“There are no passengers on spaceship Earth. We are all crew.”
AquaGen Infrastructure Systems

Integrated sustainable solutions

Algae based planetary restoration, one village at a time

www.aquagen-isi.ws
Dennis-Yarmouth Regional School Campus

EcoDistrict STEM Institute
Vacuum based liquid conveyance technology is utilized throughout the installation for environmental sensitivity and process efficiency.

Teaching the students through experiential learning is a key facet of our project vision to prepare them for tomorrow. We’ve got to train the crew.
Attention Humans!

We are here to help

We know how to save the planet,
But we need your help!
TURNING WASTEWATER INFRASTRUCTURE INTO RESOURCE RECOVERY AND RENEWABLE ENERGY PLATFORMS

Sustainable infrastructure
Alternative water and energy resources
Alternative fuels feedstock development
Green Revolution in wastewater transition to the Utility of the Future, Resource Reclamation for resiliency and sustainability

Algae is viewed as a pathway to sustainability, resiliency and highly circular local economic dynamic.
PROBLEM:

• Waste water treatment is expensive, required by law and a pure cost center
• Increasingly stringent regulations are making compliance more difficult and more expensive
• By 2050 half of the worlds population will be experiencing water shortages
• Global Warming is happening, GHG reductions are needed

SOLUTION:

• New proprietary algae-based technology allows simpler process, less mechanical equipment, less cost and much less energy use
• Substantial collateral benefit in the production of renewable energy and valuable by-products while consuming carbon dioxide and producing oxygen
• 70 to 85 percent of the worlds oxygen supply comes from algae
ClearVue Solar Greenhouses
Hydroponics, Vertical Farming

Convert your facility from a wastewater treatment plant to a renewable energy platform.

Algae based photosynthesis is our main technology

www.aquagen.isi.ws
VALUE PROPOSITION:
CHEAPER, GREENER, BETTER!

• AQUAGEN is cheaper, greener, and better than any other waste water technology. Turns waste water into a renewable energy resource. We are an agricultural based technology.

• CUSTOMERS: 20% less in construction cost and 60% less in operating cost with superior water treatment quality

• CONSUMERS: Cleaner, greener, better solution for more sustainable communities, with lower utility costs, strong local circular product economics
CO₂ + H₂CO₃ + HCO₃ + CO₃

Water

Nitrogen
Phosphorus
Potassium
Trace metals

O₂
High Dissolved Oxygen has many benefits
Increased crop yield and health
Better for the environment if discharged
Creates added value in local produce
Eliminates the need for mechanical aeration
May actually be self disinfecting

We are witnessing a 100 year evolution in infrastructure and the convergence of utility functions into holistically based community sustainable resource platforms.
Aerobic conditions are an important part of almost all conventional treatment systems. The method for providing oxygen for this process is typically mechanical aeration that requires expensive machinery that consumes vast amounts of energy blowing bubbles of air through the wastewater. Only 21% of this is oxygen. Our atmosphere is composed mostly of nitrogen. 4% of our national energy budget is spent blowing bubbles through wastewater.

We utilize algae photosynthesis which consumes carbon dioxide and generates pure oxygen in solution in the water for our biological oxygen needs.
Henry’s Law
The effect of partial pressure on solubility of gases

At pressure of few atmosphere or less, solubility of gas solute follows Henry Law which states that the amount of solute gas dissolved in solution is directly proportional to the amount of pressure above the solution.

\[ c = kP \]

\( c = \) solubility of the gas (M)
\( k = \) Henry’s Law Constant
\( P = \) partial pressure of gas

Henry’s Law Constants (25°C), \( k \)

- \( \text{N}_2 \) \( 8.42 \times 10^{-7} \) M/mmHg
- \( \text{O}_2 \) \( 1.66 \times 10^{-6} \) M/mmHg
- \( \text{CO}_2 \) \( 4.48 \times 10^{-5} \) M/mmHg

Solubility of Gases vs. Temperature

C. Ophardt, c. 2003
The Energy Trilemma

- Energy Security
  - Reliable infrastructure
  - Providers able to meet demand
  - Management of supply from a variety of sources

- Energy Sustainability
  - Energy efficiencies in demand and supply
  - Energy supply from low-carbon and renewable sources

- Energy Affordability
  - Population can access and afford energy
  - Growth can be blocked by poor energy access or high prices

The three variables cannot be thought of independently.
We are just taking a page from the planet earth operating manual on algae and atmospheric gas balance
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