

PASTEURIZATION

TECHNOLOGY GROUP

Wastewater Disinfection with Renewable Energy Generation

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Company Overview - PTG

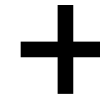


- Leader in heat-based disinfection of wastewater with renewable energy generation
- Eight years in development
- Patented Technology – 22 Countries
- Proprietary Software Control
- Multiple pilot projects over seven years
- Technology vetted by 3rd party consulting engineers
- Independent analysis reveals low cost technology

Technology – “2-for-1”



- Wastewater disinfection & renewable energy



- Waste heat from turbine or engine pasteurizes wastewater



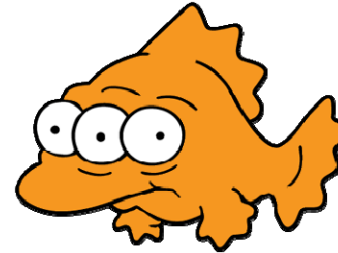
- Eco Friendly



Technology – “2-for-1”



- Robust and non-toxic technology



- Chemical Free



- **Title 22 certification for Reuse/Recycle – Unrestricted Use**



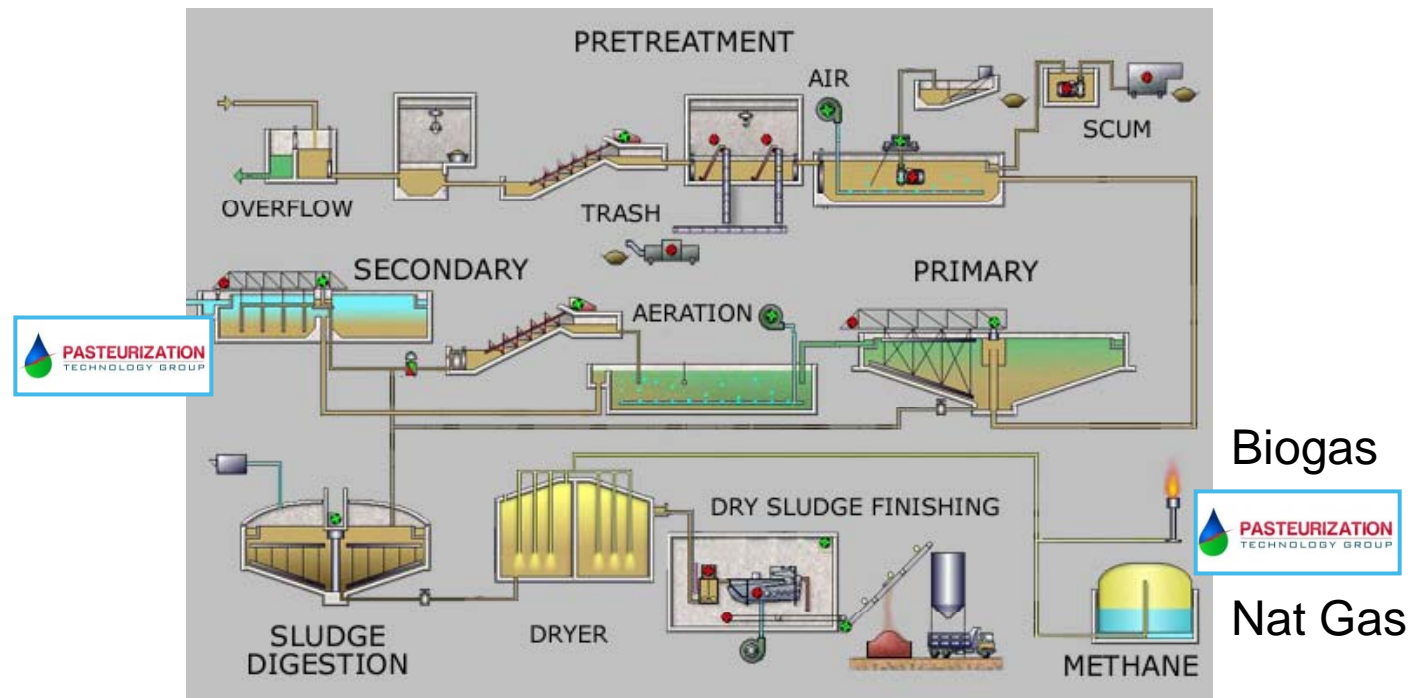
3rd Party Validated Technology



- **Pilot Plant work at Los Angeles County Sanitation District, *Carson Plant***
2006-2007 -Initial testing of wastewater.
- **Pilot Plant testing at Santa Rosa, CA - *Laguna Plant***
2007-2008 -**Title 22 Certification.**
- **500,000 gallon per day Pilot Plant testing at a So. California Wastewater Treatment Plant**
2011-2012 – Demonstration system to design for 10-20MGD system.
- **EPA Recognizes PTG as Disinfection Technology**
2012 - *EPA 2012 Water Reuse Guidelines*
- **First installation of combined Turbine/disinfection system for a No. California Wastewater Treatment Plant**
2013 -Capacity of 500,000 gallons per day and 30Kw of electricity generation.

