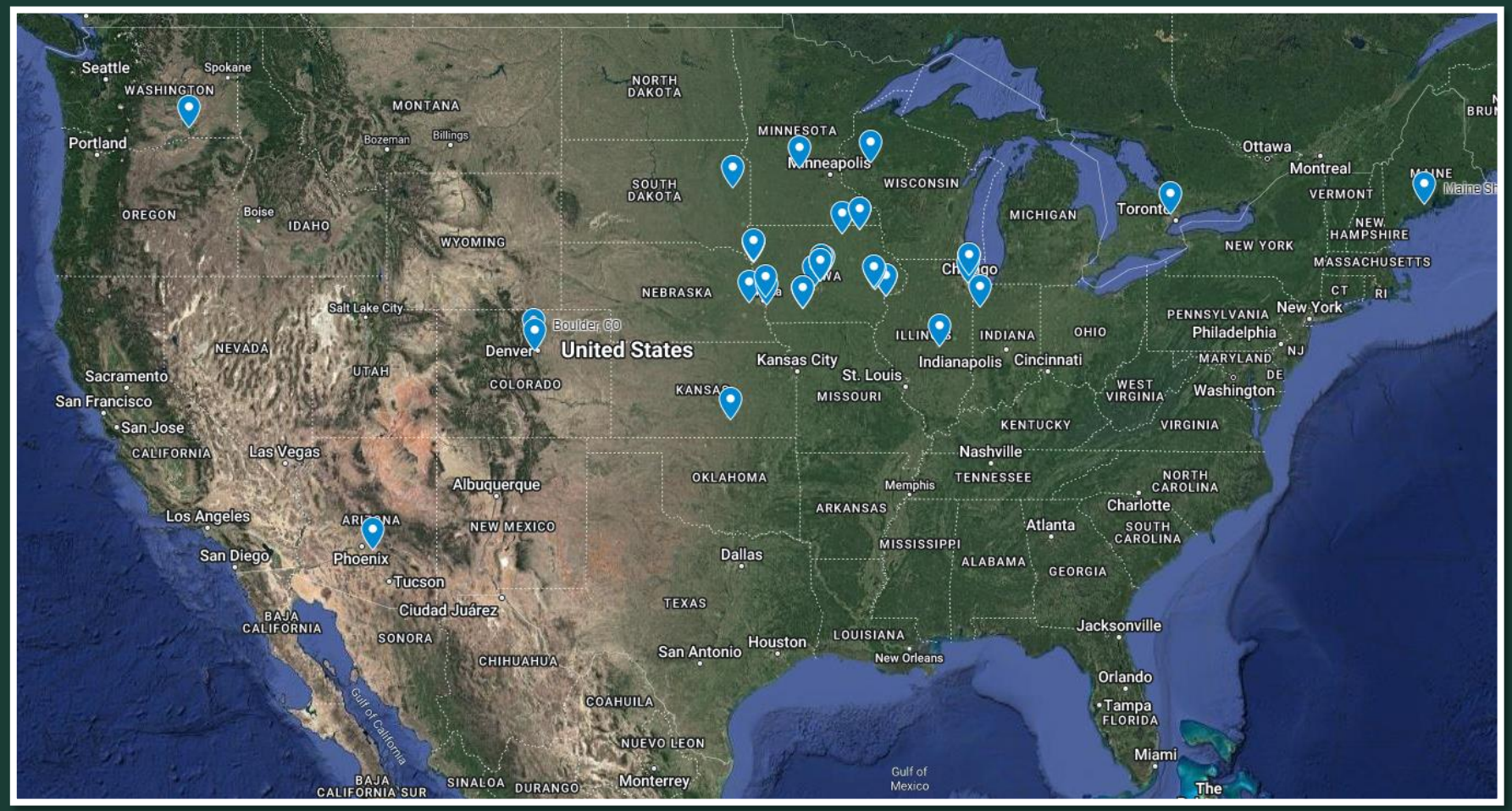
5 HP
Drive motor

The RAB system is easily modified for site specific requirements. More treatment is achieved by adding additional modules.

