Issues To Watch As Biochar Carbon Project Demand Heats Up

By **Mackenzie Schoonmaker and Astrika Adams** (September 7, 2023)

Mackenzie Schoonmaker

Astrika Adams

A report released last month by Emergen Research indicates that the global biochar market is expected to nearly triple from its current value of $160 million to over $450 million by 2030.

Biochar is a soil amendment used to increase crop yield and health for agricultural purposes. The increased demand for biochar reflects the increased demand for soil amendments in the agricultural sector generally.[1]

Entities considering financing, constructing or operating biochar projects, however, are evaluating more than the demand for biochar as a soil amendment. Biochar projects also have the potential to generate revenue from carbon credits and produce other byproducts such as bio-oils and synthesis gas.

Below is an overview of biochar projects, as well as the legal issues that will continue to affect this rapidly emerging market.

Defining Biochar

Biochar is the end product of the exposure of certain biomasses — such as wood, wood residues, manure, poultry litter, other agricultural residues and biowaste — to intensely high temperatures in the absence of oxygen.[2] The physical description of biochar can be compared to the char left in your oven after cooking; the only difference is that biochar is made at much higher temperatures and without the presence of oxygen.

Importantly, biochar consists of trapped carbon and other greenhouse gases. Because biochar is an extremely stable form of carbon, the carbon and other GHGs are effectively permanently trapped for hundreds — if not thousands — of years, preventing carbon and other GHGs from being emitted into the atmosphere.[3]

If the biochar had not been created, the biomass would have decayed, decomposed, burned or otherwise undergone processes resulting in carbon and other GHG emissions.

Biochar is created through a thermochemical process that can manifest itself in three ways:

- Torrefaction: The biomass is exposed to temperatures less than 300 degrees Celsius with products including biochar (80%), noncondensable gases (15%) and bio-oil (5%).

- Pyrolysis: The biomass is exposed to temperatures between 400 C and 500 C with products including biochar (12%-35%), noncondensable gases (13%-35%) and bio-oil (30%-75%).

- Gasification: The biomass is exposed to temperatures between 750 C and 900 C with products including biochar (10%), noncondensable gases (85%) and bio-oil (5%).[4]

How Biochar Is Used

Multiple industries and sectors can use biochar. As a soil amendment, so long as the user applies the right biochar to the right soil, it can improve soil structure, increase nutrient holding capacity and improve water retention.[5]

It is important to understand that each produced biochar is wholly unique from other biochar created from different biomass sources.[6] The molecular makeup of the biomass fed into the system will be comparable to the molecular makeup of the produced biochar.[7]

For example, if biomass used has a high concentration of potassium, it is expected the resulting biochar will similarly contain a high concentration of potassium. Some potassium-deficient soils would be better served to utilize this potassium-rich biochar than a biochar that lacks a high potassium concentration.

But looking beyond soil amendment uses, biochar has a variety of other commercial and manufacturing uses. For example, it can be used as a substitute for fly ash, as a cap for oil and gas wells, and as a dyeing agent for tires and electronic devices.

Biochar Carbon Credits

In addition to biochar, these thermochemical processes can produce environmental benefits from permanently removing carbon from the atmosphere by capturing it in the biochar for hundreds, if not thousands, of years.[8]

Biochar carbon credits can be verified by carbon registries and sold in the voluntary carbon market, and each credit represents the permanent removal of GHG emissions from the atmosphere. Unlike forest carbon credits and soil carbon credits, biochar carbon credits are consistently sold well north of $100 per credit.[9]

Other Byproducts

In addition to biochar and the related biochar carbon credits, biochar projects also produce bio-oils as well as consolidated gases such as syngas.[10] Syngas, in particular, is a valuable renewable fuel that can be used, or sold, for various energy production purposes.[11]

However, it is important to understand the different chemical and nutrient makeup attached to any particular biochar will dictate what environmental risks, if any, might exist stemming from any chemically treated feedstock used.

Legal Hurdles Facing Biochar Projects

The decision to enter the biochar market requires consideration of a variety of legal issues, including the following:

Corporate and Deal Structuring

Effective corporate and project structuring — including financing considerations, which

ensure that benefits are maximized while liabilities are minimized — are cornerstones of any successful venture. This is especially true for biochar projects, which have an extra layer of uncertainty because of the relative novelty of them.