WWTP Process

- Disinfection for:
 - Primary
 - Secondary
 - Tertiary

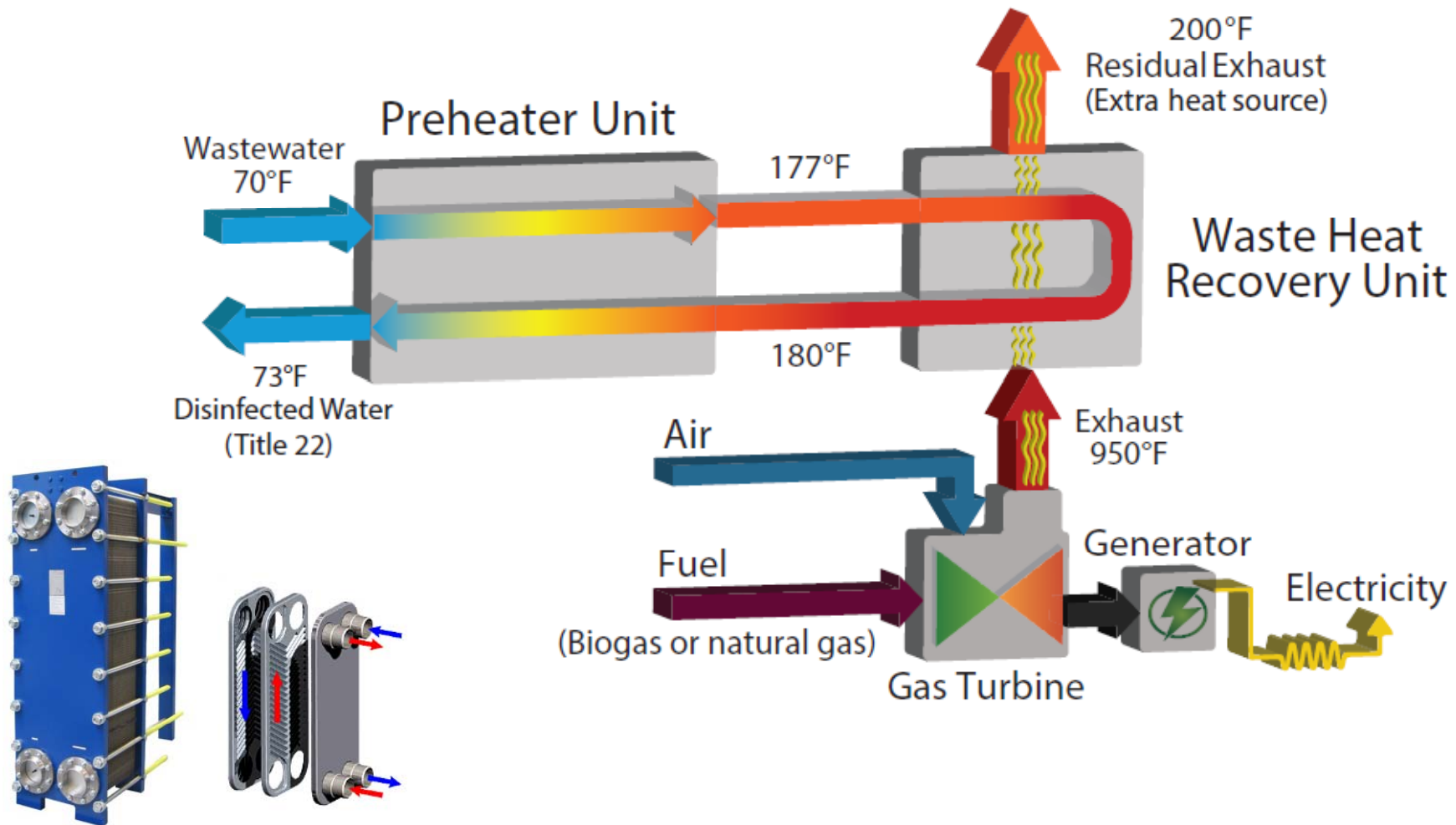


Patented Technology



- PTG's patented systems utilize proprietary software & controls

PTG Integrated System



PTG Fundamentals



Btu/°F to heat water 1 Btu

Water, lbs/gallon	8.3
Btu/gallon	8.3
Entering Water Temp	70°F
Exit Water Temp	180°F
Temp Rise	110°F
Amount of Water Treated	1,000,000 gallons
Energy Required per °F	8,300,000 Btu
Total Energy Requirement	913,000,000 Btu's



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With **PRE-HEATER**, the final temperature rise is only 3°F

|                          |                   |
|--------------------------|-------------------|
| Temp Rise                | 3°F               |
| Amount of Water Treated  | 1,000,000 gallons |
| Energy Required/°F       | 8,300,000 Btu     |
| Total Energy Requirement | 24,900,000 Btu's  |

