



WASTE TO ENERGY
SYSTEMS



SUSTAINABILITY

IS PART OF OUR DNA

bioHearth®

by wastetoenergy

The affordable and sustainable waste to energy solution.



WASTE TO ENERGY SYSTEMS

Letter From The CEO



I started Waste to Energy Systems to give my flooring company energy independence and a sustainable use for its byproducts: shavings, sawdust and woodchips. After years of intense research and development, our first waste to energy system was born. Our bioHearth® system gives new meaning to the age-old saying “One man’s trash is another man’s treasure.” The goal of our company is simple, we aim to provide our customers with sustainable energy, sustainable revenue and the opportunity to create a sustainable environment.

One of our key advantages is allowing our customers to place our small footprint bioHearth® system where the fuel is available, lowering costs for the customer in the form of fuel transportation. Our cutting edge technology is a perfect application for the new development of sustainable communities, hospitals, island communities, universities and a variety of local industries looking to get an edge on green initiatives. Unlike other renewable energy, the bioHearth® system provides immediate savings upon installation without counting on time consuming government subsidies.

Waste to Energy Systems, LLC changes the way waste is treated and energy is created. We turn your waste into a modern energy solution. Come visit us at our facility located in Tickfaw, Louisiana for a demonstration of the bioHearth® downdraft gasification system.





WASTETOENERGY

S Y S T E M S

Meet The Team



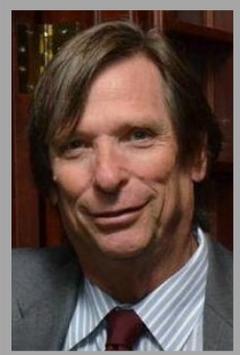
RICHARD WOODS

Chief Executive Officer

Richard Woods started the company in 2011. With over forty years of entrepreneurial experience and over ten years experience with gasification design and engineering, Richard Woods provides clear vision, steadfast dedication and innovation for the company.

Contact Richard : rwoods@wastetoenergysystems.com

Office: 225-567-2409 Direct: 985-320-9361



DAVID McBURNETT

V.P. Strategy, Sales & Marketing

David McBurnett joined WES in 2012. He has spent a lifetime in strategy, management and marketing. From music television to addressing the challenges of technology and government, he brings forty years of strategic knowledge to the company.

Contact David: dmcburnett@wastetoenergysystems.com

Office: 225-567-2409 Direct: 305-733-6234



FRANK LARMON

Chief Engineer

Frank Larmon has worked as a Chemical Engineer in numerous industries for the past fifty years. He joined the WES team in 2013 and has become an expert on gasification design and engineering and a very valuable team member.

Contact Frank: flarmon@wastetoenergysystems.com

Office: 225-567-2409



WASTETOENERGY SYSTEMS

Meet The Team



APRIL WOODS

Digital Media Consultant

April Woods started at WES in 2013 with over seven years experience as a Marketing & PR Manager. Her knowledge and ingenuity has played a vital role in creating the company's brand image, online presence and relationships with key industry members.

Contact April: awoods@wastetoenergysystems.com

Office: 225-567-2409



ALEJANDRO MARTINEZ

Research & Development Operator

Alejandro Martinez joined the team in 2015. He added to the team a Mechanical Engineering degree with a specialization in Electronics to compliment our Chemical Engineer. His skillset, bilingual abilities and experience are a huge asset in the development and maintenance of the system.

Contact Alejandro: amartinez@wastetoenergysystems.com

Office: 225-567-2409 Direct: 225-567-5150



ALISSA WOODS MAHONEY

Operations & Development Specialist

Alissa Woods Mahoney joined the team in 2014 from a career in Hospitality and Event Management. Her experience in coordination, logistics and large scale operations has enabled the WES team to develop several key aspects of the business and system's development.

Contact Alissa: ahwoods@wastetoenergysystems.com

Office: 225-567-2409



WASTE TO ENERGY SYSTEMS

Gasification Benefits



ENVIRONMENTAL SOLUTIONS

We understand the realities of the world's ever growing energy demands. Our solution is to turn waste into energy without it ever leaving its point of origin. Recent studies show that existing methods for waste removal are a major contributor to the

increased CO2 levels. Our bioHearth® downdraft gasifier converts biomass waste into carbon neutral energy without environmental damage. Take the first step toward a cleaner future with WES.



