



Biochar Engineering Corp makes modular equipment that produces ***biochar***, a carbon-sequestering charcoal soil amendment, from waste biomass. Future systems will also produce ***carbon-negative energy***, generating heat, electricity and ultimately liquid fuels, on-site.

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Challenge: Climate, Energy & Soils

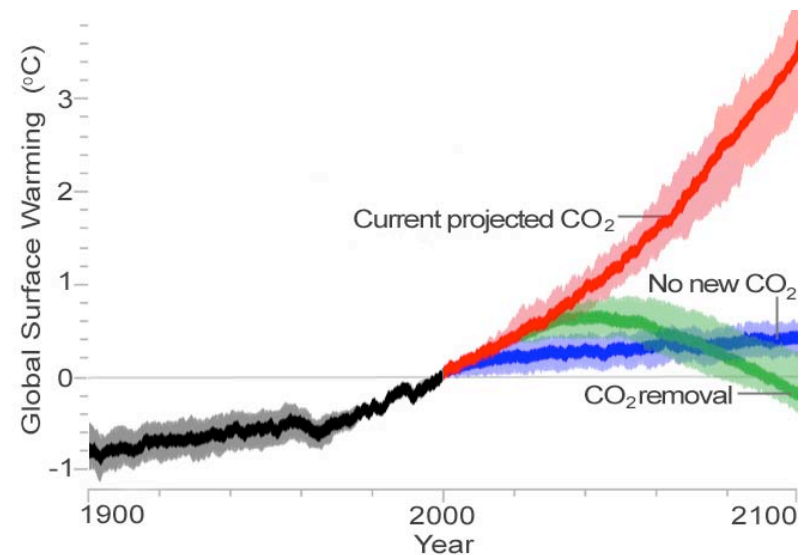
“We will have to take the CO₂ level down to 350ppm or less.”
NASA Chief Climate Scientist Dr. James Hansen

The UN IPCC now predicts 3.5°C of warming by 2100; even if we enact all proposals currently under discussion.

Even 2°C risks civilization.

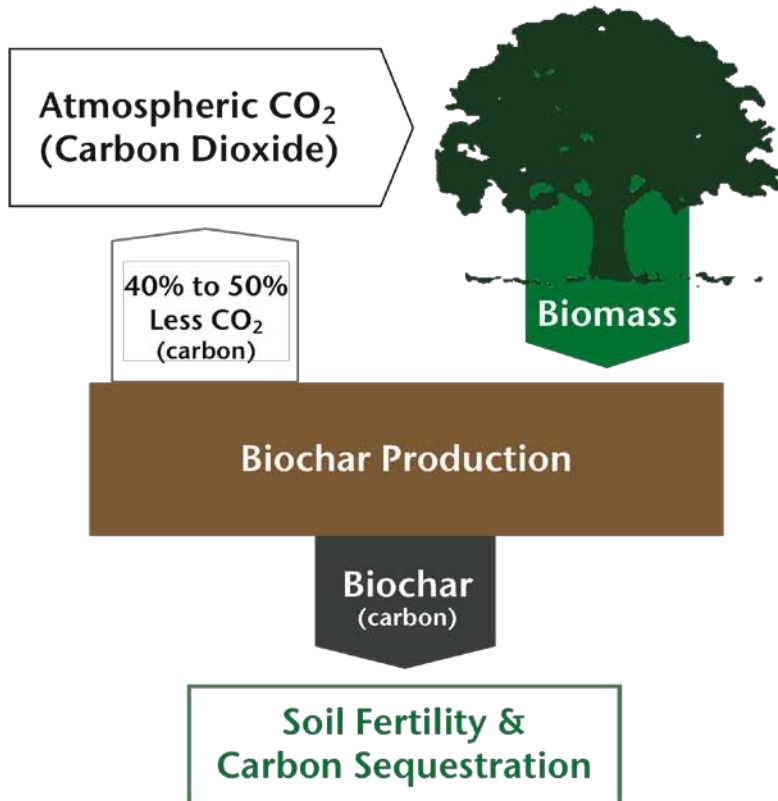
We are adding 4.6 Gigatons per year (Gt/yr) of net atmospheric Carbon.

We need to take emissions to zero, and then *remove* 100's Gt of Carbon!



Global Temperature vs. Time

Biochar is *Carbon Negative*



The Biochar cycle *removes* net Carbon from the atmosphere.

Biochar sequesters over 40% of the Carbon from biomass for 1,000 years.

