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# AgriCos e-Newsletter
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# Biochar: Turning Farm Waste into Climate Cash

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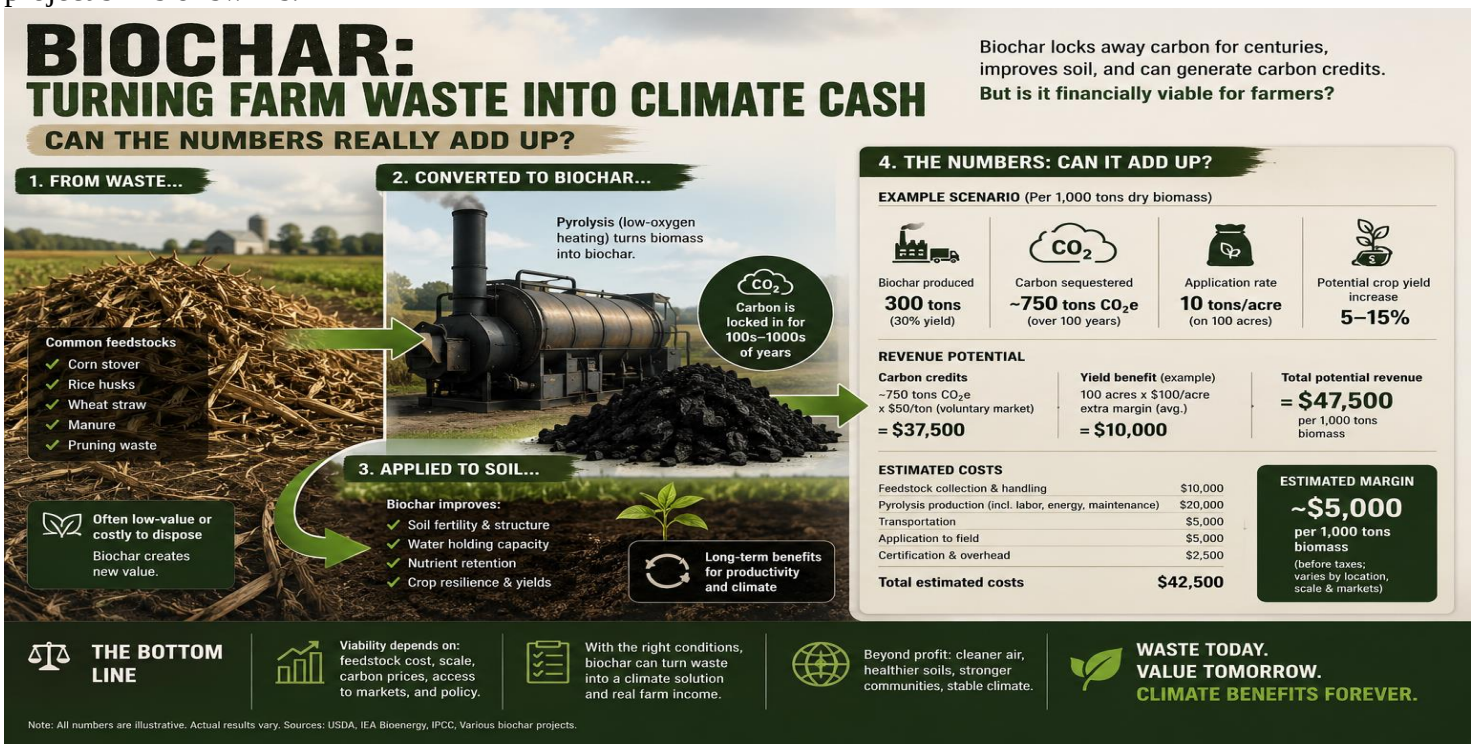
**SUMMARY**