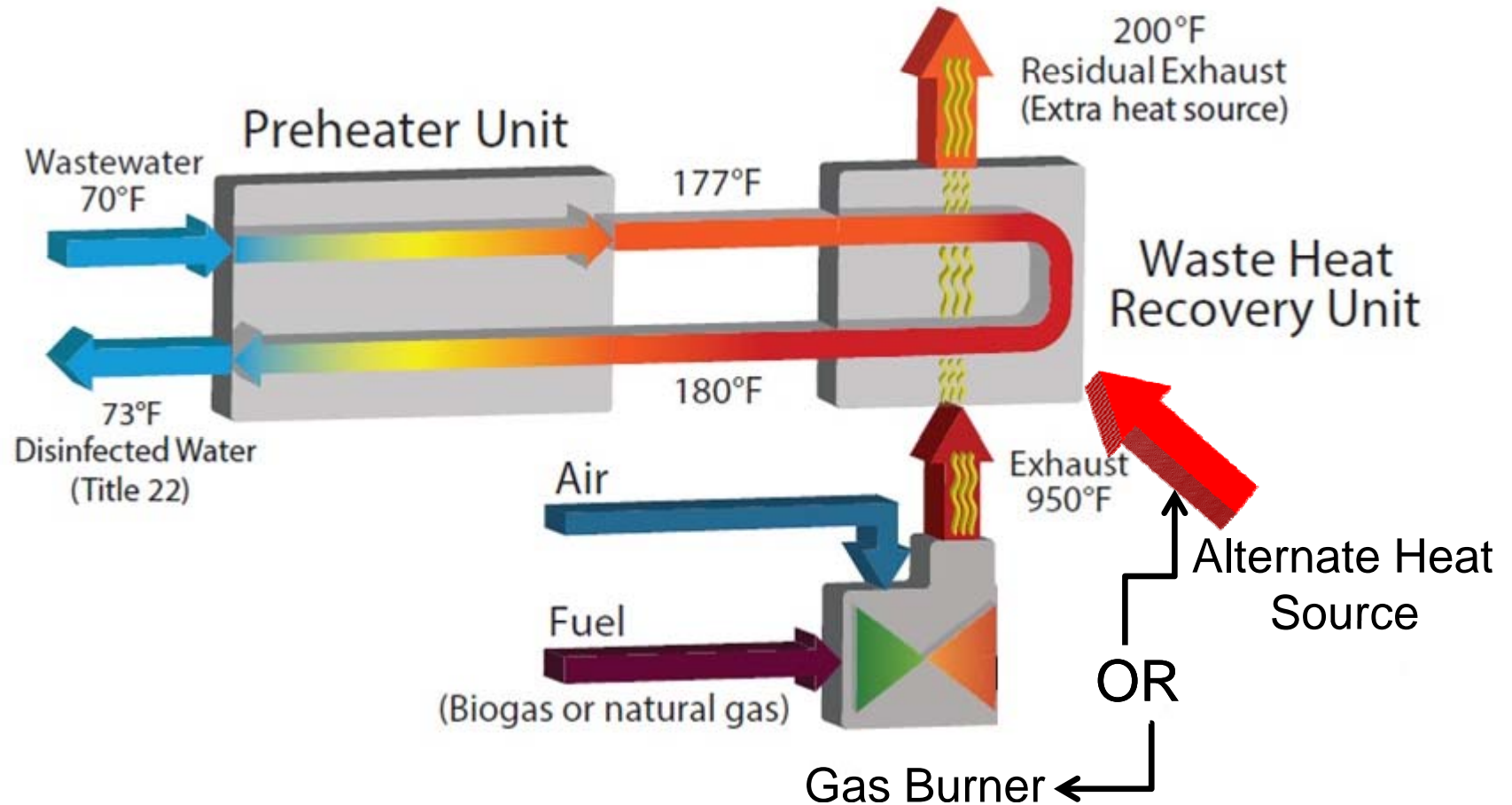
Difference in Energy Consumption  
Energy Use Reduction Factor