POSITIVE PUBLIC RELATIONS

Our bioHearth® system greatly enhances your public image by demonstrating a commitment to sustainable green energy. General Electric, Marriott, Bacardi Rum are just a few of the many fortune 500 companies adopting green initiatives. Environmental

stewardship and responsible resource usage are quickly becoming major determiners in the daily choices made by consumers.



BALANCE SHEET RESULTS

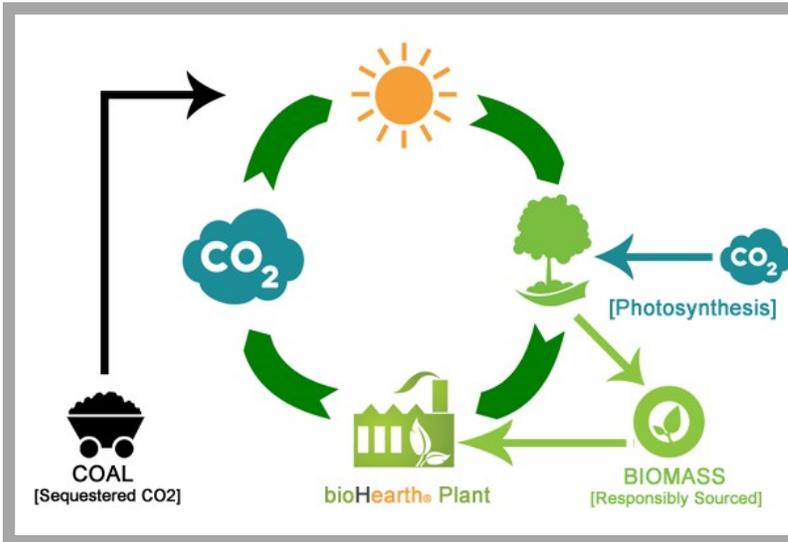
Converting your waste into energy is always a financial benefit for your company. Removing the cost of disposal, decreasing energy cost by creating onsite heat and/or power increases your company's profitability. Your local cost of energy will determine

the exact return on investment in a purely dollars and cents formula. The additional value when factoring the benefits of positive public relations and environmental effects makes the decision to add a bioHearth® system an easy one. WES offers a truly rewarding solution. Come see how we can make a difference for you.



WASTE TO ENERGY SYSTEMS

Gasification Benefits



CARBON NEUTRAL PROCESS

Gasification is a carbon neutral process. It fits in the carbon cycle in perfect harmony by using responsibly sourced biomass as fuel. The carbon dioxide released from the bioHearth® gasification system is re-absorbed by plant life through photosynthesis, creating a complete carbon cycle. Fossil fuels release sequestered CO₂, adding to the total amount of CO₂ found in the Earth's atmosphere.

GASIFICATION			INCINERATION
1000° - 2500°C	CO	C CARBON	600° - 800°C
OXYGEN STARVED	H ₂	H HYDROGEN	OXYGEN REQUIRED
HIGH PRESSURE	N ₂	N NITROGEN	ATMOSPHERIC PRESSURE
CREATES FUEL	H ₂ S	S SULPHUR	CREATES EXHAUST
		O OXYGEN	

GASIFICATION VS. INCINERATION

EPA has officially ruled that gasification is a separate process from Incineration. This chart proves that gasification releases no harmful compounds unlike incineration. Gasification makes incineration obsolete in efficiency and environmental safety.



WASTE TO ENERGY SYSTEMS

Our System

bioHearth®

After several years of research, testing, analysis and development, WES has an efficient, patent pending down draft gasification system, bioHearth®, in operation at our facility. Our bioHearth® system has the capacity to provide enough electricity to run the plant and the heat for curing wood. Our advanced down draft gasification system, bioHearth®, paired with the necessary ancillary equipment, is the key to converting waste to energy.



Fuel Testing

Our laboratory will design and test your feedstock to ensure you are provided with the best delivery system for your new bioHearth® system.





