



Advancing Biochar: From Misunderstanding to Innovations!

Despite significant advancements in biochar production and utilization in recent years, misunderstandings still abound. Information sources often highlight uncommon negative outcomes, yet the reality and science of biochar's benefits are far more positive in the majority of studies and demonstrations. This past month alone, several excellent guides on the cost-effective use of biochar have been released. The **Australian New Zealand Biochar Industry Group (ANZBIG)** has published a **"A Farmer's Guide to the production, use and application of biochar"** filled with invaluable insights. Kelpie Wilson's **"The Biochar Handbook"** is highly recommended must-read, offering plenty of practical tips. Professor Johannes Lehmann and Stephen Joseph have released the third edition of **"Biochar for Environmental Management,"** enriched with new material. Additionally, the US Forrester released **Mobile Biochar Production by Flame Carbonization: Reducing Wildfire Risk and Improving Forest Resilience** multi-year research document. For those who prefer visual learning, numerous instructional **videos** have also become available online. Be sure to check out the factsheets and videos on the **USBI Learning Center website** for more information.

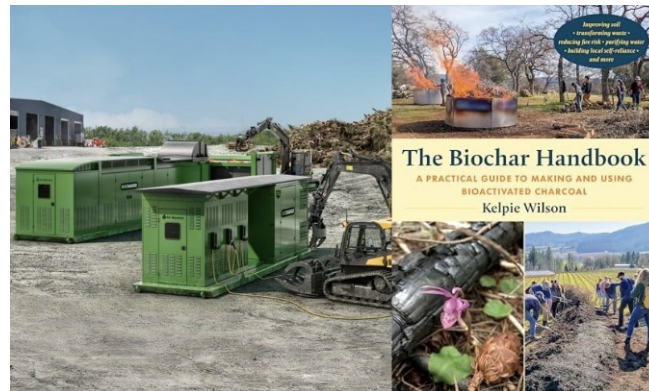
Access to affordable **laboratory testing** for quality control remains a challenge for many producers. To address this, we have initiated a process to develop an American National Standard (ANSI) for laboratory analysis of biochar. The response from industry, laboratories, and researchers across the United States, Mexico, and Canada has been enthusiastic. While this work, led by our Program Director, Myles Gray, is just beginning, our goal is to develop a methodologically consistent standard that is easy for labs in North America to use but also rigorous enough to be highly repeatable. The formal standards development effort will begin in August 2024 and we hope to release the standard by the end of Q2 2025 to fill a critical gap.

We have seen a flood of research papers exploring new applications for biochar, potentially leading to innovative products and markets. Just a decade ago, our Program Director, Myles Gray, assisted a high school student investigate biochars as electrode materials in microbial fuel cells. Today, there are demonstrations of biochars in microbial fuel cells that absorb ammonia and phosphorus from wastewater while generating electricity. Nanochars are being tested to remove microplastics from water, and magnetic biochars are being utilized to capture pollutants. Various municipalities are establishing pyrolysis projects to eliminate harmful "forever chemicals" (PFAS) from biosolids with equipment from manufacturers like **PYREG, VOW**, and others. Moreover, we are witnessing an increase in the use of biochars in building products. We extend our gratitude to the new wave of carbon financing for providing essential support to the industry in production of biochars and advanced carbon products.

USBI focus is on industrial scale biochar production for wide adoption and utilization with the benefit of carbon capture. We also support the artisanal producers through Biochar in the Woods and similar programs. In recent years we have been fostering an innovative market in the mid-tech sector that includes mechanized portable place-appropriate carbonization systems that produce biochar.

To help build this new market, a few years ago USBI helped **Tigercat** demonstrate their large mobile carbonizer. Today, there are many carbonizers working on the crucial task of removing hazardous

fuels from forests, organics recycling facilities, and post-disaster cleanup sites while also producing biochar. A similar product from the UK is currently being tested in the upper Midwest. Recently, the EPA has eased stringent (Title V) permit requirements for these air curtain incinerators (ACI) which should allow for their broader use. USBI has been instrumental in supporting air quality testing and providing education to state agencies to streamline the permitting process.



At a smaller scale, USBI supports the USFS and Air Burners Inc. in developing the **CharBoss mobile carbonizer**, now used by urban and forest contractors. The key components of the CharBoss are expected to be adapted to larger machines. Using data from our air quality testing, we conducted a preliminary **Life Cycle Assessment** to determine the carbon dioxide removal potential of the CharBoss. We are encouraged by the prospect of creating a protocol to monetize carbon removal with these machines, particularly if they can recover energy while generating carbon credits. In their latest development, Air Burners has demonstrated their “**Biocharger**,” which can recover heat and biochar using their system to generate electricity and charge a battery for remote mobile equipment. The current model can process 10 tons per hour of wood and generate enough power to charge up to four electric vehicles each day.

