

# STELLAR J CORPORATION

General Contractor

EPC Contractor

Waste to Energy Developer

*An Employee Owned company since 1988*



# GASIFICATION OFFERS A "SILVER BULLET" SOLUTION FOR SOLID WASTE DISPOSAL

1. Meets Air Quality Standards.
2. Uses food waste for direct conversion to heat thereby de-risking contamination of feedstocks that interfere with the production of methane.
3. Near perfect thermal destruction process allows processing of materials as far ranging as green wastes, ag wastes, biosolids and even coal to be processed cleanly.



# Scoreboard

Projects  
Completed = 100%

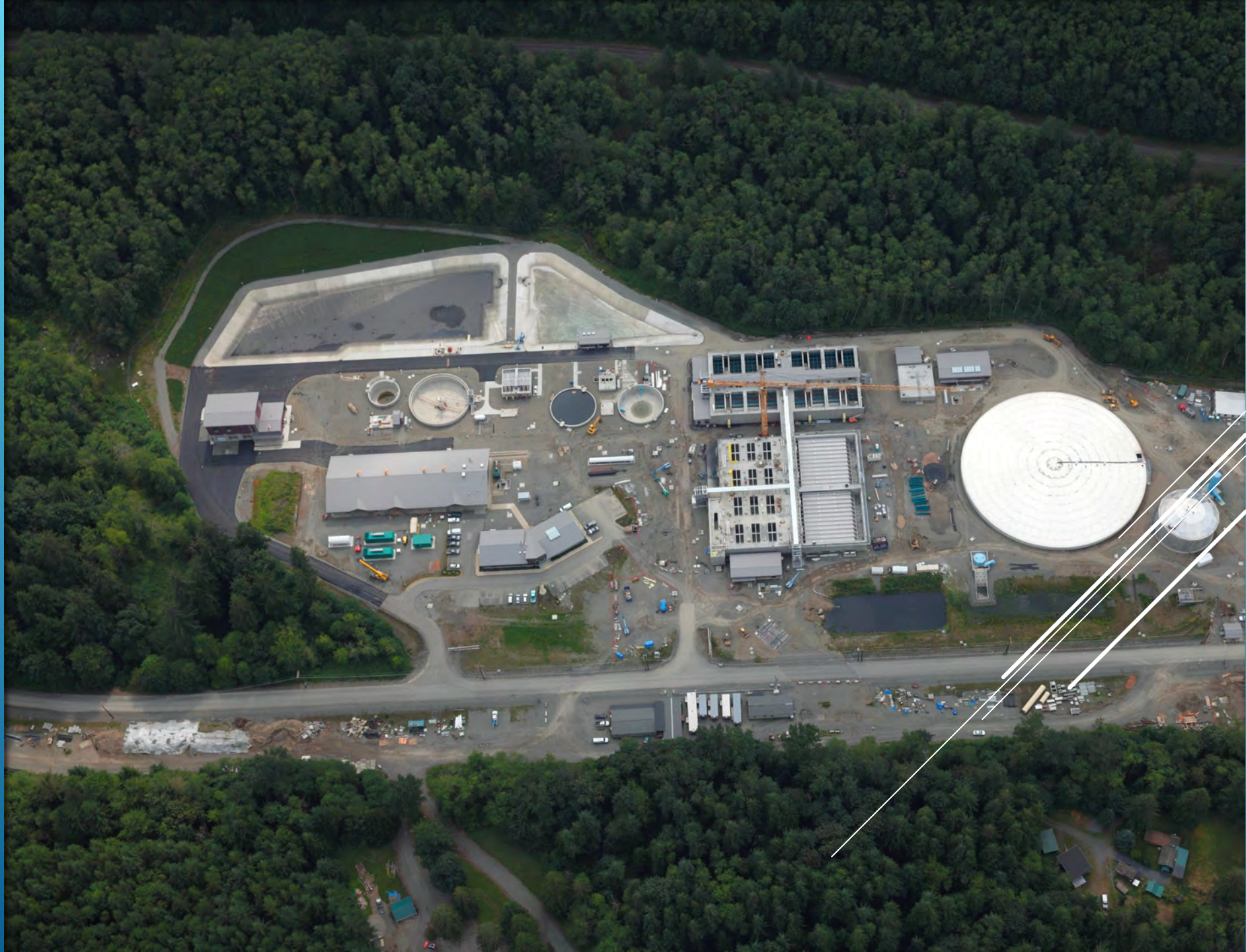
Completed on  
Schedule = 99.8%





# GREEN RIVER WATER TREATMENT PLANT

Project Location  
Ravensdale, WA











**BROWN AND CALDWELL**  
Environmental Engineers & Geoscientists



ZERVAS GROUP ARCHITECTS<sup>1</sup>

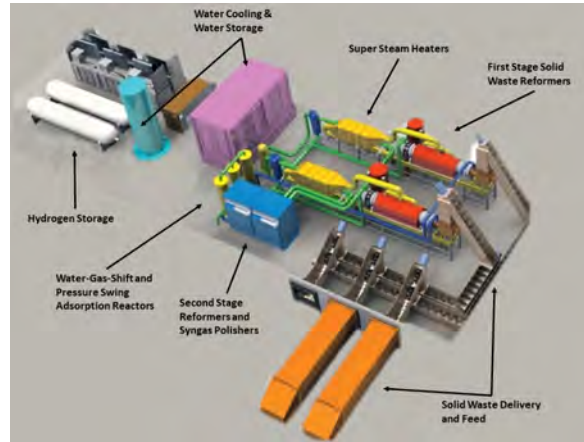
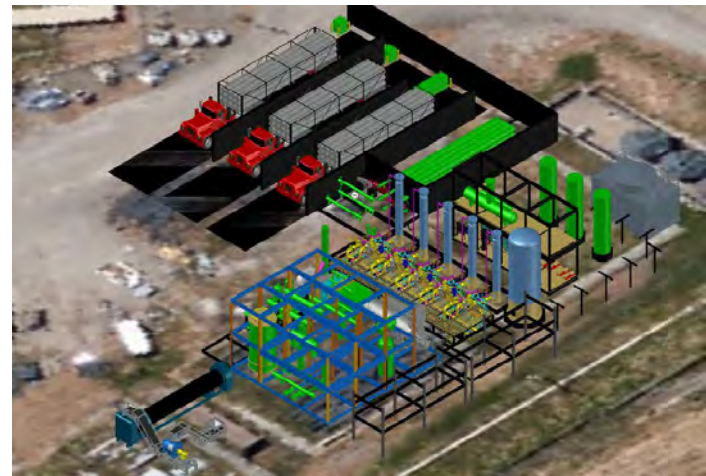


**SVR** DESIGN COMPANY

**Wilson**  
SURVEY/ENGINEERING

# Lighthouse Point Water Reclamation Facility

## Wastewater Treatment



STELLAR J IS THE EPC  
SELECTED TO BUILD TWO  
HYDROGEN PRODUCTION  
PLANTS USING GREEN  
WASTE AS FEEDSTOCK.

PROJECTS ARE LOCATED  
IN NORTHERN CALIFORNIA.





- ▶ Project Location: San Bernardino, CA
- ▶ Stellar J was the EPC contractor responsible for the design and construction of a new food waste biodigester project that will process 85,000 gallons of food waste a day and produce 2.6 megawatts of power.