The RAB is Modular

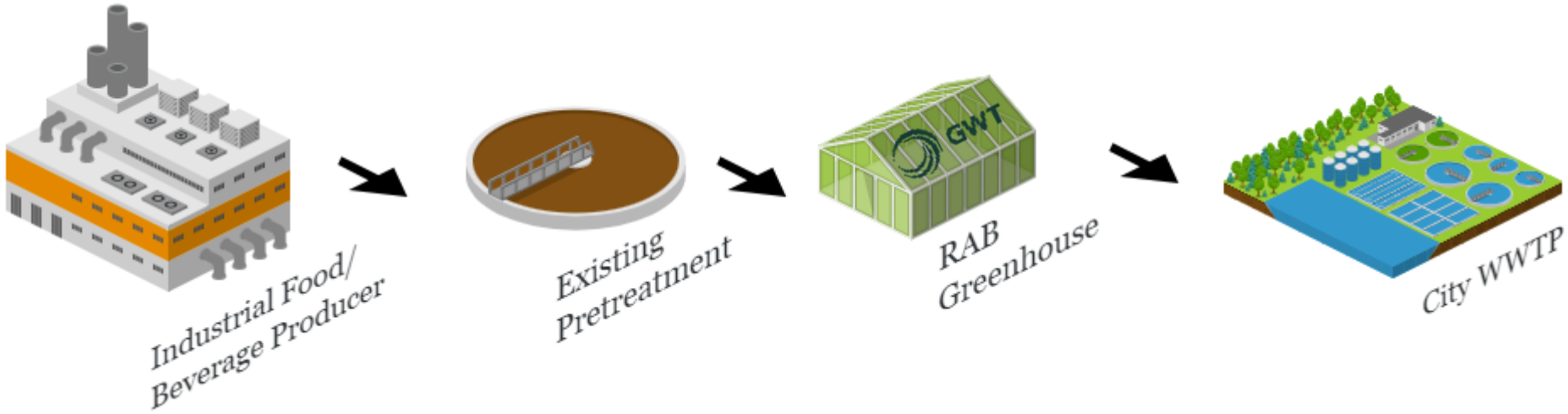


Where has the RAB been?

