

Carbon Sequestration.

Plants take in CO₂ and utilize it in photosynthesis. If we combust plant matter for energy, we release CO₂ back to the atmosphere.

CO₂ in and CO₂ out are roughly equal so using plant matter (biomass) for energy is *carbon neutral*.

But what if we combust biomass for energy, create a char waste product, and then bury it in the soil? This process would be *carbon negative* and a form of *carbon sequestration*, helping to reverse the negative effects of CO₂ buildup in the atmosphere.

Pyrolysis (in Greek *pyros* = fire, *lysis* = dissolution) is the decomposition of biomass and other organic materials at high temperatures in the absence of air. Pyrolysis differs from combustion with incinerators and partial combustion gasifiers. Only pyrolysis, specifically of the type called Slow Pyrolysis, produces large quantities of biochar.

This thermo-chemical process underlies the use of fire, humankind's oldest technology, but is still an inexact science, taught at few universities, according to Dr. Alex Green, University of Florida Professor Emeritus and founder of Green Liquid and Gas Technologies.

So far there are few producers of biochar in the U.S. The market is just being created as awareness of the many benefits of this product grows.

Member International Biochar Initiative

<http://www.biochar-international.org>

Promoting Soil Fertility



In Florida's warm climate, compost and other organic matter incorporated into the soil break down and must be reapplied.

Most plant nutrients, like Nitrogen, Potassium, Magnesium, and Calcium, are cations (positively charged). Cation exchange capacity, the number of adsorption sites for cations in a soil, usually depends on the amount of clay and/or humus present. Clay and humus serve as the cation reservoir of the soils.

Humus is any organic matter that has reached a point of stability, where it will break down no further. Once developed, humus may remain essentially as it is for centuries or millenia. So how can we speed up this development of stable humus in the soil?

Biochar appears to hasten the conversion of compost to stable humus. In the Amazon, where even in clay soils the excessive rainfall causes leaching of cations, the addition of biochar has improved cation exchange capacity and the soil microenvironment.

Biochar can promote the development and persistence of humus here also over a period of time. Preventing leaching of nutrients will help protect our groundwater as well as reduce money needed for fertilizer or additional compost.

GREENLIQUID&GAS Technologies
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Benefits of Biochar

Infertile Soil Made Fertile!

Biochar is a charcoal-like material produced from plant and other organic wastes through the process of pyrolysis. Biochar is a by-product of this waste-to-energy process, but is increasingly being recognized for its many environmental values.

Soil researchers in the Amazon found that early people there buried biochar, and the carbon has persisted in the soil for thousands of years. There it is called *Terra Preta* or black earth, and the biochar improved fertility of the soil. Entire civilizations built up in the region where biochar was used.

Interest is rapidly growing in home vegetable gardening and small-scale commercial agriculture to support the local food movement. Locally grown food reduces expensive transportation costs and reduces greenhouse gas emissions. However, growers and home gardeners must confront our infertile sandy soil.

Biochar increases cation exchange capacity, raises the pH of the soil, which also helps the soil retain nutrients, and improves the environment for beneficial soil micro-organisms. Research indicates that this has to do with the pores in the biochar creating surface area for growth of micro-organisms.

GREENLIQUID&GAS
Technologies

GREEN LIQUID & GAS Technologies

GREEN LIQUID & GAS Technologies of Gainesville, Fla, sells the Green Pyrolyzer Gasifier (GPG). This machine is installed at your farm or business to dispose of organic wastes while producing thermal energy. As examples, this energy can be used to heat greenhouses, facilitate drying operations, or run a small-scale steam turbine. Waste disposal costs are eliminated as your waste is put to work.

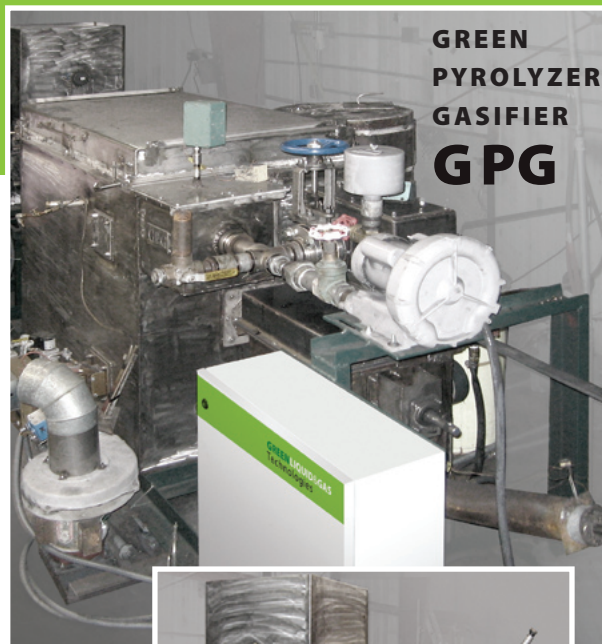
The GPG produces pyro-liquids, that can be distilled into automotive fuels and valuable liquid chemicals, and a mixture of pyro-gases that can run gas generators. But the most immediately usable by-products of this waste to energy process are the heat and the char. In addition to serving as a biochar soil additive, the char can be used as a solid fuel (charcoal) or can be processed into an activated carbon adsorbent.