## OES FOOD WASTE DIGESTER AND POWER GENERATION PROJECT

Gasification Research and  
Development with Over 10  
years testing History

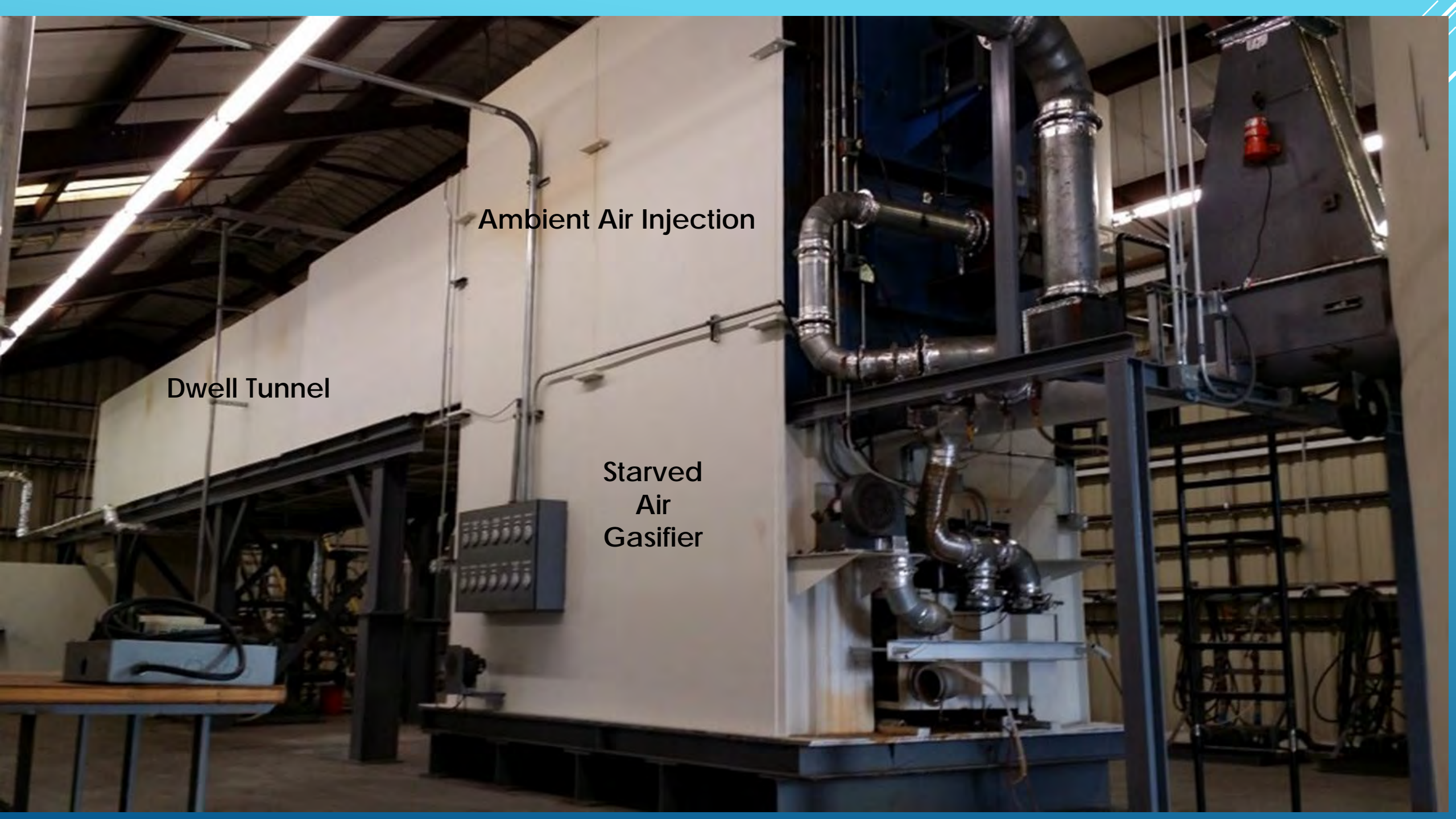


Stellar J's R&D activities  
are conducted at Lincoln,  
Alabama Test Facility



# Waste to Energy Gasification



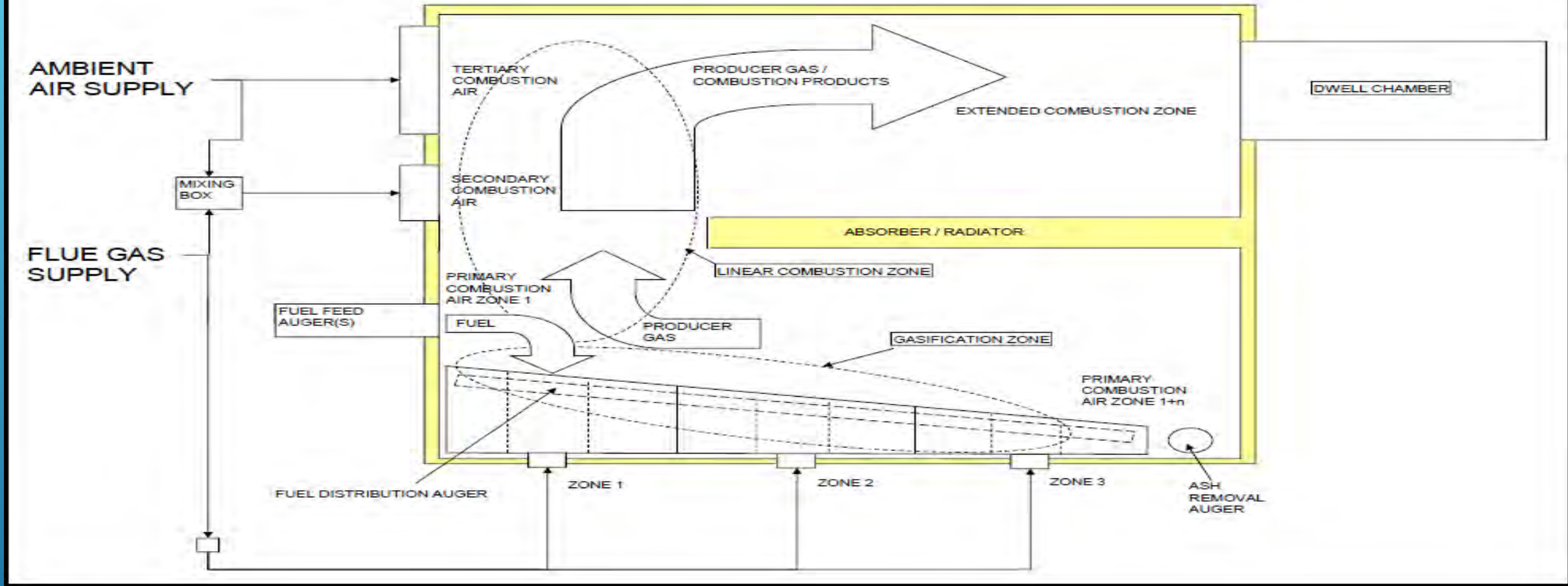


Dwell Tunnel

Ambient Air Injection

Starved  
Air  
Gasifier

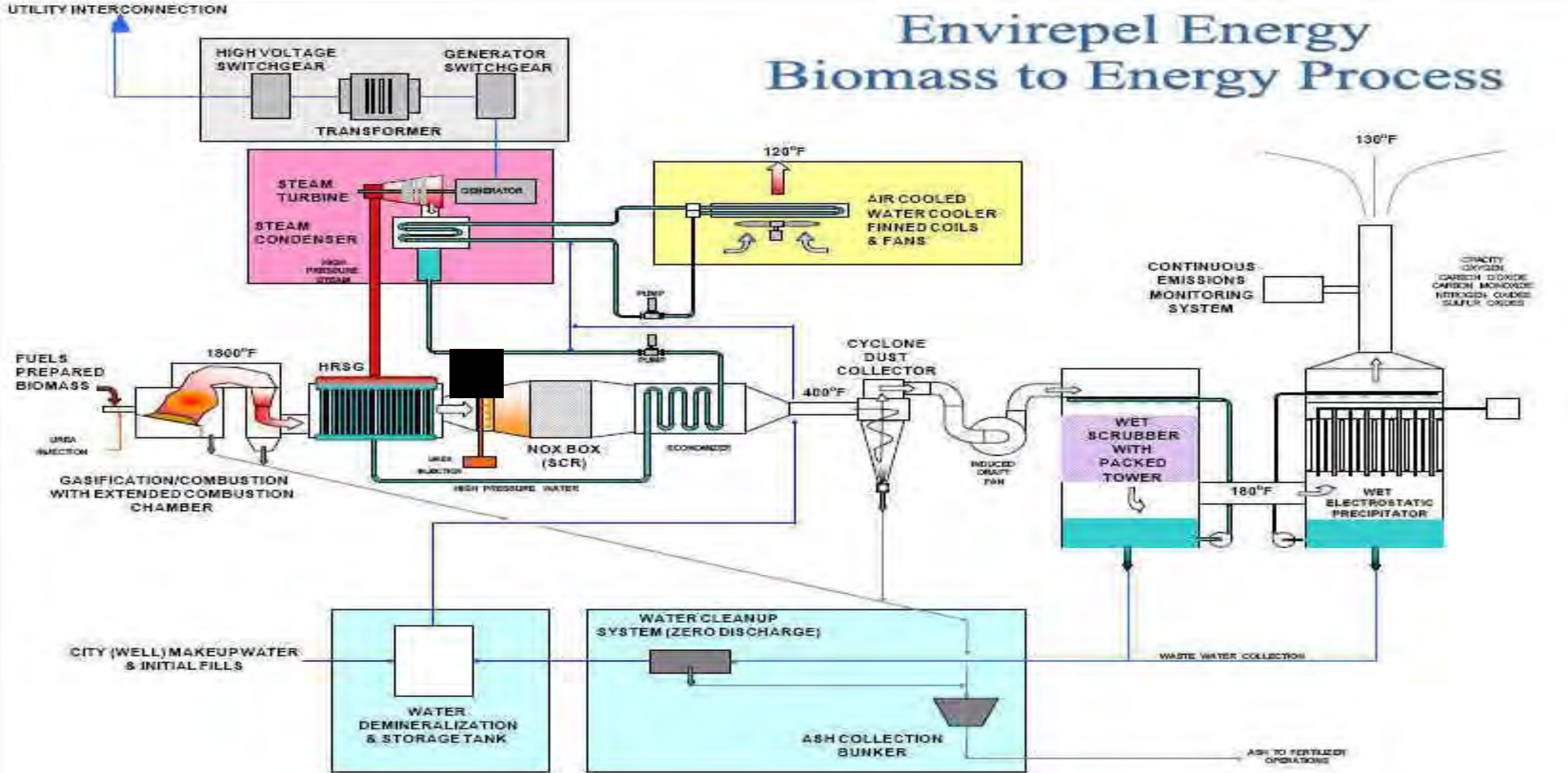
## BLOCK DIAGRAM EEI LINEAR GASIFICATION / COMBUSTION UNIT



- Infra-red radiation from superheated ceramics releases water from the feed stock as it is gasified. The water splits into hydrogen and oxygen allowing the “water” to combust