Deployed globally, biochar with energy co-production from residual agricultural waste can remove at least 1-Gt/year of Carbon, & avoid another 1-Gt/year from fossil energy.

The Carbon in Biochar is equivalent to about 3 times its weight in CO₂.

Biochar Improves Soil Fertility

Inspired by Terra Preta Soils
in the Amazon Basin

Produced by Heating Biomass
with Limited Oxygen

Increases Crop Yield 10-200%

Reduces Nitrogen up to 80%

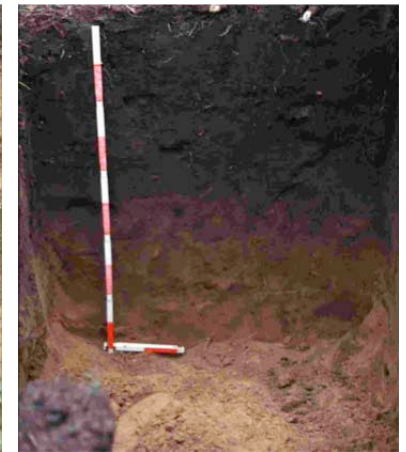
Increases Water Holding &
Drought Resistance

Increases Cat-Ion Exchange

Improves Soil pH



Regular Soil



Terra Preta



Biochar Value Streams

1. Soil Fertility

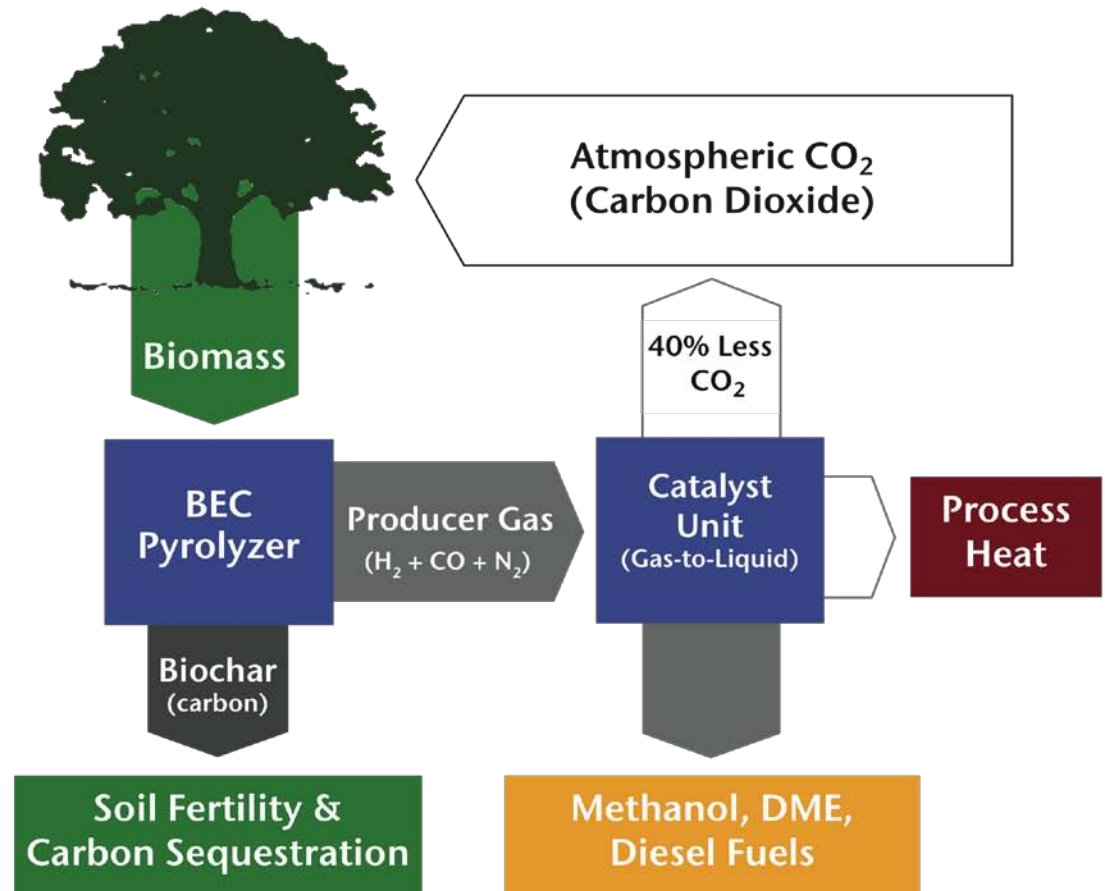
Agriculture
Forest Management
Remediation