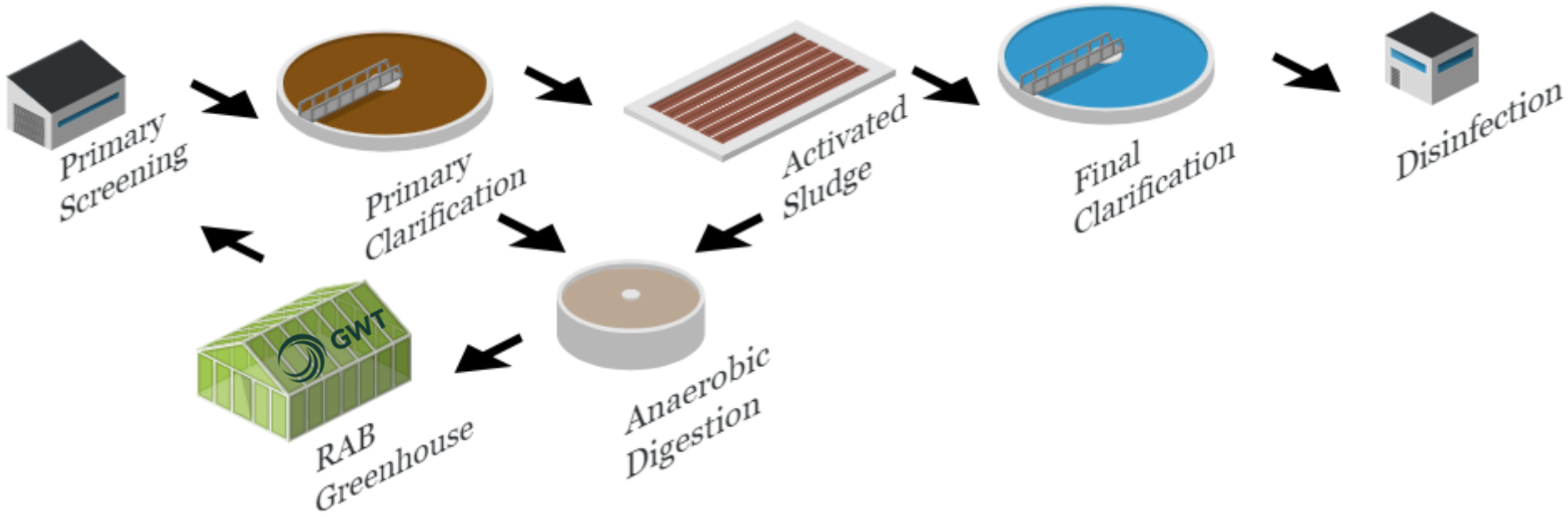


40 Projects over the last 10+ years

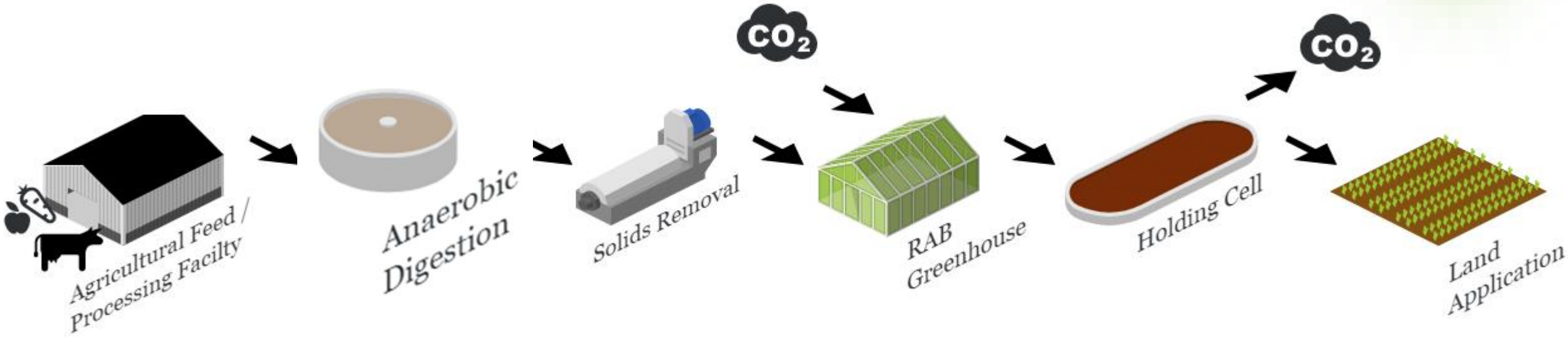
The top application for the RAB is Industrial Digestors treating Food and Beverage Wastewater