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Fuel Delivery

Auger Fuel Delivery

The auger feedstock delivery system option is best suited for larger feedstock such as wood chips and agricultural byproducts. The auger directly feeds in the fuel source from a conveyor or similar delivery system.



Briquette Delivery

The briquette delivery system allows the use of a wide variety of feedstocks from sawdust to agricultural waste. Creating briquettes is a more economic process than pelletizing. It compresses the feedstock into a consistent fuel size and density. This creates optimal energy conversion inside the bioHearth® system.





WASTE TO ENERGY SYSTEMS

Gas Cleaning System



Gas Cooling

The gas cooling system serves as the initial gas cooling mechanism for the gases. Our patent pending design begins lowering the gas temperature for further cooling and refinement in the next steps of the process. The result is clean gas that can be used for a multitude of applications.

Venturi Water Scrubber

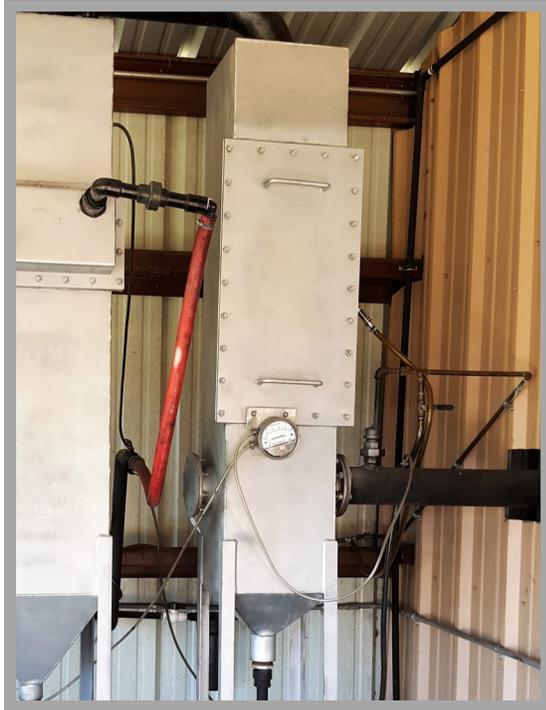
Our venturi water scrubber cleans the producer gas with 95% efficiency by forcing it to pass through a high pressure spray of water at 120 PSI. The dirty water is then removed from the bioHearth® system.





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Gas Cleaning System

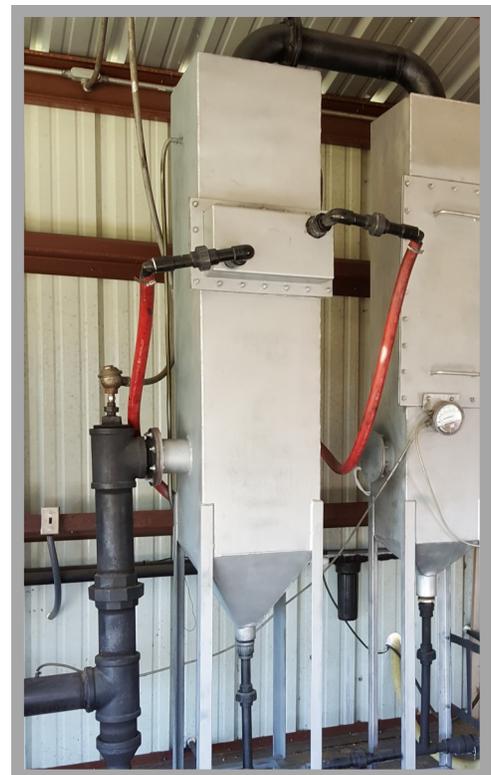


Mist Elimination System

Our two stage mist elimination system completes the gas cooling process. Our uniquely designed mist elimination system removes water vapor and droplets and is easy to maintain to allow 24/7 operation. The water removed at this point feeds the wet scrubber system.

Water Removal System

The water removal system is comprised of a glycol and water based chiller with a copper condensing coil. The gas leaves the mist elimination system and then passes through a 56 F chamber. When the gas comes in contact with the cold condensing coil, it removes 90% of remaining water vapor.