With more markets and more tools, the carbon-negative biochar community continues to advance!



Tom Miles
Executive Director

Unlocking the Value of Biochar for Corporate Climate Goals

I hope you are having a great Summer! I just finished up a backpacking trip with my kids to the high country of Mt Hood. We get up there every year, and we have all seen the snowfields get smaller and the glaciers recede uphill as the climate continues to warm. I talked to my kids a lot during the trip about the work that I do, why I do it, and why I think it matters. But I also acknowledged, to them and to myself, that there are no perfect outcomes and no perfect actors in the fight against climate change.

Since we returned to the real world, I have been refocused on strategies to scale the production



and use of biochar, including engaging with major corporations and companies to bring them into the biochar space, either as producers or end-users. This was the topic of an AirMiners webinar on [leveraging biochar to help companies cut value-chain emissions without purchasing Carbon Dioxide Removal \(CDR\) credits](#) that I participated in this past April.

The discussion stuck with me, especially given the dynamic shifts in the CDR industry and as the Science Based Targets Initiative (SBTi) refines its guidelines, and I wanted to share my thoughts with you in a longer format and so I will encourage you to [read my longer blog post on biochar.org](#).

On the blog post I cover a number of key points and highlight their importance in upcoming initiatives we are launching later this year.

- * **Biochar is Leading the CDR Market:** Biochar continues to dominate durable carbon removal deliveries in 2024, representing a significant portion of the market.
- * **Cost-Effective Climate Action:** With biochar CDR credits averaging \$125 per ton of CO₂, shovel-ready biochar is an affordable alternative compared to other high-tech CDR solutions.
- * **Value Beyond Carbon Removal:** Biochar can replace high-carbon materials, reduce fertilizer needs, boost crop yields, and lower soil emissions of nitrous oxide, driving substantial carbon reductions across various sectors.
- * **Guidance for Value-Chain Decarbonization:** USBI is developing guidance to help companies use biochar to decarbonize their value-chains, establishing it as a carbon-neutral material when sold separately from its CDR credits.

Looking ahead, USBI will release detailed guidance on leveraging biochar's additional carbon benefits, providing companies with a cost-effective tool to achieve their climate targets. Together we can achieve great goals.

I hope you are enjoying your Summer and connecting with the things you love.

[**Watch the AirMiners VCM Conversation**](#)



Myles Gray
Program Director

BIOCHAR GAINING MUNICIPAL INVESTMENT



4 CORNERS

CARBON REMOVAL COALITION

4 Corners Carbon Coalition Awards \$245K To Carbon Removal Projects

The [4 Corners Carbon Coalition](#), a network of communities in the Western U.S., has announced grants for \$245,000 to three innovative biochar projects aimed at combating climate change and reducing wildfire risks through carbon dioxide removal (CDR) in the Southwest.

These projects will convert organic waste into biochar and other useful products. The grant recipients are:

- [Gila WoodNet](#) (\$145,000) – Processing forest waste into energy and biochar in Boulder, and Silver City, New Mexico.
- [Bioforcetech Inc.](#) (\$50,000) – Incorporating biochar from municipal waste into asphalt and concrete in Boulder, and Flagstaff.
- [Carba Inc.](#) (\$50,000) – Converting woody biomass into biochar for burial and carbon storage in Flagstaff.

The coalition is an important and growing sub-set of municipalities in the Southwestern US that include; Albuquerque, New Mexico; Boulder County, Colorado; Flagstaff, Arizona; Santa Fe, New Mexico; and Salt Lake City, Utah. As the coalition, they play a pivotal role in supporting and advancing CDR, including biochar carbon removal, through regional collaboration, advocacy, resource mobilization, and market development, contributing to broader environmental and economic benefits.

More about 4 Corners Carbon Coalition

Allow us a moment to expand on just how truly groundbreaking and important organizational efforts like this are to the biochar industry.

Highlighting their bold action, the coalition did not wait for federal funding before launching. Co-founded by [Ramon Alatorre](#) and [Christopher Neidl](#), they demonstrated that by pooling resources and securing funding from various stakeholders, the coalition can invest in CDR/BCR projects, research, and development initiatives. This approach accelerates innovation and the adoption of shovel-ready technologies. We encourage other regional municipalities to view the 4CCC as a template for reaching resilience goals.

Through grants like this, the coalition is helping develop and expand the market for biochar by raising awareness among potential users, such as farmers, businesses, stormwater managers, municipal greening programs. and more. This increased demand drives the economic viability of biochar enterprises.



