

Local Carbon Networks for Carbon Capture - Summary

Local Carbon Networks use proprietary technology and locally sourced green waste to make electricity, heat and biochar in local communities, while sequestering carbon through biochar-enriched composting.

The Local Carbon Network (LCN) is an initiative of All Power Labs, a biomass gasifier genset company based in Berkeley, California. LCN is a framework for enabling community based carbon sequestration via the production of biochar from woody biomass waste while generating electricity using biomass gasifier gensets. Currently there are two functional LCNs: one in Berkeley, California, and one in Terni, Italy.

Plant life on earth is the largest carbon capture system in existence, capturing millions of tons of carbon per year; what is needed to take advantage of this system to actually remove carbon from the atmosphere is carbon *storage*—a method to keep a significant fraction of that plant-captured carbon from returning to the carbon cycle through decomposition. The production of charcoal from biomass waste (derived from agriculture, forestry, and post-consumer wood) converts the fixed-carbon content of biomass into a form that is stable and removed from the carbon cycle. The same biomass, if left to decompose, entirely reverts to carbon dioxide and even methane within a few years. Charcoal, also known as biochar when used as a soil amendment, does not easily revert to carbon dioxide unless combusted, thereby sequestering its carbon content while conferring long-term benefits to the soil. We liken this process of producing solid carbon and burying it in the ground to “reverse coal mining”. Given that the mining and burning of coal plays such a large role in climate change, it seems fitting that the burial of solid carbon has a role to play in the carbon drawdown.

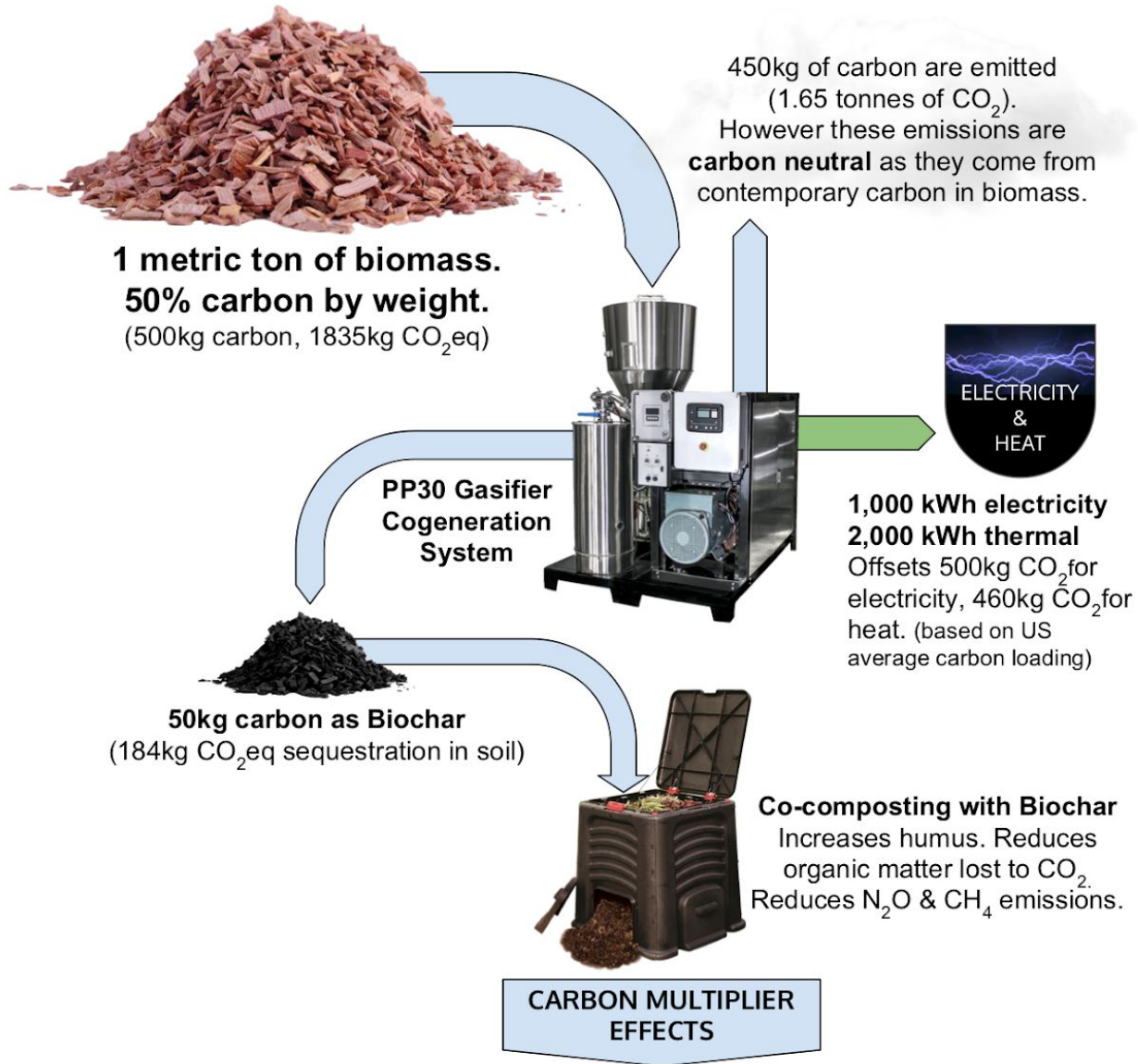
The LCN's role in this effort is to link the three parts of a composite value proposition enabled by small scale biomass gasification:

1. the need for electricity/heat
2. the need to dispose of woody biomass waste
3. the agronomic applications of biochar as a soil amendment

Those who have all three value propositions usually purchase a biomass genset of their own. However, in many areas, these interests do not coincide in one client, so the LCN connects various stakeholders, for the purpose of facilitating carbon drawdown via biochar use in composting.

Our objective is not only to provide technology and build local carbon networks but also to promote regenerative agriculture, soil health and *low impact composting methods*.

Below is a diagram of the carbon flows and balance using our technology.



50kg direct carbon sequestration
(184kg CO₂eq)



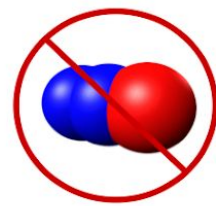
Standing biomass increase ~250kg
(458kg CO₂eq)



Soil Organic Matter
~1 tonne increase in humus, plant exudates, fungal mycelium, glomalin, microbes, etc (1835kg CO₂eq)



N₂O & CH₄ emission reduction 10-90%
(CO₂eq varies w/ soil)



Below is a summary of the inputs and outputs - we are looking at potentially 451 tons CO₂ impact for every 100 tons of waste wood used (offset and sequestered)

input	output
100 tons of biomass	90 mWh of electricity
	74.4 tons of offset fossil fuel use
	5 tons of biochar
	When composted - 100 tons of fungal mycelia and exudates - generating a carbon sink of approximately 377 tons CO ₂ eq
	Reduced nitrous oxide emissions
	Increased compost volume and stability

The reduction of the nitrous oxide emissions is particularly important as it is a greenhouse gas with 298 times the greenhouse gas impact of carbon dioxide that remains in the atmosphere for over a century. With the addition of biochar to a compost pile we can reduce nitrous oxide emissions by up to 90%.

We usually seek grant funding and sponsorships to cover the initial project cost and the first year of running, by the second year the project should generate value through the production of agriculture based and energy based products and become self sustaining.

Examples pumpkin grown with biochar at Gill Tract Community Farm — Berkley LCN (planted on some day)