WASTE TO ENERGY SYSTEMS

Waste Removal System



Particulate Auger Transition



Particulate Auger Collection

Our continuous auger particulate removal system is fully automated and collects particulate from the major components of the system. This keeps labor costs down and minimizes maintenance. The collected particulate, also known as activated carbon, has a variety of applications or can become fuel for your bioHearth® gasification system!

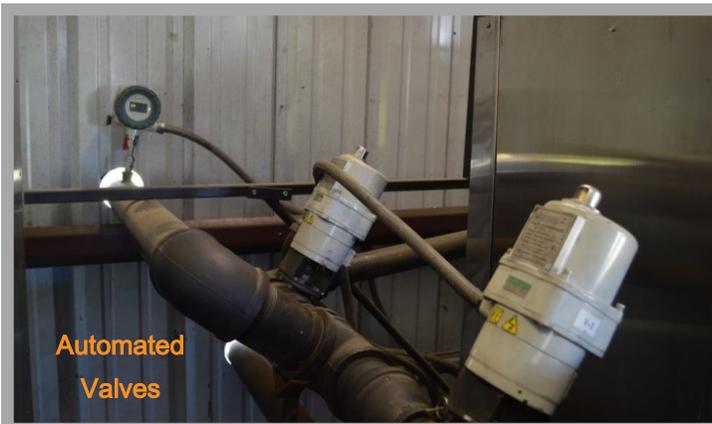
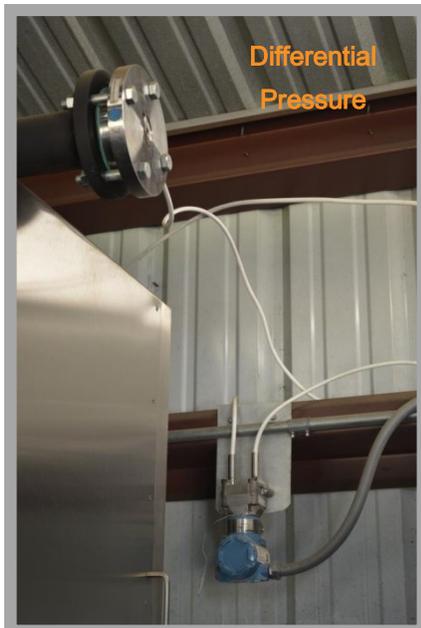
Scrubber Tar & Particulate Removal

Our wet scrubber particulate removal point takes the waste water from the wet scrubber and re-filters it to be pumped into the system once again. Minimal water is needed to start and is self-sustaining due to water removal from the gas. The waste stream can be dried and the particulate reintroduced back into the system as fuel.



WASTE TO ENERGY SYSTEMS

Safety and Automation



Our state of the art, fully automated system is designed to minimize labor and maximize safety. With automated valves, flow sensors, safety relief valves, oxygen analysis and pressure differential sensors, you can rest easy knowing that your system is running safely at full efficiency.



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Gas Analysis

University of Maine
Process Development Center

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GAS COMPONENT ANALYSIS

Done in conformance with ASTM 1945

Sample Log # 07172013

Project Description: Regular testing
Date Received: July 16, 2013
Date Tested: July 17, 2013
Operator: Jon Spender

		Enter Sample ID.1
COMPONENT	Conc. Unit	WTE
Methane	%	2.2
Carbon dioxide	%	8.1
Nitrogen	%	52.1
Hydrogen	%	15.9
Carbon monoxide	%	20.8
Ethane	%	0
All Others including: Argon, Acetylene and Propylene	%	0.920

*** Calculation is based on all major components listed.**

NOTE: All major component concentrations are reported as a moisture and C₂ plus free basis and are normalized to 100%. Oxygen and Argon cannot be separated; therefore, the oxygen result includes a small amount of Argon.

For the sake of reference, if analysis indicates an additional component of significance, it will be reported here.

Standard conditions: 60 °F and 14.73 psia



WASTE **TO** ENERGY
S Y S T E M S

*Make **Green** by Being **Green**!*



SUSTAINABLE
energy



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