Biochar charcoal made by heating agricultural waste without oxygen has quietly become one of the carbon market's hottest products. Once seen mainly as a soil booster, it is now the most commercially mature "carbon removal" technology on the planet, responsible for the vast majority of all durable carbon credits actually delivered to buyers like Microsoft and Google. But does the basic business of making biochar actually turn a profit? A recent techno-economic study from Portugal found that a standalone biochar plant loses over €1.3 million over its lifetime unless it's bundled with other revenue streams, such as forest-clearing services or surplus biomass sales, in which case it becomes solidly profitable. Meanwhile, biochar carbon credits sell for good amount, ten to thirty times the price of ordinary carbon offsets, driven by buyers chasing genuine "net zero" claims. Looking ahead, two regulatory shifts mandatory airline carbon offsetting from 2027 and possible inclusion in official EU carbon markets could send demand soaring. This article explains, in plain terms, how biochar economics actually work, why carbon credits are the secret ingredient, and what risks could still derail the boom.

## INTRODUCTION

Picture a farmer in Brazil burning leftover coffee parchment, or a sawmill in Oregon with mountains of wood offcuts nobody wants. For decades, this kind of agricultural and forestry "waste" was either burned, left to rot, or quietly became a fire hazard. Today, that same waste is being transformed into something with a price tag attached: biochar. Biochar is essentially charcoal but charcoal with a purpose. Instead of burning biomass completely (which releases its carbon back into the air as $CO_2$), biochar production uses a process called pyrolysis: heating organic material to high temperatures with little or no oxygen. The result is a stable, carbon rich solid that can be locked away in soil for centuries, all while improving how that soil holds water and nutrients. What has turned biochar from a niche gardening product into a genuine investment opportunity is its connection to carbon credits the tradable certificates that companies buy to offset their greenhouse gas emissions. Biochar credits now sell for eye watering prices compared to ordinary carbon offsets, and tech giants like Microsoft and Google are buying them by the hundreds of thousands. But headline numbers can be misleading. Does making biochar actually pay for itself? And how much of biochar's current boom depends on a carbon market that history tells us can be volatile and unpredictable. This article unpacks both sides of the story: the nuts and bolts economics of producing biochar, and the fast evolving, sometimes confusing world of carbon credits that increasingly determines whether a biochar project sinks or swims.



**The Basic Math: Why Biochar Alone Doesn't Pay**

Let's start with the uncomfortable truth. A detailed financial study of a small biochar plant in Portugal using residual forest biomass like acacia, gorse, and broom that are prime wildfire fuel found that if you simply build a pyrolysis reactor, make biochar, sell it for around €900 per tonne, and collect carbon credit payments on top, you still lose money. Across a 20-year project lifetime, the loss adds up to roughly €1.36 million. To break even on biochar sales alone, the price would need to hit around €2,480 per tonne nearly three times the highest prices seen anywhere in today's market. That's the bad news. The good news is what happens when biochar production is bundled with other activities. When the same plant also gets paid to clear and maintain fire prone forest land essentially, a wildfire prevention service, the picture flips completely. The project becomes profitable, paying back its investment in about 15 years with a modest but real return. Add a third revenue stream selling the leftover biomass that isn't needed for the pyrolysis reactor and the project pays back its investment in just 8 years, with a healthy return on investment. The lesson is clear: biochar production rarely works as a standalone business. It works brilliantly as part of something bigger a forestry management service, a waste disposal contract, an energy plant, or an agricultural cooperative's circular economy. The most successful biochar companies in the world follow exactly this pattern. NetZero, operating in Brazil, takes coffee processing waste for free, turns it into biochar, and sells it back to the same coffee farmers closing the loop. HUSK, in Cambodia and Vietnam, turns rice husks into premium fertilizer products, with carbon credits providing only 10–20% of revenue rather than being the main event.