In Pioneer Hi-Bred International Inc. v. Alten LLC in February,[12] the U.S. District Court for the District of Nebraska found, when considering whether to issue a preliminary injunction, that a biochar production company had worked "in active concert or participation with [both an ethanol manufacturing plant and a cattle feedlot]," despite each being a distinct legal entity.

Because of its "closed loop" system to generate ethanol as well as biochar, the biochar production company was deemed potentially responsible for the failure of the ethanol manufacturing plant to comply with various waste management regulations.

In addition, the biochar production company was comparably deemed potentially responsible for the ethanol manufacturing plant's various contractually created indemnity obligations.

This case demonstrates that separating integrated operations by legal identity alone does not always offer the necessary protection to safeguard against extraneous liabilities affecting only one part of the integrated system. Entities should consider these risks against the advantages that vertical integration offers.

Regulatory Compliance

Depending on the goal of a biochar project, different regulatory questions and obligations may arise, including but not limited to:

- Is the biomass considered waste under applicable regulations? Is the biochar produced considered waste under applicable regulations?

- Was the biomass used treated with any chemicals or other additives, subjecting the use of the biomass and biochar to additional chemical regulations?

- What shipping and storage requirements will apply?

- Will the biochar be sold for agricultural purposes, thus triggering potential labeling requirements under potentially both federal and state law?

- What claims can you make when selling the biochar for use in the agricultural sector?

Carbon Credits and Green Marketing Claims

The project developer will need to comply with the applicable biochar carbon credit methodology if generating carbon credits. These methodologies require a life cycle assessment of the carbon credit — which assesses the environmental impacts associated with every stage of the life cycle of the biochar, from the emissions used to generate the biochar to emissions used to transport the biochar and beyond.

Mackenzie Schoonmaker is a principal and Astrika Adams is an associate at Beveridge & Diamond PC.

[1] Global Biochar Market Size to Reach USD 454.3 Million in 2030, Emergen Research, available at https://www.globenewswire.com/news-release/2023/08/17/2727369/0/en/Global-Biochar-Market-Size-to-Reach-USD-454-3-Million-in-2030-Emergen-Research.html (last accessed August 21, 2023).

[2] Under certain conditions, there may be limited oxygen present.

[3] See, What Is Biochar and How Is It Made, Puro.Earth, available at https://carbon.puro.earth/biochar (last accessed Aug. 22, 2023).

[4] Legal constrains and opportunities for biochar: a case analysis of EU law, Tania van Laer, GCB Bioenergy Vol. 7, Issue 1, p. 14-24, available at https://onlinelibrary.wiley.com/doi/full/10.1111/gcbb.12114 (last accessed August 21, 2023).

[5] See Biochar Introduction, US Biochar Initiative, available at https://biochar-us.org/biochar-introduction (last accessed Aug. 22, 2023).

[6] See What Is Biochar and How Different Biochars Can Improve Your Crops, Nastaran Basiri Jahromi et. al., University of Tennessee Institute of Agriculture, available at https://extension.tennessee.edu/publications/Documents/W829.pdf (last accessed Aug. 22, 2023).

[7] See USDA NRCS Code 336 Soil Amendment webinar series, available at https://www.youtube.com/watch?v=8UfjW9VZgAM&list=PL1S3D7L3NZpVnwDN_x4uK7T-DuRd9AZBS (last accessed Aug. 21, 2023).

[8] See Methodologies, Puro.Earth, available at https://puro.earth/carbon-removal-methods/ (last accessed Aug. 22, 2023).

[9] See Biochar: the 'black gold' for soils that is getting big bets on offset markets, Reuters (Oct. 5, 2022), available at https://www.reuters.com/business/sustainable-business/biochar-black-gold-soils-that-is-getting-big-bets-offset-markets-2022-10-05/ (last accessed Aug. 22, 2023).

[10] Legal constraints and opportunities for biochar: a case analysis of EU law, Tania van

Laer, GCB Bioenergy Vol. 7, Issue 1, p. 14-24, available at https://onlinelibrary.wiley.com/doi/full/10.1111/gcbb.12114 (last accessed August 21, 2023).

[11] Biomass gasification for syngas and biochar co-production: energy application and economic evaluation, Yao, Zhiiyi, et. al., Applied Energy, Vol. 209 (Jan. 2018), available at https://www.sciencedirect.com/science/article/abs/pii/S0306261917315003 (last accessed Aug. 22, 2023).

[12] See Pioneer Hi-Bred Int'l Inc. v. Alten, LLC, 2023 U.S. Dist. LEXIS 21516 (Neb. Dist. Ct.).