888,100,000 Btu's saved  
**36.6 Times less energy**

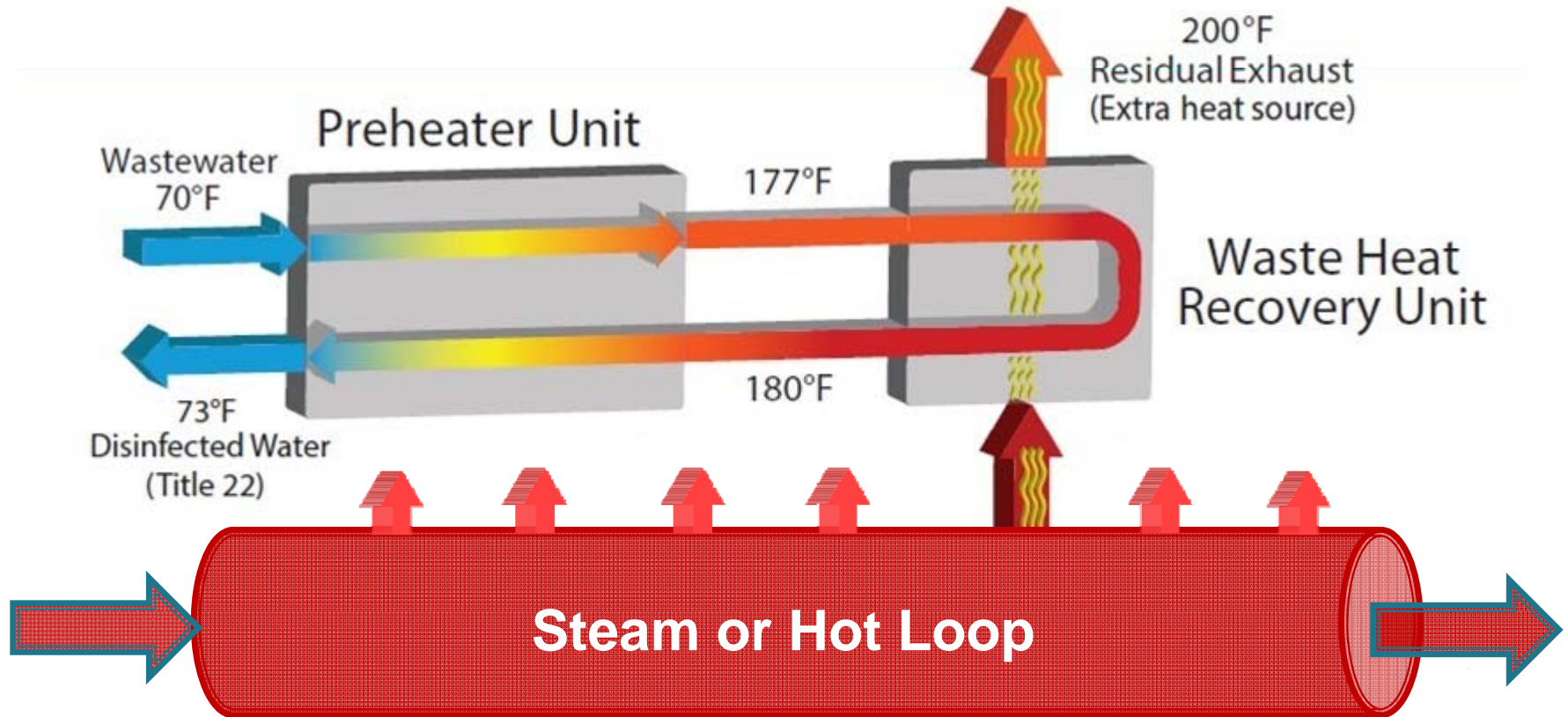




## PTG Integrated System



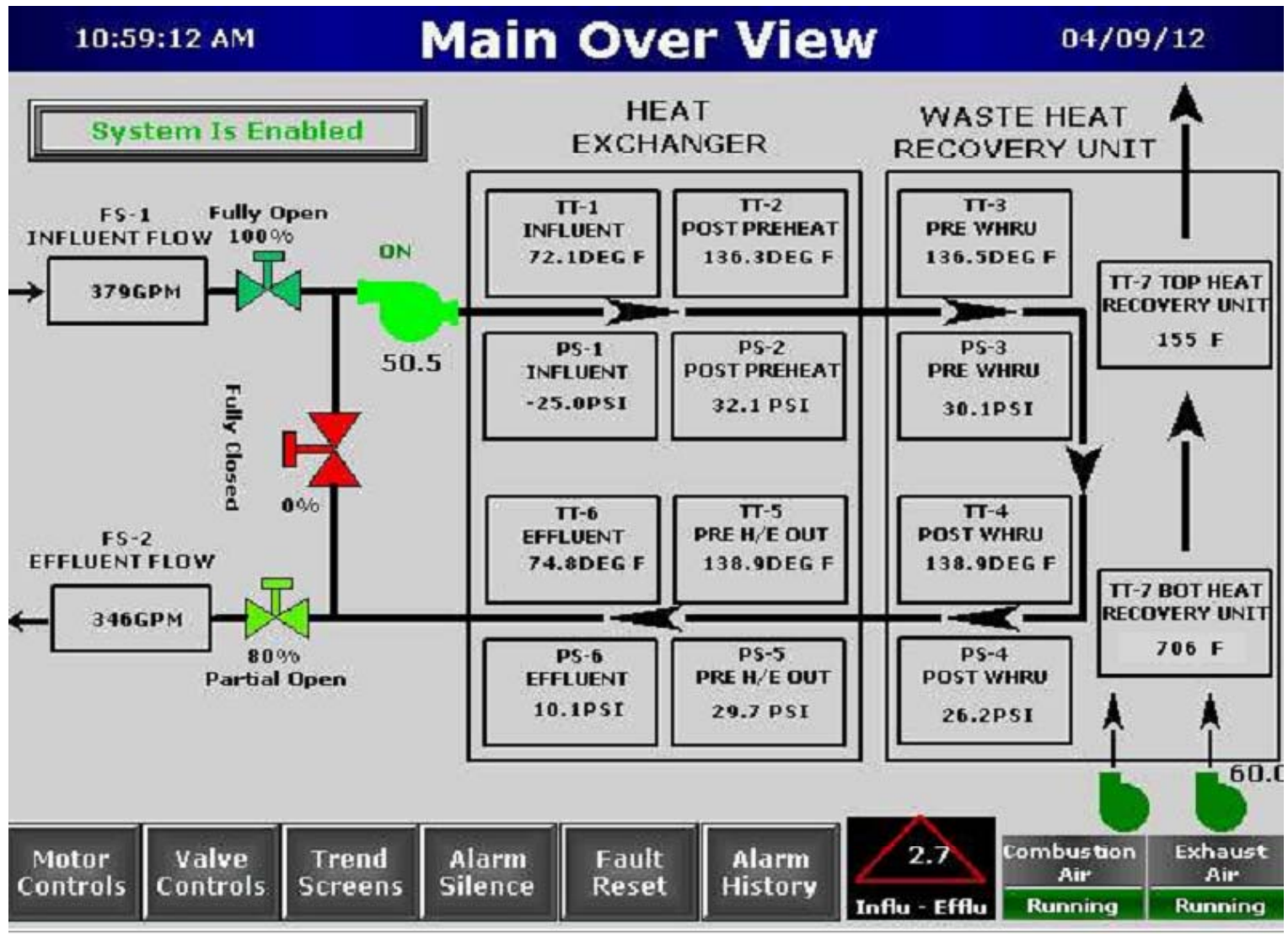
## PTG Integrated System



# PTG X-500



# Process Data





# Heat Source & kW Generation



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Turbine



Micro-Turbine



Reciprocating



Duct Burner



Hot Loop



Incinerator Heat

# Energy/Fuel Options



Digester Gas



Nat Gas



Flare Gas



Landfill Gas



LNG



Diesel Fuel

# Product Review

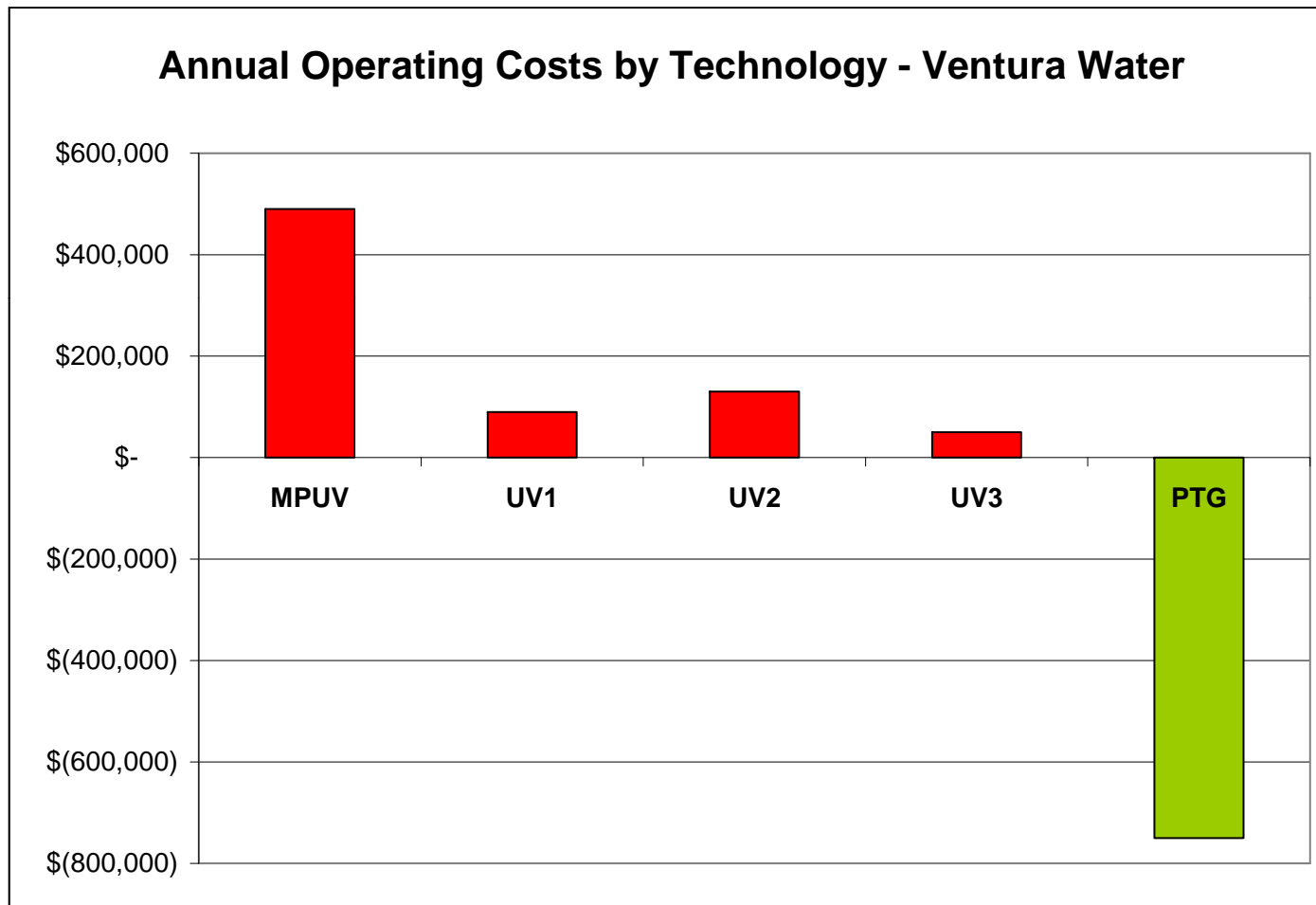