**Carbon Credits: The Premium Ingredient**

Here's where biochar gets genuinely interesting from an investment perspective. Most carbon credits the kind generated by tree planting or renewable energy projects sell for somewhere between $4 and $10 per tonne of $CO_2$. Biochar carbon credits sell for $100 to $300 per tonne. That's not a small premium; it's an entirely different price category. Why the gap? Two reasons. First, carbon stored in biochar is considered extremely durable — potentially lasting over a thousand years, compared to a forest that could burn down next summer. Second, and perhaps more importantly, biochar is currently the only "durable carbon removal" technology that's actually working at commercial scale today. Competing technologies direct air capture machines that suck $CO_2$ straight from the atmosphere, or enhanced rock weathering that speeds up natural mineral processes are still years away from delivering credits in meaningful volumes. Of all the durable carbon removal credits that have actually been delivered to buyers so far, more than three quarters came from biochar. This scarcity has made biochar credits a favorite of companies racing to make credible "net zero" claims. Unlike "carbon neutral" which can be achieved by buying almost any type of offset "net zero" requires proof that carbon has genuinely been pulled out of the atmosphere. That's a much higher bar, and biochar is one of the few products that can clear it today. Microsoft, Google, Shopify, and a handful of other tech and finance companies have become the dominant buyers, often locking in massive multi-year contracts for tens of thousands of credits at a time.

**What Could Go Wrong?**

Markets built on premium pricing and concentrated demand carry obvious risks. If a handful of large tech companies decided to scale back their voluntary carbon spending say, due to economic pressure or political shifts biochar credit prices could fall sharply. There's also a credibility risk: the carbon market has been burned before by scandals involving forest protection credits that turned out to be less effective than claimed. A similar scandal involving biochar, especially from less rigorously monitored small scale "artisan" projects, could spook buyers across the entire sector. There's even a more fundamental debate brewing among scientists and policy experts: should biochar credits even count as "carbon removal" at all? Some argue that since the waste biomass would have decomposed and released its carbon anyway, biochar production is really just *avoiding* emissions rather than *removing* extra carbon from the atmosphere. If regulators ever agreed with this view, biochar credits could lose their premium pricing overnight and be repriced down to the level of ordinary offsets a tenfold drop or more.

**The Big Opportunities on the Horizon**

Despite these risks, several developments could send demand and prices sharply higher. The most significant is a new rule for the airline industry. Starting in 2027, a global aviation agreement called CORSIA will require airlines to offset the *growth* in their international flight emissions and this requirement becomes mandatory, not optional. Estimates suggest this could create demand for more than 500 million carbon credits, dwarfing the entire current supply of durable carbon removal credits combined. If biochar is approved as an eligible credit type (and several certification bodies have already applied), the resulting demand surge could be transformative. Europe is also developing an official "Carbon Removal Certification Framework" that would give biochar formal

recognition within EU climate policy potentially opening the door to government funding and, eventually, access to the much larger compliance carbon markets that big polluting industries are legally required to participate in. Beyond regulation, there's a quieter opportunity in the world of commodity trading. Companies that trade coffee, cocoa, and cotton are under growing pressure to clean up the carbon footprint of their supply chains. Biochar offers them a neat solution: turn the agricultural waste from their own supply chains into biochar, and apply it back to the farms that grew the crops in the first place cutting emissions and improving soil health in one move.

## CONCLUSIONS

Biochar sits at a genuinely exciting crossroads. The technology works, the climate science behind it is solid, and unlike many "future" climate solutions, it's making real carbon credits and delivering them to real buyers right now. That puts it years ahead of flashier-sounding alternatives like direct air capture. But the path to profitability is narrower than the hype sometimes suggests. Making biochar and selling it, on its own, generally doesn't pay the bills. The projects that succeed are the ones that think bigger: pairing biochar production with forest management, energy generation, waste disposal services, or agricultural supply chains and treating carbon credits as the icing on the cake rather than the whole cake itself. The next few years will be decisive. If aviation offset rules and European carbon regulations open up as expected, biochar could move from a promising niche to a mainstream climate technology with genuinely large scale demand. If they don't or if a credibility crisis hits the sector the way, it hit forest protection credits today's premium prices could come back down to earth. Either way, biochar has already proven something that few climate technologies can claim: it works, it's being bought, and farmers, foresters, and investors are making real money from it today.

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