BC&E LLC
Bio Mass Conversion & Energy

Utilizing and Promoting APS IP Holding, LLC ADVANCED PYROLYTIC SYSTEM

FAQ - Frequently asked questions

What is Pyrolysis?

Pyrolysis is a commercially proven manufacturing process that converts carbonaceous materials into Renewable Energy and high value Bio-Char. Pyrolysis is a method for extracting energy from organic material and is an efficient technology that can produce high value products from low-value feedstock such as many waste products.

What are the distinct attributes of Pyrolysis?

- A clean, flexible, and reliable way of turning waste into clean energy.
- Ability to convert low-value feedstock into high-value products.
- Provides a cost effective way to capture CO2 with the Bio-Char Produced
- Provides economic benefits with respect to investment and job creation.
- Pyrolysis is enabling redefinition of "clean energy."

What are the benefits of Pyrolysis?

- Pyrolysis for electricity production provides environmental and cost benefits compared to traditional combustion technologies.
- Pyrolysis enables the use of low-value feedstocks to produce energy.

What are the economic benefits of Pyrolysis?

- Pyrolysis can compete effectively in high-cost energy environments.
- Pyrolysis converts abundant low-value feedstocks into high-value products.

What are the environmental benefits of Pyrolysis?

- Pyrolysis-based systems offer significant environmental advantages over competing technologies, particularly waste-to-electricity combustion systems.
- Reduced air emissions: Significant air emission reductions achieved through Pyrolysis verses other gasification technology or the natural decay of Bio-Mass (CO2 generated)
- Ability to use Pyrolysis for clean power generation: Utilizing the heat from our efficient combustion process to generate steam which is then in turn is used to generate electricity thru a steam turbine. This leads to air emissions levels much lower than those of conventional coal-fired power, gasification or even natural gas-fired combined cycle generation.

What makes Pyrolysis environmentally friendly?

Biomass is organic matter- and Biomass energy development likes to take what is usually thrown away and turn it into energy. Our technology allows business and industry to operate "off the grid" using their own waste stream (pallets, boxes, paper), or materials from agriculture such as farming, milling and ranching. We use clean technology to take the stored energy from these materials and create heating, electricity, even cooling. ...

What are some issues with biomass Pyrolysis?

To reduce costs, biomass should be located within 20-50 miles of the Pyrolysis facility. Appropriate (and potentially large) storage facilities need to be located in close proximity to the facility. Most importantly, however, is ensuring that a quality and sufficient supply of biomass can be obtained.

How does biomass Pyrolysis compare to ethanol?

The production of ethanol and the resulting producer gas of biomass Pyrolysis require very different processes. Ethanol is produced through the breakdown of starches and sugars in a low oxygen environment to create alcohol fuel. The process of biomass Pyrolysis involves heating biomass to create gases to be used in various applications.

What is the history of Pyrolysis?

Thermal distillation, commonly known as Pyrolysis, dates back nearly three hundred years. It was commonly used throughout England, France and Germany to create liquid fuels from solid carbon based materials such as coal. Pyrolysis was the most viable method to create liquid fuels before petroleum fuels became more readily accessible.

As the use of petroleum fuels and natural gas became more profitable, capitalism cast the Pyrolysis technology out of favor. Today, the immense consumption of petroleum fuels creates an unfavorable dependence on foreign powers. This addiction for fuel reserves has drawn attention back towards alternatives such as Pyrolysis. Despite inadequacies in environmental sustainability and financial impracticality, enormous subsidies and grants from the US government have allowed inferior gasification technologies to develop into large scale test plants. Even with financial subsidies, these programs have been incapable of evolving their technologies beyond environmental and financial impracticality into industrial viability any business created around our technology is financially viable WITHOUT governemnt subsidies.

What is the competitive market for our Pyrolysis system?

Below are some common types of waste reduction/management technologies in use and their apparent limitations in meeting stringent air and environment quality standards.

- Traditional Gasification: Traditional techniques use an oxidizing agent such as oxygen to create the desired reaction. With the introduction of oxygen, oxidation occurs resulting in creation of undesired emissions such as acid gases, dioxins and furans, nitrogen oxides, sculpture dioxide, particulates, cadmium, mercury, lead and hydrogen supplied.
- Incineration: The most widely used waste reduction method internationally is still the burning or incineration of trash. Air emissions include in extreme amounts acid gases,

dioxins and furans, nitrogen oxides, sulphur dioxide, particulates, cadmium, mercury, lead, hydrogen sulphide, carbon monoxide, and carbon dioxide.