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- Capacity
  - 100,000 gallons / day to – 100 MGD and larger.
- Multiple configurations available
- Multiple energy/fuel options
- Industry specific solutions
- Custom engineered and designed for each specific site.
- Non consumptive technology
- **Provides a Return on Investment (ROI)**



# PTG – O & M Savings



# Markets Served



- Municipalities
- Industrial markets:
  - Food & beverage
  - Beer
  - Agriculture
  - Meat & Dairy
  - Oil & Gas



# Potential Clients

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- Plants looking to disinfect wastewater
- Plants flaring digester gas
- Plants with engines that are not fully commissioned
- Plants with old UV systems (high energy and O&M costs)
- Plants replacing toxic chlorine disinfection
- Industrial clients with high water usage
- Industrial facilities with high bio-waste (breweries/dairies/meat/poultry/agriculture)
- Plants seeking to reduce electrical costs or to get off “grid”
- Wastewater plants proximate to landfill or incineration facilities

# Summary

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- “2-for-1” solution: Wastewater disinfection & renewable energy
- Cost-effective solution
- Patented & proven technology
- California Title 22 certification for water reuse/recycle – Unrestricted use
- Multiple applications: wastewater treatment plants, food & beverage, agriculture, oil & gas
- Various configurations available – Reciprocating, Micro-Turbine, Turbine , Incinerator heat, hot loop and Duct Burner
- Multiple energy options available -Biogas, Landfill gas, LNG, Natural gas and Diesel

# Questions?

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