The 4 Corners Carbon Coalition is influencing regional policies and advocating for supportive regulations and incentives for carbon removal applications, creating a favorable environment for the growth of our industry.

Thank you to Ramon and Christopher and their partners for their important work. We look forward to more announcements like this!

2024 North American Biochar Conference Presenter Highlight - Josiah Hunt - Pacific Biochar "Intergenerational Benefits of Farmland Applied Biochar"

Our 2024 Biochar Conference theme was "Climate Action with Biochar for Economic and Ecosystem Resilience."

Today we highlight a technical talk by Josiah Hunt, where he reviews the **intergenerational values of farmland applied biochar**, the rudimentary means of gauging them, and waxes poetic about how we could someday cohesively incentivize the deployment of biochar in ways that maximize beneficial intergenerational outcomes.

Using detailed data and practical examples, he demonstrates the economic and environmental value of biochar, encouraging a reevaluation of our methods for carbon removal and soil management. Watch the video to understand the potential of biochar in fostering a sustainable future for upcoming generations.

[Download Josiah's PDF to follow along.](#)
[Discover more presentations & videos](#)



Favorite quotes:

"... the math that makes this whole thing work for me is when the carbon is worth more in the ground than it is in the furnace..."

"Here's the crop yield value in almonds in the thousand-year value, which is \$67,000 per ton of biochar. That's the crop yield value that's being provided over the lifetime of that biochar within a thousand-year time frame."

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MOBILE BIOCHAR PRODUCTION

CharBoss®, the world's first mobile biochar production system converts unwanted wood waste into biochar.



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SPECIAL OFFER FOR USBI SUBSCRIBERS

Kelpie Wilson's latest book, *The Biochar Handbook*, is hot off the presses and publisher Chelsea Green has generously provided USBI with a -35% discount code for our subscribers. Use code CGP35 when ordering on the publisher site.



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What to Watch

[USFS webinar, Dr. Cai presents Production and Utilization of Biochar: A sustainable and Eco-friendly Approach](#) | US Forest Service in collaboration with USBI, and Southern Regional Extension Forestry - Watch Dr Cai discuss his Engineered Composites Science team's latest innovation in biochar enhanced materials. Recorded July 25h, 2024.

[Scaling Up Biochar "Biochar Testing: What We Test and Why It Matters"](#) | Presented by NFWF, CWP, USBI, and UoD Speaker: Lalitha Gottumukkala, PhD., Chief Innovation Officer, Celignis Limited, PhD. speaks to lab testing of biochar from pyrolysis and what analysis means for material applications.

[Scaling Up Biochar "What parameters are most important in bioretention mix and in situ soils and the lab analysis necessary to accurately calculate the effectiveness of different biochars."](#) | Presented by NFWF, CWP, USBI, and UoD Speaker: Paul Imhoff, Professor, PhD., Department of Civil and Environmental Engineering, University of Delaware.

[Beyond Emissions: Exploring Cutting Edge Carbon Removal Solutions](#) | 3Degrees - Southwest Biochar - CarbiCrete - Video short created by 3Degrees providing a spotlight on [Tyson Nicoll](#) of [Southwest Biochar](#)

[Biochar Did This! Explosive Growth in The Garden. Permaculture Nordic Food Forest](#) | Inspiratoriet Food Forest Retreat - This is just a fun video. For the past 3 years they added worm casting bio char to this part of the garden and the result is explosive growth and beauty. Joyful use of biochar in gardening practices.

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RK240 - 20 TPD Pyrolyzer

Located: Salt Lake City, UT.

Info: green@gobiochar.com



Join the USBI Directory!

We are building the most comprehensive biochar directory for the US market.

Join the directory, search the directory, and use the directory to connect with others in the North American biochar network. Together we are putting the world's carbon budget back in the black!

Welcome to [WasteX \(Singapore\)](#), [ScyTek Laboratories \(Utah\)](#), [Davey \(Illinois\)](#), and [Biomass Controls \(Connecticut\)](#) - the newest businesses to join our directory!

Contact john@biochar-us.org with questions.

[Get Your Directory Listing](#)

Reading List

[Mobile Biochar Production by Flame Carbonization: Reducing Wildfire Risk and Improving Forest Resilience](#) | US Forest Service

This multi-year US Forest Service report, co-authored by Kelpie Wilson, Wihan Bekker, James Archuleta, Darren McAvoy and [Debbie Page-Dumroese](#) (US Forest Service) was published last week. In this report they compare and contrast eight different mobile technologies for making biochar IN THE WOODS using woody debris that is otherwise a hazardous fire risk.

