



CO₂ Neutral Energy + Biochar Carbon Removal using Local Biomass

FOREST ENERGY, INC Founder and CEO, Shingo Numa



Forest Energy is developer and operator of wood biomass power plant in Japan. We are distributor of several gasification technology.





Net Zero Energy Building using CHP CHP 80kW



CHP + Dry food factory



12 units of small CHP





Biochar Carbon Removal (BCR)

- = burying BIOCHAR in soil / material to sequester carbon
- one of the IPCC-recognized CDR technologies
- one of the most affordable and market-ready solutions



BCR accounted for 94% of delivered carbon removal credits in 2023.

Google

By Randy Spock Jan 16, 2025

We're announcing our first partnerships to scale biochar for CO2 removal.

Today Google is announcing two long-term purchase agreements to help scale biochar as a carbon removal solution. We're partnering with <u>Varaha</u> and <u>Charm</u> to purchase 100,000 tons of biochar carbon removal from each company by 2030. These are the largest biochar carbon removal deals to date.

These deals will enable 200,000 tons of carbon removal to help Google achieve our net zero emissions goal — and help catalyze biochar production toward a scale that can help the planet mitigate climate change.

With these partnerships with Varaha and Charm, we're adding biochar to a growing toolkit of carbon removal solutions Google supports (such as <u>enhanced rock weathering</u> and <u>direct air capture</u>), and as a complement to our ongoing efforts to kickstart the carbon removal field through <u>Frontier</u> and <u>Symbiosis</u>.





Forest Energy focuses on Energy business, producing biochar as by-product.

- 1. Feed-in-tariff / Feed-in premium to support renewable electricity business
- 2. 67% of Japan is forest

Biochar Production Style		Thermal chemical process
Backyard production	Simple, small batch production suited for thinly distributed feedstock	
		Pyrolysis 400℃ - 800℃
Industrial production	Large production. Adapt to various biomass	
Our focus		
By-product of Energy production	By-product = low process cost. Mainly wood biomass	Gasification 750℃ - 1100℃

We aim to produce "local circular economy".





As of today, we have put high priority on 2 developments.

- 1. "Biochar x Compost" Pellets
- 2. Production of "Syngas" to partially replace city gas (LPG)





- 1. We put higher priority on "Biochar + Compost" pellets.
 - 1. Pellet is the easiest in handling
 - 2. AIM = Cost reduction by reducing use of conventional fertilizer
 - 3. We have seen positive effect on quality of ONION in 2023-2024 test
- 2. November 2024, we increased the size of experiment \rightarrow result May 2025.



Forest Energy Biochar + Compost Pellet test: Onion 2024/11 – 2025/5





- 1. We see SYNGAS as transitional energy source, as we move on to hydrogen.
- 2. We are upgrading CHP plant to produce SYNGAS for industrial use.
- 3. SYNGAS will be provided on-site. Not to be fed into gas grid.



Mix SYNGAS with LNG/LPG used in heat process at factory.

- 1. 5-20% reduction of LNG/LPG
- 2. Can be done using existing facility
- 3. No new technology development necessary. Syngas is produced from the same system as CHP

Forest Energy SYNGAS: Hybrid system

In 2025, we have upgraded the CHP to "CHP + Syngas" hybrid model.



2025/2026 | Feasibility Study

- We would like to conduct feasibility study in one of CEFIA member country
- Theme : Build "Biochar x Energy" model using local biomass
- LOOKING FOR: University / Research Institute interested in co-working with Forest Energy to do the feasibility study