- The hydrogen gas in the combustion process combines with major building blocks of traditional regulated pollutants such as Nox, Sox, and HC to form acids which are removed with a salt water scrubber.



# Envirepel Energy Biomass to Energy Process



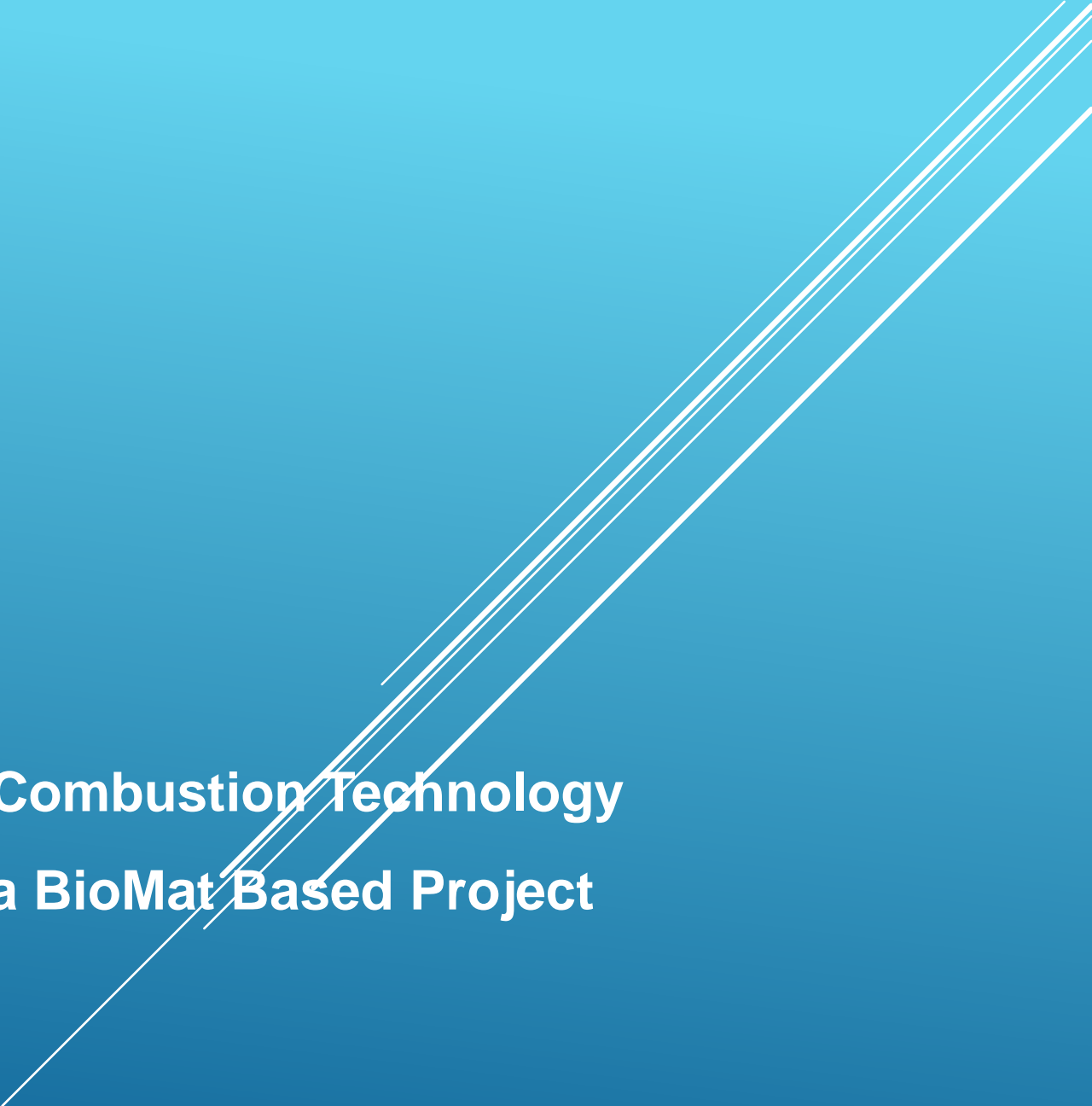
**SIMPLIFIED SYSTEM DIAGRAM**

# STACK TEST RESULTS FOR BIOSOLIDS

1. Stack Temperature – averages 145.9 F
2. % O<sub>2</sub> – averages below 7 PPM
3. % CO<sub>2</sub> – Averages 14%
4. ppm NO<sub>x</sub> – Averages under 80 PPM ppm
5. NO<sub>2</sub> – Averages under 0.4 PPM
6. % Eff net – Averages 89.4%
7. Hydrogen – Averages under 1 PPM
8. WESP Scrubber tank – remained clear and essentially free of debris all week
9. Post-test visual inspection of the burner and dwell tunnel showed no accumulation of ash or debris, no discoloration of the ceramic or system degradation