- Landfills: Contradictory to common belief, landfills are not a viable solution to sustain our environment. People are misled to believe land filling provides a suitable environment for natural decomposition, believing eventually that waste in landfills will decompose over long periods of time. The truth is decomposition needs oxygen to occur and with time landfills become oxygen-depleted environments. Over time, decomposition actually slows and waste materials in landfills are preserved for future generations to deal with.

What are the benefits of using the APS HOLDINGS, LLC Advanced Pyrolysis System?

- Extreme reduction of volume and mass. The remaining solids are the inert proportion of the waste material.
- Our patented technology can efficiently process ANY carbon based material without harmful emissions into the atmosphere or environment.
- The extreme reaction temperatures decompose organic toxins such as PCB's & dioxins.
- Our system solutions can be customized to maintain or vary reaction temperature facilitating optimal reduction and conversion conditions for various waste stream materials. Reaction can be meticulously controlled to convert virtually any and all waste materials.
- Organic materials are thermally decomposed while inorganics are condensed into an inert slag.
- Our thermal decomposition system solutions are completely customized for your waste management and energy consumption needs.
- Solid waste is reduced in volume and weight in significant amounts without harmful emissions into our environment and atmosphere.
- A negative carbon footprint is created after all energy has been deducted for creating steam and marketable Bio-Char. No harmful emissions are released into the atmosphere or environment.
- We have the ability work with municipalities, States and Federal governments all over the world. If you incur the high costs of waste management, Bio-Solids, Green Waste or Agricultural Residue, or incur a high cost for energy consumption, we can provide a solution for you to reduce your expenses energy consumption expenses.

What is Biochar?

Biochar is a term used for biomass charcoal derived from plant biomass materials. This definition generally includes chars and charcoal, and excludes fossil fuel products or geogenic carbon.

Why should I be interested in Biochar?

One of the most exciting new benefits of biomass pyrolysis is its ability to produce valuable soil amendments in the form of charcoal (biochar). Recent archeological exploration has found that indigenous peoples of the Amazon used charcoal to enrich their soil over 1,000 years ago. However, the use of charcoal as a soil amendment is not limited to ancient civilizations. New research has shown that biochar is more efficient at increasing soil fertility and nutrient retention than un-charred organic matter (Lehmann et al., 2006). Carbon enhanced soil organic matter

offers direct value through improved water infiltration, water holding capacity, structural stability, cation exchange capacity, soil biological activity and as a CO2 sink (Lehmann, 2007). Charcoal can also reduce fertilizer runoff and adsorb ammonium ions. That's USDA soil scientist, Dr. David Laird calls it a "A Win–Win–Win Scenario for Simultaneously Producing Bioenergy, Permanently Sequestering Carbon, while Improving Soil and Water Quality"

How can the production and use of biochar contribute to sustainable agriculture?

Biomass fuels such as wood, herbaceous materials and agricultural by-products currently form the world's third largest primary energy resource, behind coal and oil. At best, conventional biomass to energy is considered to be carbon neutral. Harvesting biomass to produce energy may not be sustainable because it can result in reduced soil productivity by depletion of carbon and nutrients. Biomass pyrolysis addresses this dilemma, because it can utilize waste products and about half of the original carbon can be returned to the soil. The deployment of biomass pyrolysis systems can create new local businesses, job opportunities and raise the income of people in rural communities (Okimori et al., 2003). Farming communities can benefit most from this system because the biochar co-product can reduce or eliminate purchased fertilizers while sequestering atmospheric CO2 (Glaser and others. 2002). This can create new profit centers for landowners by creating carbon credits and energy, which farmers can use or sell. This can decentralize fertilizer and energy distribution, making resources more available to farmers. It can reduce agricultural dependence on petroleum and natural gas based products by allowing regional energy production that is cost competitive with fossil fuels.

In summary pyrolysis of biomass into biochar and energy created five primary benefits for agricultural entities (International Biochar Initiative):

1) Reduction in annual water consumption up to 50% and sequestration of 3 times it weight in volatiles.
2) Improvement of the productivity of soil to achieve higher yields.
3) Creation of a bioenergy as a substitute for fossil fuels.
4) Sequestration of carbon in the soil that will reduce atmospheric carbon dioxide.
5) Management of waste.

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