[Researchers develop more environmentally friendly and cost-effective method for soil remediation](#) | Rice University PFAS Research Chemists have developed a biochar enhanced rapid electrothermal mineralization (REM) process, which in seconds can remediate the accumulation of synthetic chemicals that can contaminate soil and the environment. [Farmer's guide to production, use and application of biochar.](#) | ANZ Biochar Industry Group

[The Biochar Handbook](#) | New release by Kelpie Wilson and Chelsea Green Publishing - Be sure to take advantage of the special [35% discount with code CGP35](#) when ordering from publisher.



“This book is an absolute tour de force ... Everyone from newbies to those who have been in the biochar industry for years will learn a lot!”

Kathleen Draper, coauthor of BURN
Former Board Chair, International Biochar Initiative

Pre-order now from your favorite bookseller.

Biochar Events Calendar

Connect and collaborate at in-person or online events!

August - September 2024

August 7

[Backyard Biochar](#) | Clayton County Conservation held at Osborne Pond In-person: Elkader, Iowa 6-8 PM [Register here.](#)

August 13

[Title: Empowering Climate Action through Biochar: Insights into the U.S. and Canada Biochar Protocol V1.0](#) | Climate Action Reserve

Location: Zoom - follow link to register - 9 to 10 AM Pacific

August 14 & 15 - program is 2 full days

[Mexico Carbon Forum](#) | MÉXICO2 & GTO Secretaría de Medio Ambiente y Ordenamiento Territorial

Location: Guanajuato, MX - follow link to register

[August 24 Free Biochar Demonstration](#) | Dovetail Partners w Carlton Soil & Water Conservation District

In-person Event: 1-3PM, Duluth, MN [Registration link.](#)

August 29 [Soil Health with Biochar Field Day](#) | Dovetail Partners w Carlton Soil & Water Conservation District

In-person Event: 3-7:30PM, Holyoke, MN [Registration link.](#)

September 23 - 24

[NYC CLIMATE WEEK event with USBI & Grain Ecosystem](#) Sponsored by USBI and Grain

Ecosystem | Join the premiere biochar climate event at Climate Week!
Location: NYC, NY - Details coming soon!

September 24 - 26

[Great Plains Biochar Conference](#) Sponsored by The University of Nebraska–Lincoln [Department of Agronomy and Horticulture](#), the [Nebraska Forest Service](#) and the [Nebraska Biochar Initiative](#) |

Location: Lincoln, NE - [follow link to register](#)

Looking for biochar industry career opportunities?

[Check out LinkedIn for sales, research, internship postings, and more!](#)

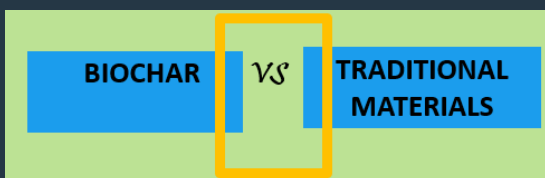
[Davey Tree hiring biochar production system operator.](#)
[Harshal Kansara - RIT PhD Candidate seeks biochar position](#)

Biochar Newsbytes



[Biochar Vs Traditional Materials](#)

This ScienceDirect.org journal article offers a handy, well-organized graphic showing how biochar compares to traditional materials used for water, soil, and ecosystem remediation, amending agricultural practices and soil, energy production, construction materials, climate mitigation, air



quality improvement, and waste management.



[The Know-How of Biochar-Concrete](#)

Adding biochar to concrete improves its strength and durability, enhances its insulation properties, and can substitute for some of the cementitious materials needed to make concrete. Read more to learn about biochar-concrete's economic feasibility and performance.

[Could Biochar Help Charge Your Smartphone?](#)

Is there a cleaner/greener option than lithium batteries? Research shows biochar's potential as a sustainable alternative for certain components

within lithium-ion batteries.



Managing Storm Water by Integrating Biochar with Circular Resource Management Strategy



With EPA maximum PFAS drinking

water contaminant levels now in place, many localities are under pressure to rebuild storm water infrastructure that costs more than its tax and fee base can afford.

By integrating Circular Resource Management with biochar production, Hanover (Eastern Pennsylvania) is navigating regulatory hurdles and building a resilient future.

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USBI thanks the USDA Forest Service, Wood Innovation Program for continued support of its activities and publications. USDA is an equal opportunity provider, employer, and lender.

USBI is supported in part by The United States Endowment for Forestry and Communities, Inc. The Endowment is a not-for-profit corporation that works collaboratively with partners in the public and private sectors to advance systemic, transformative, and sustainable change for the health and vitality of the nation's working forests and forest-reliant communities.



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