STELLAR J'S  
STARVED AIR  
GASIFICATION  
PROCESS IS A  
SILVER BULLET  
SOLUTION TO  
MULTIPLE WASTE  
PROBLEMS.

Feedstocks include agricultural waste, green waste, food wastes, and biosolids while meeting air emission standards. The Envirepel process has been approved by both the Mojave and San Joaquin Air Boards and Yorke Engineering has provided Stellar J a favorable feasibility report for using the Envirepel technology in the South Coast Air Quality Management District.

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**Biomass Combustion Technology  
Used in a BioMat Based Project**

**ONEFRESNO**

*Let's Build Together!*




# AG WASTE AND GREEN WASTE

Project scheduled to begin construction in 4<sup>th</sup> quarter 2021



# PROJECT SUMMARY

- ▶ Utilize 2-acres for Biomass Power Plant
  - ▶ Feedstock: 200 tons of woodchips per day
    - ▶ Material already received on-site
  - ▶ Generate 5 megawatts of 100% renewable electricity
    - ▶ Enough to power 4,000 homes
    - ▶ Plus replacement of existing on site diesel powered equipment for electric equipment.
- 



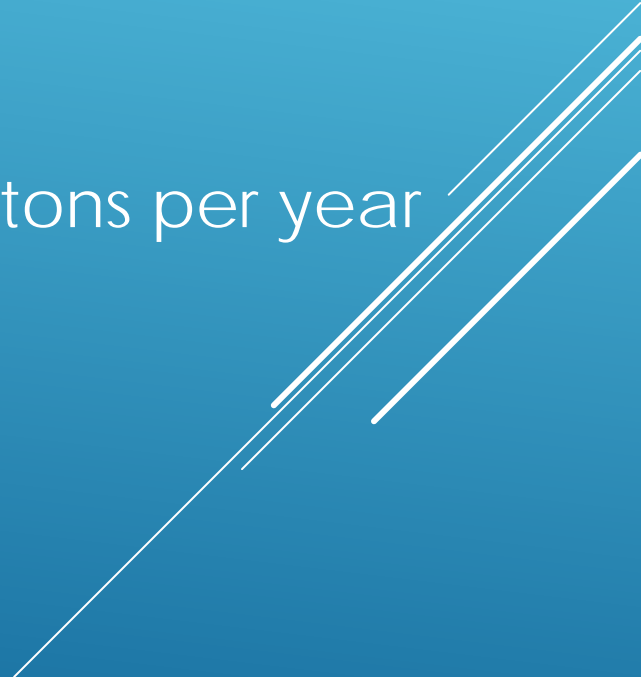
# WEST COAST WASTE

Fresno Renewable Energy Station (FREES)

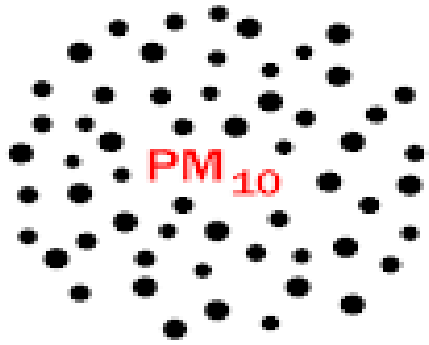
April 2021



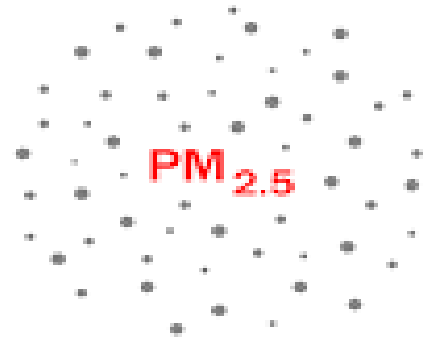
# PROJECT BENEFITS:

- ▶ Improves Air Quality by removing approximately 70 tons per year of airborne particulate .
- 

Air pollution  
particulate matter (PM)



Coarse particulate matter



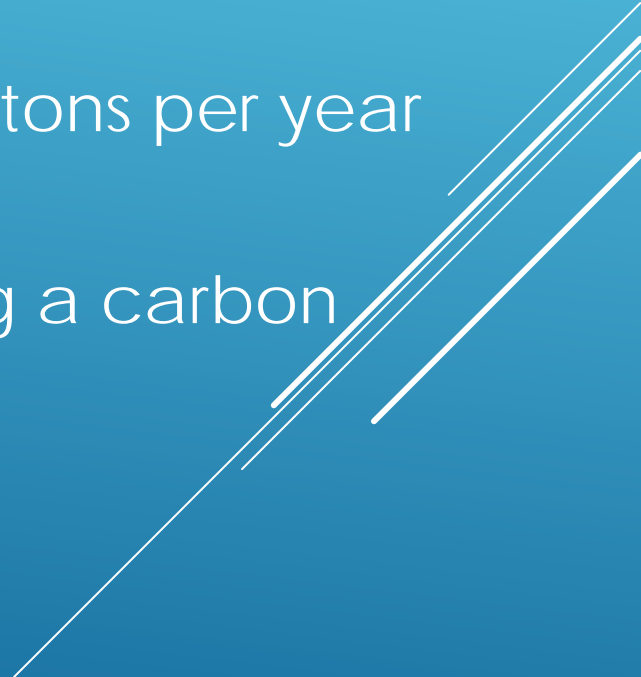
Fine particulate matter

- ▶ The gasifier purifies ambient air by thermally destroying contaminants as air passes through the gasifier's heating process. As a result Fresno's air pollutants will be reduced by:

- ▶ 29 tons per year of PM<sub>25</sub>
- ▶ 18 tons per year of PM<sub>10</sub>
- ▶ 23 tons per year of ozone



# PROJECT BENEFITS:

- ▶ Improves Air Quality by removing approximately 70 tons per year of airborne particulate .
  - ▶ Produces 5 MW of renewable electrical power using a carbon negative process.
- 
- A decorative graphic consisting of several parallel white lines of varying lengths, slanted upwards from left to right, located in the bottom right corner of the slide.



# RENEWABLE ELECTRICITY:



- ▶ The Gasifier Power Plant uses agricultural wastes to produce enough electricity to power 4000 homes continuously (24/7).
- ▶ At West Coast Waste, the power plant will provide 3 MW/h of baseline power (24/7) to PG&E .
- ▶ At West Coast Waste, the power plant will use its remaining 2 MW/h for powering machinery in this advanced renewable energy plant.