The GPG has successfully pyrolyzed over 20 types of organic materials, with custom models tapered to utilize your waste product as a feedstock. Approximately 1/5 of the feedstock input remains as char.

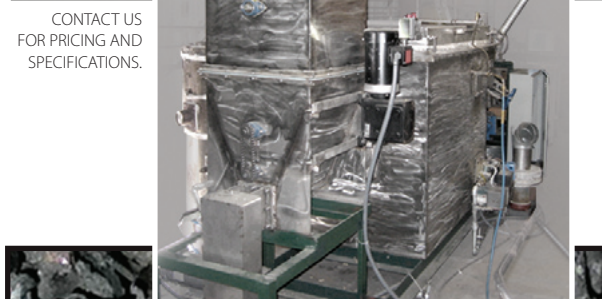
Installation comes with a limited warranty on the equipment and includes training of operations staff. Assistance for your marketing of the biochar or other char products is provided as part of our customer service, upon request.

Breaking into the market to sell biochar through garden shops and other distributors will be easy. Carbon credits for this carbon sequestration method, possible in the near future, will improve the economic equation. Meanwhile, your company can be ahead of the curve and part of the solution!

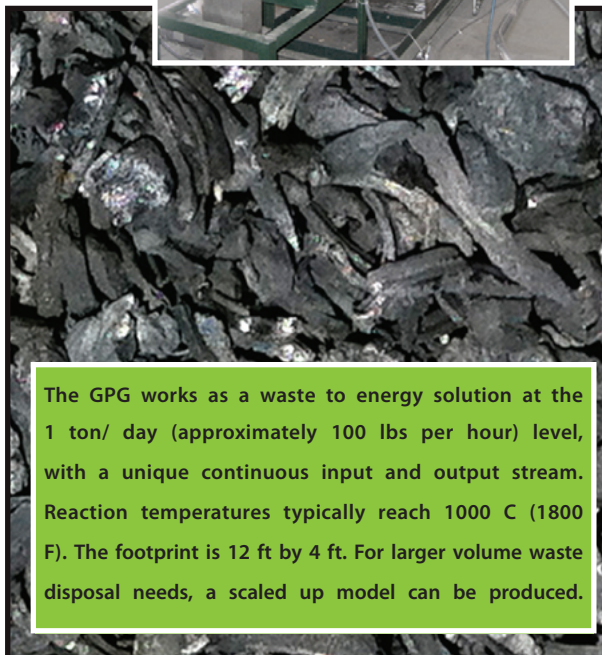
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PYROLYZER
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GPG**



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SPECIFICATIONS.



The GPG works as a waste to energy solution at the 1 ton/ day (approximately 100 lbs per hour) level, with a unique continuous input and output stream. Reaction temperatures typically reach 1000 C (1800 F). The footprint is 12 ft by 4 ft. For larger volume waste disposal needs, a scaled up model can be produced.

Put Your Waste To Work!

AGRICULTURAL RESIDUES. NON-RECYCLABLE WASTE. PLASTICS. FOREST UNDERSTORY RESIDUES. BEETLE INFESTED TREES. HURRICANE DEBRIS. INVASIVE SPECIES. CONSTRUCTION/ DECONSTRUCTION WASTE. WASTE PLASTICS. FROM RESTORING LANDFILLS REFUSE. DERIVED FUEL. POULTRY. FARM WASTE. BIO-SOLIDS. OLD ROOF SHINGLES. URBAN YARD WASTE. PIG FARM WASTE. FAST FOOD RESTAURANT WASTE. DRIED EUTROPHIED LAKE MUCK. USED PAPER. BIOREMEDIATION. ALGAE. USED TIRES. LEFTOVER CROPS. MANURE FROM CATTLE FEED LOTS. ETHANOL PRODUCTION WASTE. ANAEROBIC DIGESTION WASTE. TREATED WOOD. BIO-OIL PRODUCTION WASTE. SAWDUST. WOOD CHIPS. PINE BARK. PINE NEEDLES. LABORATORY RAT BEDDING. HORSE BEDDING. CHICKEN LITTER. COW MANURE. DRIED SEWAGE SLUDGE. FOOD COURT WASTE. CHRISTMAS TREE CHIPS. FOOTBALL GAME WASTE. MEALS READY TO EAT WASTE. OAK LEAVES...

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