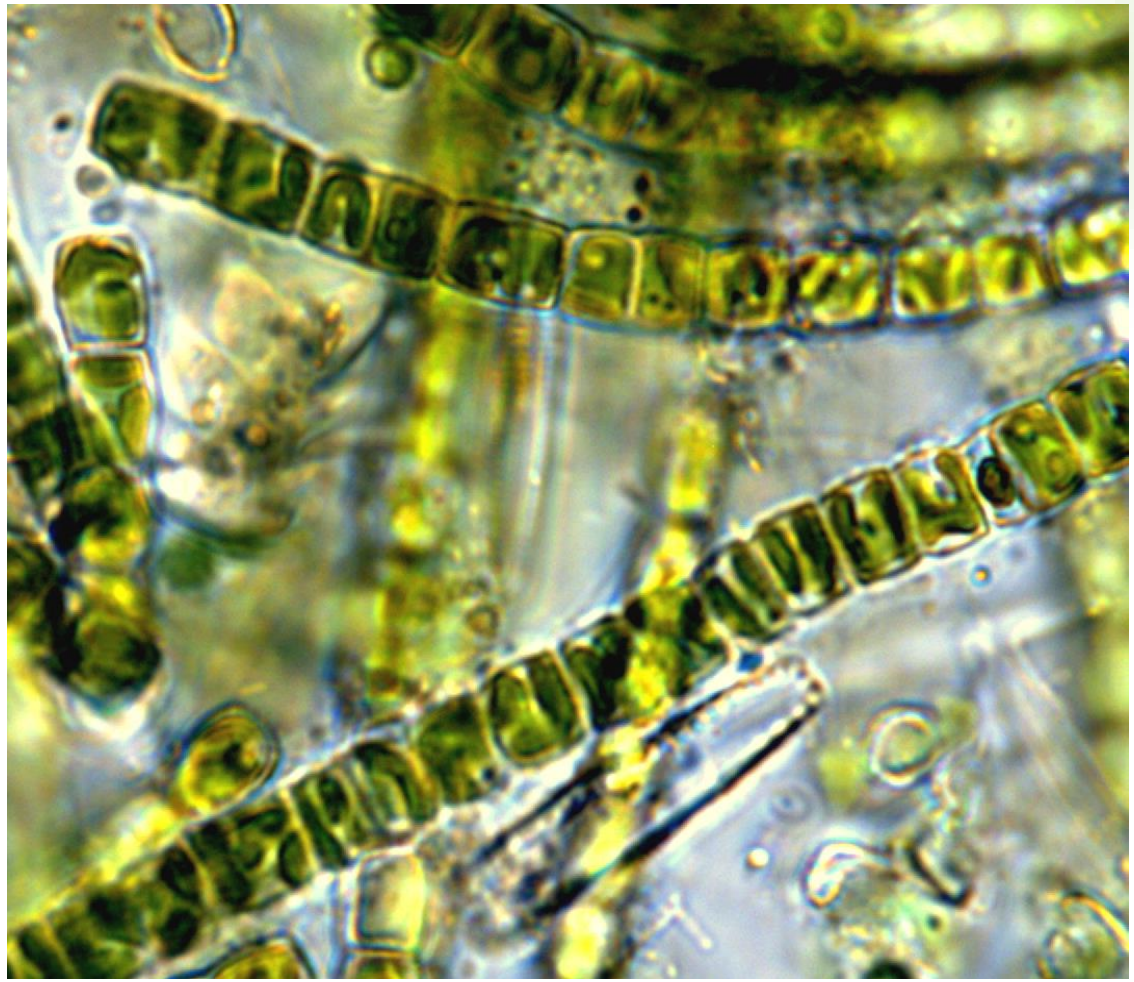
Municipal Anaerobic Digestor Projects



Agricultural Waste
Digestor Projects



Advantages of algae treatment at digestor projects?



Nitrogen and Phosphorus Treatment:

Simple and Low-Cost Operation:

Potentially Reduce CI Score of Project:

Offset GHG Emissions:

Profit from algae biomass

End Use for Algae Biomass:

Algae represents a new revenue stream for ADM
No cost of disposal after treatment (chemical and bacterial processes).

CURRENT MARKETS

Turf Grass Fertilizer:

Estimated offtake value:

$0.25/kg

Bioplastic feedstock:

Estimated offtake value:

$0.50-1.10/kg

Soil Amendment:

Estimated offtake value:

$5-10/kg

FUTURE MARKET

GWT

Global Oil Major

Sustainable Aviation Fuels:

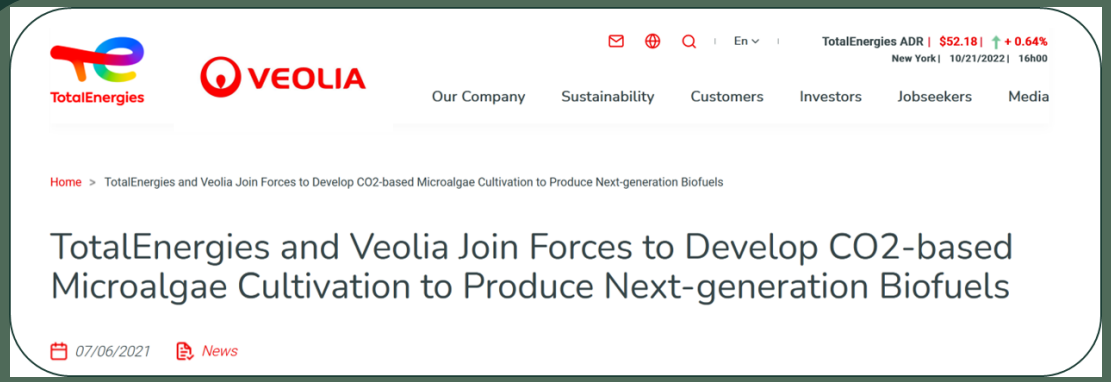
Estimated offtake value:

TBD

Algae to Sustainable Aviation Fuels

Feedstock	Potential (million dry tons/year)
Biomass based on 2021 ethanol and biodiesel production capacity [a]	
Seed oils	9
Corn grain	148
Biomass based on *2016 Billion-Ton Report* [b]	
Forestry resources and woody wastes	133
Woody energy crops	71
MSW	55
Agricultural residues	176
Herbaceous energy crops	340
Algae input based on 2017 *Algae Harmonization Study* [c]	
Algae	235
Biomass based on 2017 *Biofuels and Bioproducts from Wet and Gaseous Wastes* [d]	
Fats, oils, and greases (FOG)	7
Wet wastes (animal waste, food waste, wastewater solids)	78
TOTAL	**1,252**

Algae represents the crop with the highest potential for SAF production



Global leaders in energy, water, and aviation are in investing in algae to SAF. GWT's business model and technology is at the center of it

Pasco Nutrient and Carbon Recovery Facility (13 Modules)

Project Example:Pasco Washington Project:

Treatment of food waste digestate

- 13 RAB Modules
- 4.0 MGD Wastewater
- 2,250 lb/day N removed
- 140 M.T. Algae Produced / year
- 5,300 M.T. CO_2e Offset / year
- 1.1 Acres of Land Required

Sustainability

Wastewater treatment plants contribute 5% of total GHG emissions globally

GWT GROSS-WEN TECHNOLOGIES

Utilizing the Revolving Algal Biofilm (RAB) System to Meet Nutrient Reduction and Sustainability Goals

ALGAE.COM

Martin Gross PhD
President, Gross-Wen Technologies
martin@gross-wen.com

WE DON'T JUST THINK GREEN, WE GROW IT ™