# PROJECT BENEFITS:

- ▶ Improves Air Quality by removing approximately 70 tons per year of airborne particulate .
- ▶ Produces 5 MW of renewable electrical power using a carbon negative process.
- ▶ Reduces truck traffic by converting woody biomass into electricity. Materials come in, but little material leaves the facility.

# REDUCED TRUCKING:

- The gasifier consumes approximately 98% of the waste materials used for feedstock. The residual material has commercial applications for use as concrete additives or civil applications. Trucking of residuals will be only 3 to 4 truckloads per month.





# PROJECT BENEFITS:

- ▶ Improves Air Quality by removing approximately 70 tons per year of airborne particulate .
- ▶ Produces 5 MW of renewable electrical power using a carbon negative process.
- ▶ Reduces truck traffic by converting woody biomass into electricity. Materials come in, but little material leaves the facility.
- ▶ Produces surplus water from its processes.

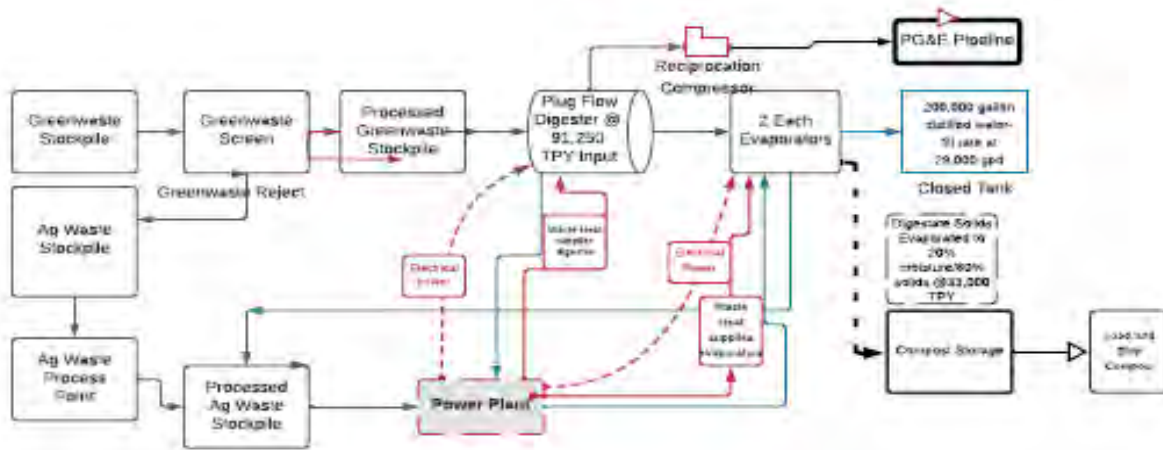
# WATER PRODUCTION:

- ▶ The power plant, in combination with waste evaporators used in plant operations, will produce nearly 10,000,000 gallons of water per year extracted from waste materials .





# PROCESS FLOW DIAGRAM



# PROJECT BENEFITS:

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- ▶ Produces surplus water from its processes.
- ▶ Provides construction jobs opportunities for the local community.

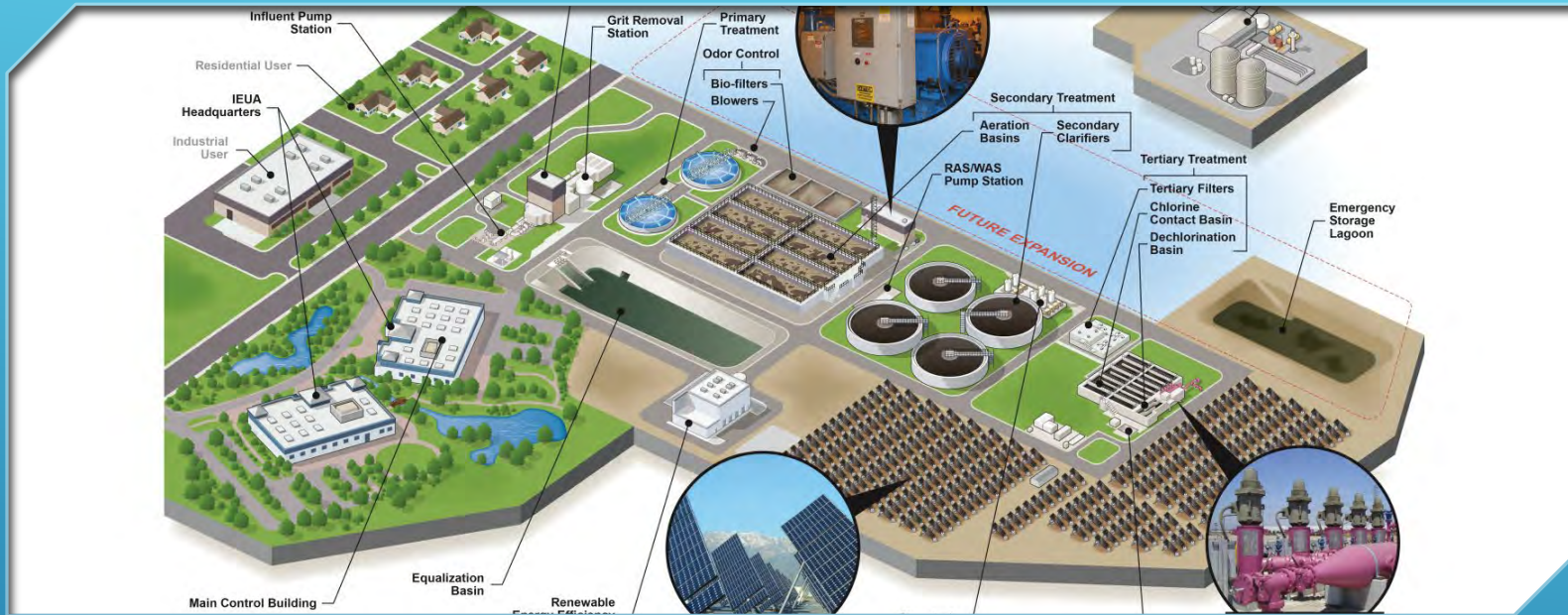
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- ▶ Produces surplus water from its processes.
- ▶ Provides construction jobs opportunities for the local community.
- ▶ Over the next four years, there will be phase out of nearly all agricultural field burning in California
  - ▶ The phase out will most likely affect owners of vineyards and orchards, who will have to grind up vines, trees, and other waste and mix it into soil, or haul it to composting and biomass facilities.