2. Energy

Process Heat
Electricity
Liquid Fuels

3. Sequestration

Carbon Credits



Current Value Streams

1. Soil Fertility

Agriculture: \$200 to \$2,000/mt of biochar; niche markets in US

Forest Management: Pine Beetle mitigation, avoided air emissions

Remediation: Mine lands, oil & gas; research, proof of concept

2. Energy

Process Heat: Propane cost offset can pay for system

Electricity: Still too expensive for US market; green tags coming

Liquid Fuels: Very attractive in US, but several years out

3. Sequestration

Carbon Credits: \$10 to \$50/mt of biochar

4. Tipping Fees

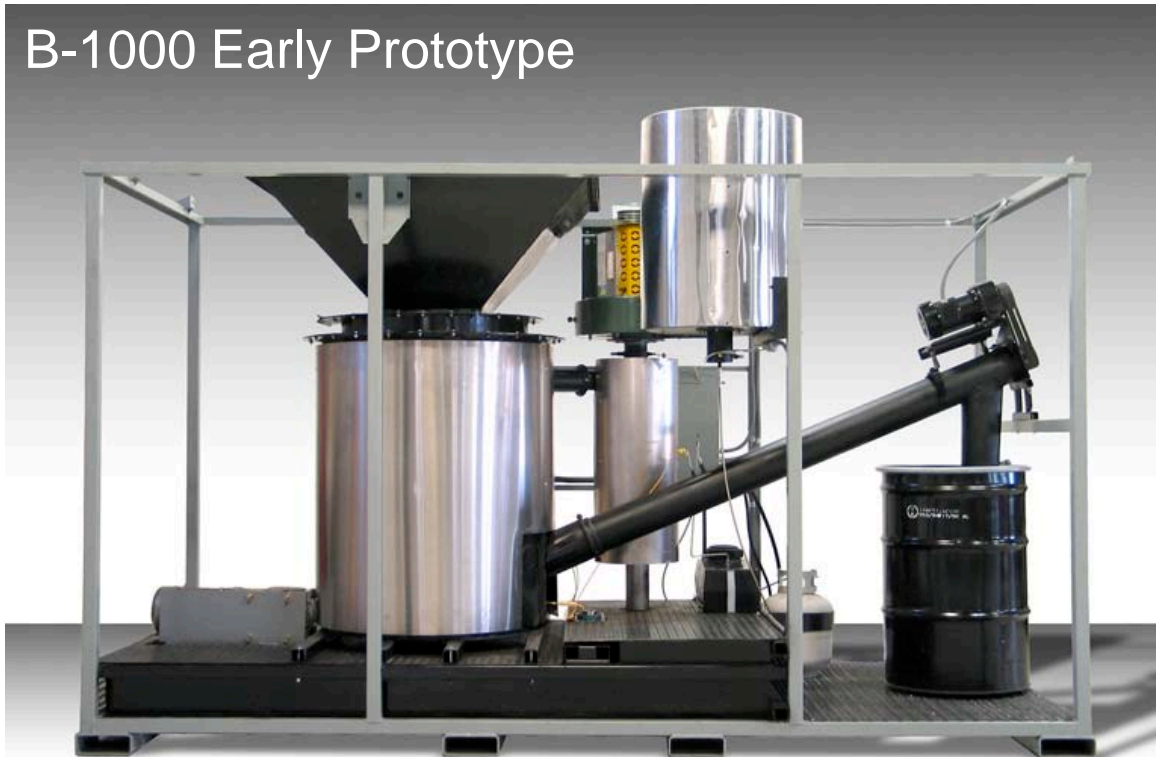
Avoided disposal cost for Green Waste = big early driver

BEC Technology

Safe, Simple, Reliable, Cost-Effective

Low Temperature Gasification - Direct-Contact Pyrolysis

B-1000 Early Prototype



Open-air process:
no risk of explosion

Produces biochar at
the lowest capital cost
in continuous field-
scale systems

Biochar produced has
low volatile content;
high surface activity;
good adsorption

Modular Systems

Field-deployable

Containerized Systems

Minimize Transport of
both Biomass and Biochar

Automated Operation to Minimize Labor

Distributed Manufacturing to Maximize Political Support

Liquid Fuel Production

BEC is working on a biomass-to-liquid fuel module that will produce methanol, DME, and ultimately ammonia, at field-scale using a novel, low-cost, nitrogen-tolerant, catalyst system already developed for stranded natural gas.