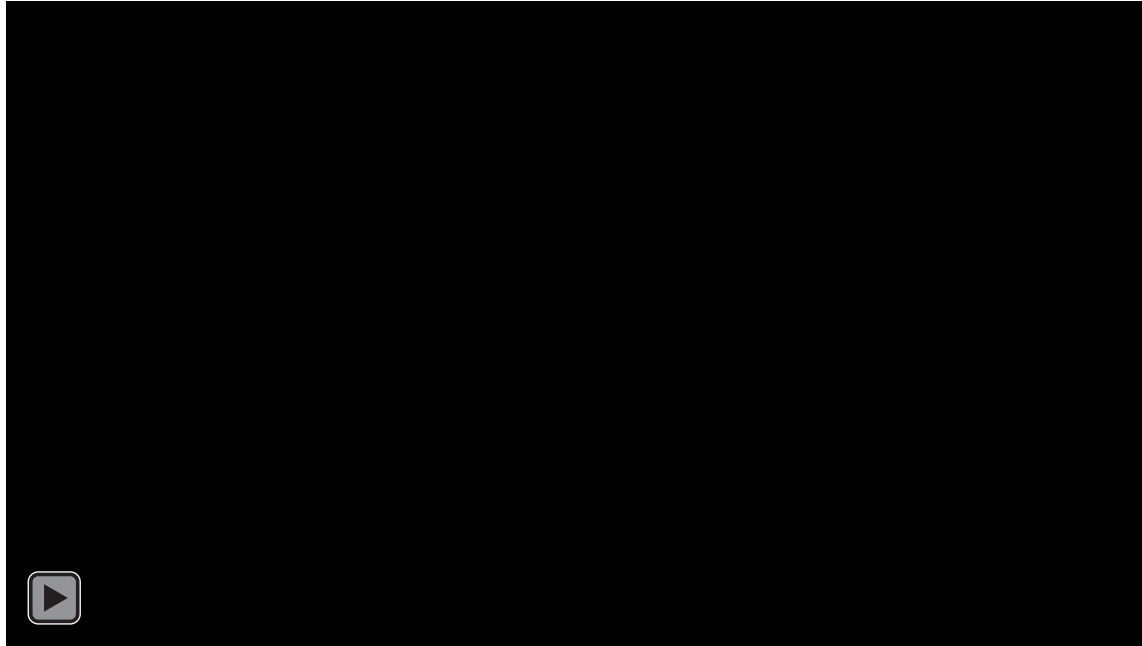
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# **Biomass Combustion Technology**

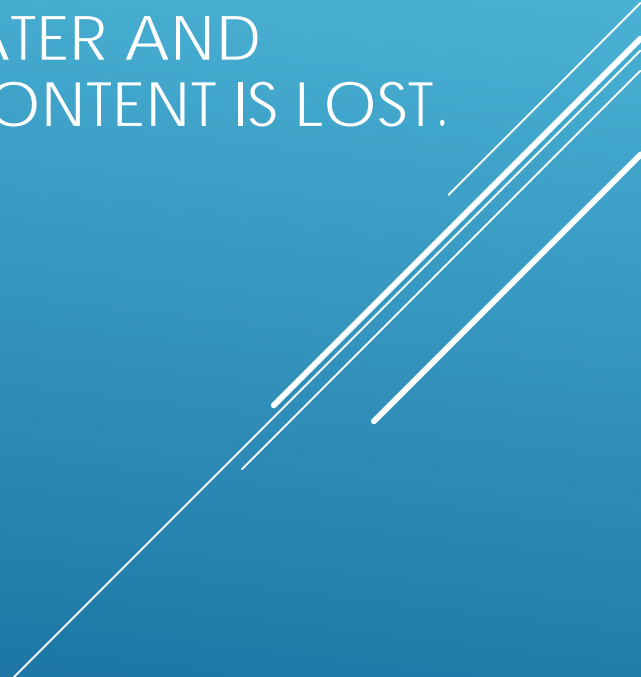
**Designed for Food Waste and  
Municipal Waste Based Projects**



THE PRIMARY TASK FOR A WASTEWATER TREATMENT PLANT IS TO CLEAN THE WATER USED TO TRANSPORT HUMAN WASTE, NOT TO DISPOSE OF BIOSOLIDS.



**INSTEAD**, BIOSOLIDS ARE TAKEN TO LANDFILLS AT GREAT EXPENSE. AT THE LANDFILL, ANY VALUE OF HARVESTING BIOSOLIDS FOR ITS WATER AND ENERGY CONTENT IS LOST.

Several white lines of varying lengths and thicknesses are drawn diagonally across the bottom right portion of the blue background.



Biosolids are taken to facilities such as the Inland Empire Regional Compost Facility where no water is recovered from the biosolids.

The 445,275-square foot composting facility processes 150,000 tons of biosolids and 54,000 tons of wood and green waste into 81,000 tons of compost each year.

From the composting facility, the processed biosolids are transported for land application.



In land application, all beneficial use of the biosolid's water content is lost and all **liability** for its application to the land remains with the producer .



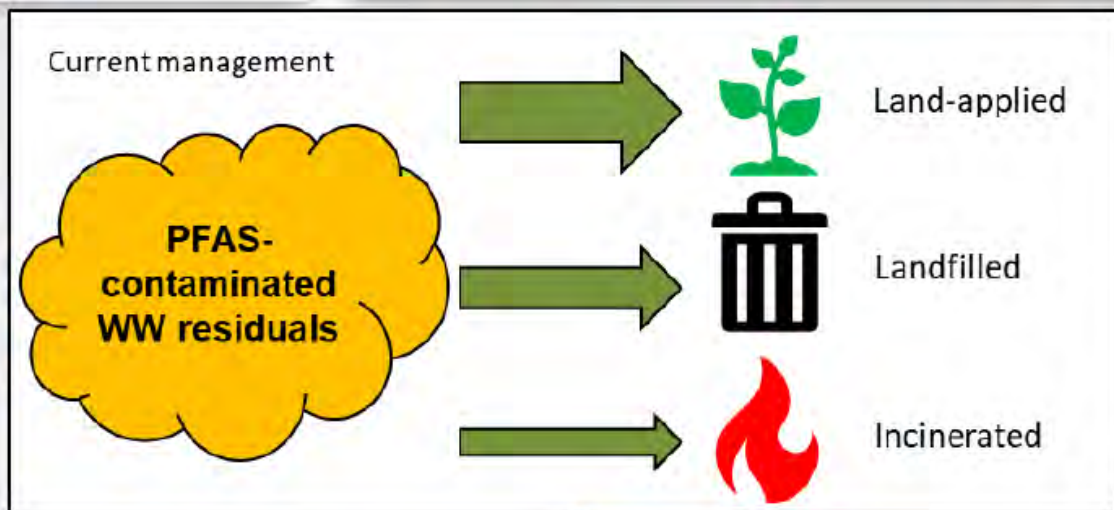






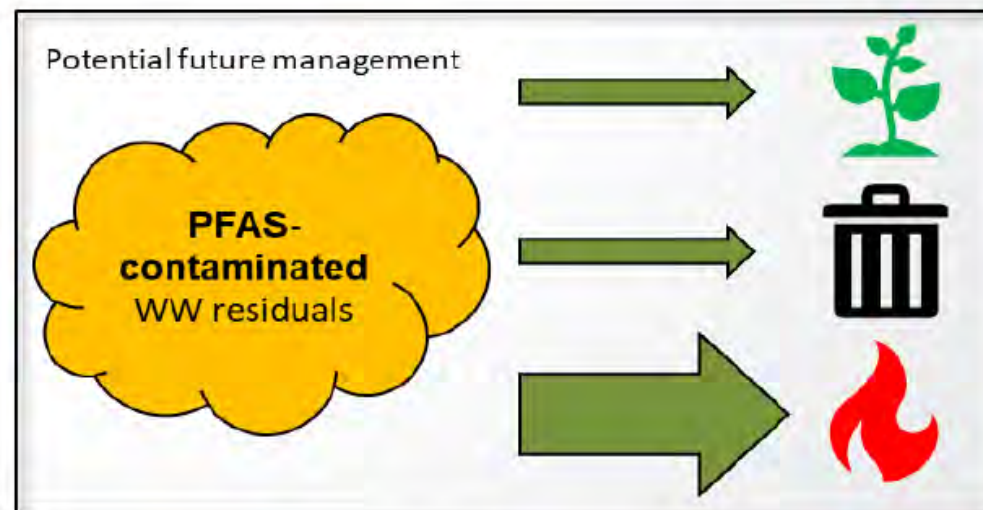


# Changing Fate of Wastewater Residuals



*USEPA is looking for partners for sampling full-scale sewage sludge incinerators*

- Wastewater residual incineration may increase as policies shift to address PFAS in wastewater
- Lack data on the fate of PFAS in full-scale incinerators



TO DECREASE COSTS AND TO ELIMINATE LIABILITY, IT WOULD BE BETTER TO REMOVE AND REPURPOSE THE WATER FROM THE BIOSOLIDS AND THEN JUST MAKE THE BIOSOLIDS DISAPPEAR.



Stellar J Corporation with its partners, USA Sludge, Go Green, Power Engineers and our development team, see the Inland Empire's existing and unused food waste processing plant as an ideal facility to incorporate our proprietary technology that makes **biosolids disappear** while creating a vast water resource, derived from biosolids, available to Inland Empire.





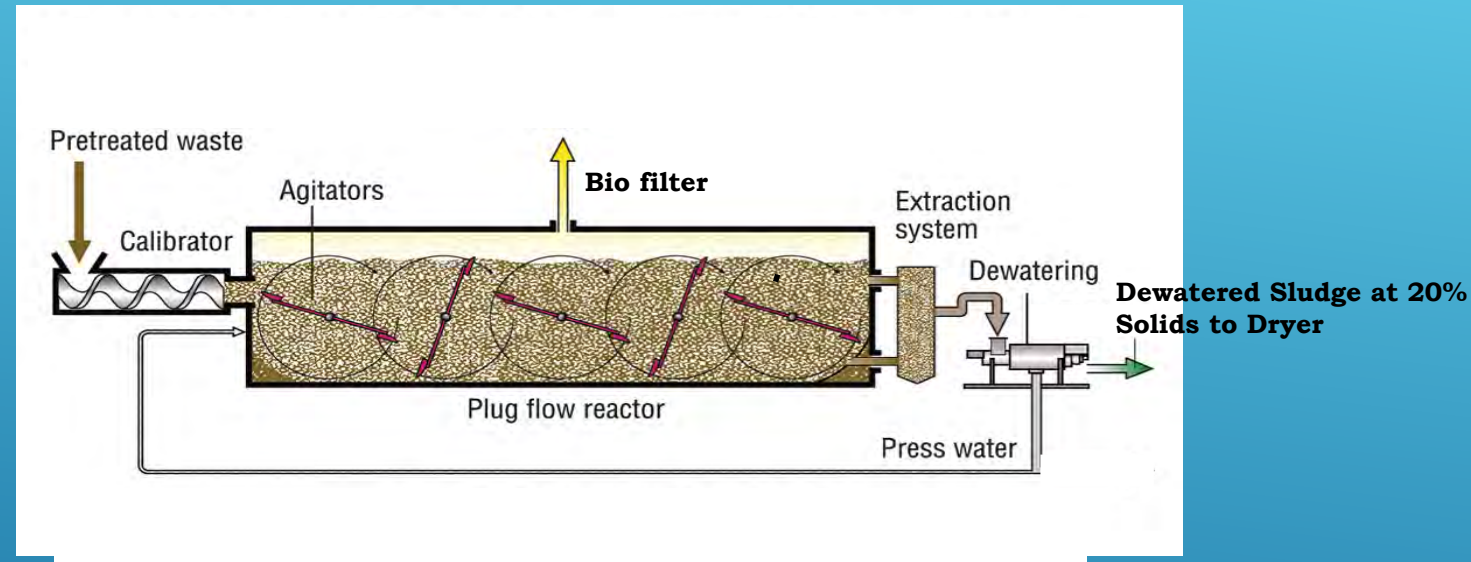
**OUR TECHNOLOGY  
OFFERS THE  
DESTRUCTION OF  
FOOD WASTE, GREEN  
WASTE AND  
BIOSOLIDS WHILE  
REPURPOSING ITS  
WATER FOR  
BENEFICIAL USE.**

The solids are delivered by truck transport, then:

1. We will segregate that part of the total water volume generated by evaporation as potable water.
2. Next, we will process to potable standards or return as non potable water that portion of the total water volume that is dewatered by other means than evaporation.
3. Finally, we will deliver the dewatered biosolids to where the biosolids are gasified, used as fuel for a five (5) megawatt/hour electrical power plant.



# STEP 1: LIQUID SLUDGE ENTERS THE EXISTING DIGESTER

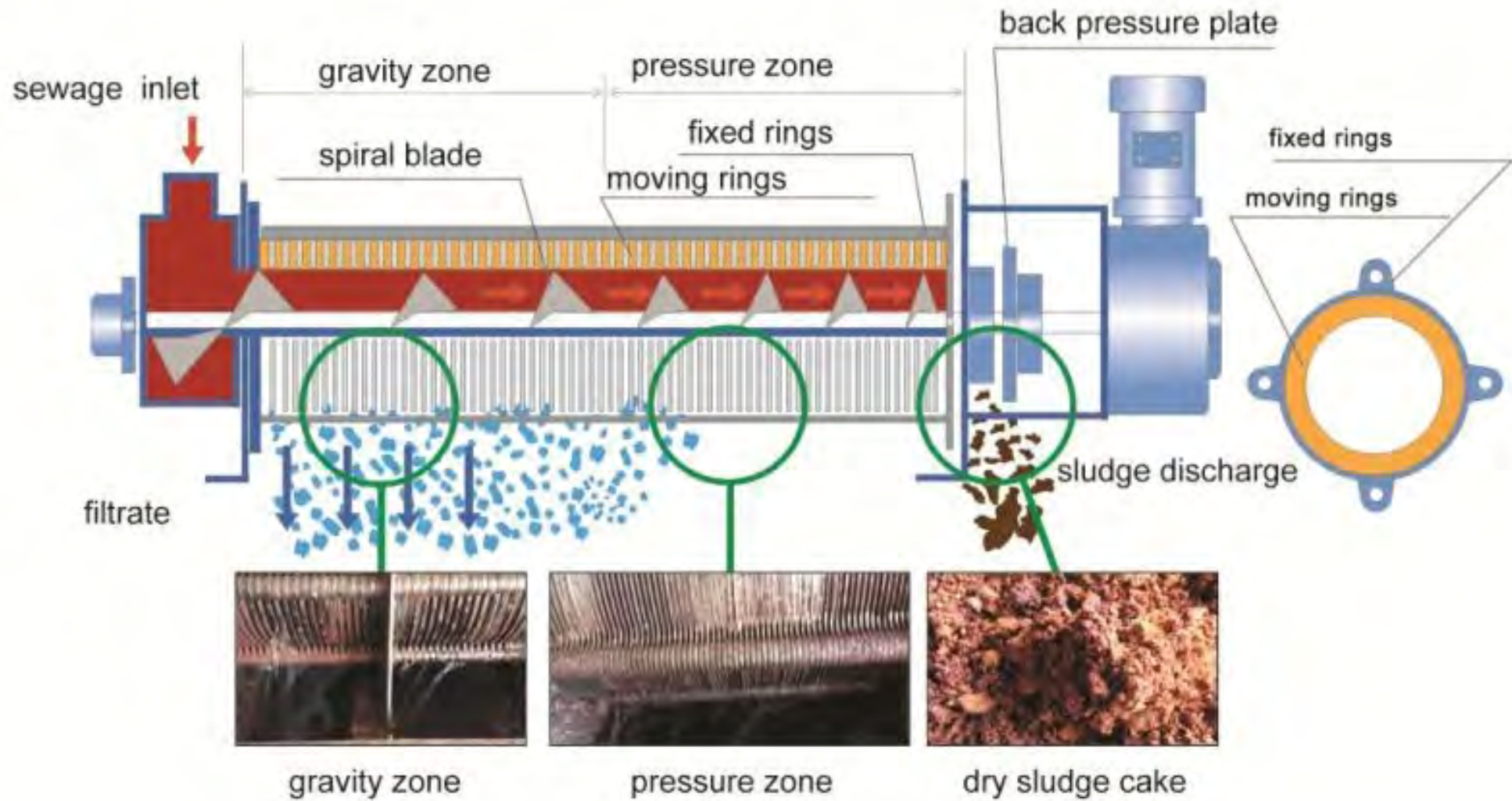


Sludge arrives at 2% solids into existing plug flow digester. “Super bugs” are added to stabilize the sludge for two hours, killing all the pathogens and eliminating odor. Sludge is then pumped to the dewatering system.

# STEP 2: DEWATERING

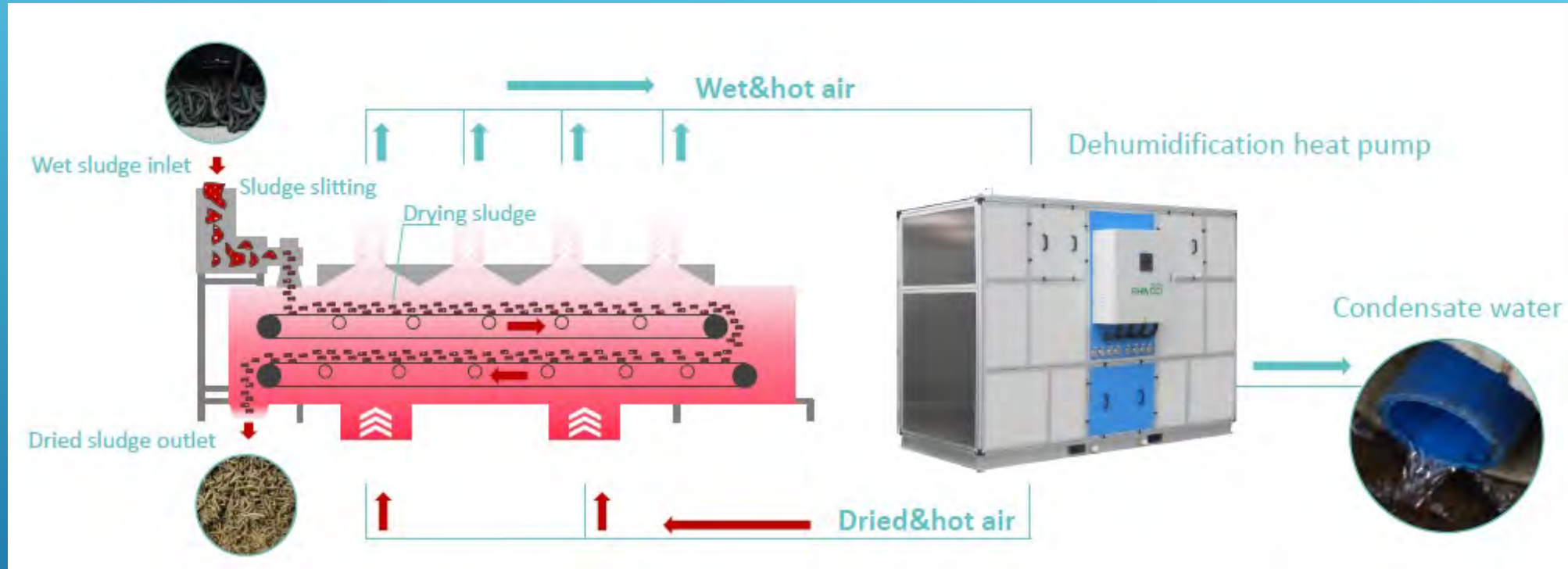


Sludge is pumped from the “modified plug flow digester” to the dewatering unit . Mineral flocculant is added. Sludge is “Caked” to 20% solids and 80% moisture. Sludge cake is conveyed to the dryer.





# STEP 3



Sludge at 20% solids enters the top of the dryer where it spends one hour drying to 80% solids before being discharged from the machine. Odor is not an issue since moisture is released as pure condensate water. Dried sludge is gasified to generate electricity.






DEWATERING UNIT

# Final Product ready for combustion

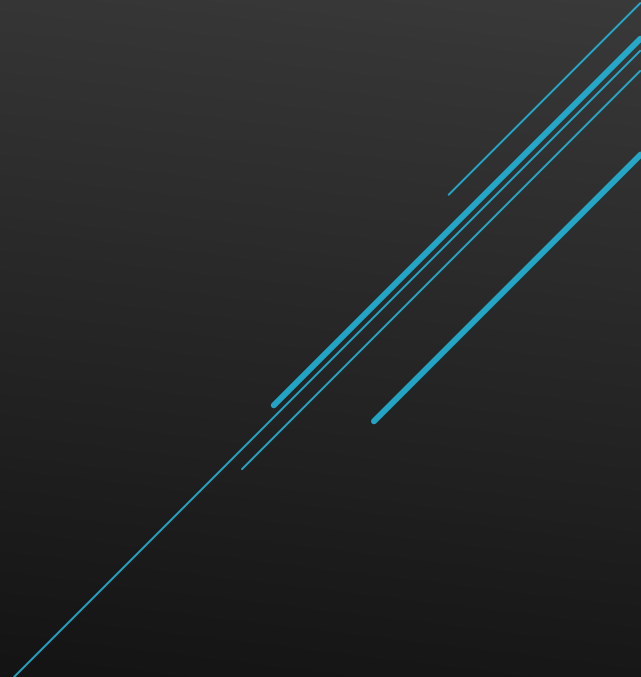






Gasifier Assembly with dwell tunnel

# STACK TEST RESULTS FOR BIOSOLIDS

- ▶ Stack Temperature – averages 145.9 F
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  - ▶ % CO<sub>2</sub> – Averages around 14%
  - ▶ ppm NO<sub>x</sub> – Averages under 80 PPM
  - ▶ ppm NO<sub>2</sub> – Averages under 0.4 PPM
  - ▶ % Eff net – Averages 89.4%
  - ▶ Hydrogen – Averages under 1 PPM
  - ▶ WESP Scrubber tank – remained clear and essentially free of debris all week
  - ▶ Post-test visual inspection of the burner and dwell tunnel showed no accumulation of ash or debris, no discoloration of the ceramic or system degradation.
  - ▶ Waste residuals produced are composed of a non-toxic particulate suitable for civil applications; waste is 0.5% of total processed feedstock.
- 



# Stellar J's process technology offers the destruction of biosolids while repurposing its water for aquifer recharge

We will dewater digested or undigested biosolids at 2% solids to 20% solids and 80% moisture.

We will capture and treat the filtrate water being generated by our dewatering process to Aquifer recharge standards.

We will dry the dewatered solids from 20% solids to 80% solids by using the energy efficient heat pump cycle.

We will capture the water in the drying process as condensate that will meet the Aquifer recharge standards.

We will then destroy the biosolids in our specially designed gasifier either on-site or in the Mohave air district where we have already secured an air permit.

We will eliminate ALL FUTURE LIABILITY OF BIOSOLIDS DISPOSAL BY IEUA THROUGH THERMAL DESTRUCTION.