December 22, 2023

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600 Wilshire Blvd., Suite 202
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Re: Public Comment for Climate Action Reserve *U.S. and Canada Biochar Protocol*

On behalf of United States Biochar Initiative, I am writing to provide comments on the Climate Action Reserve (CAR) proposed *U.S. and Canada Biochar Protocol* ("proposed protocol"). We appreciate the hard work that has gone into producing this draft, and we firmly believe that this protocol represents an important pathway for generating biochar carbon removal credits in the U.S. and Canada as compared to other existing methodologies. At the same time, we believe that certain changes should be made to ensure that this protocol is deployable and utilized by biochar producers.

The following sections represent the most important areas where we recommend changes be made to the protocol.

Chain-of-Custody Requirements for Biochar End Use

Under the proposed protocol, chain of custody tracking requirements applied to intermediaries (e.g., biochar brokers, manufacturers of biochar-containing products, retailers, etc.) are substantially less burdensome than tracking requirements applied to biochar producers who sell directly to end users. We believe this approach provides an incentive for biochar producers to sell biochar to intermediaries rather than directly to end users, which, in some circumstances, will lead to higher prices for biochar to end users, potentially limiting growth in biochar sales and biochar production in the U.S. and Canada. Further, this approach unfairly disadvantages small biochar producers, few of whom work with intermediaries.

We recommend applying the same chain of custody tracking requirements to all biochar sellers / distributors, regardless of whether they are also biochar producers. A simple approach to creating consistency would be to require all biochar sellers use sales contracts that require end-users to adhere to the positive end-use list or to prohibit the use of biochar in non-carbon preserving applications.

Project Developer

The proposed protocol assumes that project developers are biochar end-users. This approach is not viable and appears to be inconsistent with other aspects of this proposed protocol, which seems to be written under the assumption that project developers are, in

fact, biochar producers. Most importantly, very few biochar end-users could implement the complex monitoring, reporting, and verification requirements presented in this proposed protocol.

Instead of assuming end users are project developers, end users wishing to retain carbon removal attributes associated with biochar production can simply contractually purchase carbon removal credits bundled with biochar (i.e., buy the credit with the physical product) or instead, they could purchase biochar bundled with the carbon removal attributes outside of the voluntary carbon market (i.e., end users can just purchase biochar for which no carbon removal credits have been issued).

Existing Biochar Producers and Business as Usual

The proposed protocol indicates that biochar production volumes which began prior to the carbon credit "project start date" (i.e., the start date for crediting under this proposed protocol) are not eligible because such activities qualify as "business-as-usual". We believe this is both a fundamental misunderstanding of the biochar industry but also an unfair penalty against early adopters.

Generally speaking, existing biochar production in the U.S. and Canada can be classified as either intentional or unintentional biochar. Unintentional biochar producers are primarily biomass energy power plants, which can produce biochar by ceasing the business-as-usual approach of reinjecting high-carbon fly ash (i.e., biochar) material into boilers to generate slightly more power and to dispose of this material. We strongly support applying the proposed "business-as-usual" standard to such unintentional biochar producers if any of this material is not typically re-combusted.

Intentional biochar producers use pyrolysis, gasification, or other methods to produce biochar. These facilities are, by and large, operated by companies and individuals whose goal in producing biochar is to sequester carbon. This is particularly true for those companies and individuals that began production prior to the availability of carbon removal credits for biochar, as many of these companies are barely economically viable. Such facilities are far from "business-as-usual", and the proposed protocol unfairly penalizes these early adopters, motivated by carbon sequestration, from financially benefitting from their activities.

Methane Accounting

The proposed protocol requires accounting for methane emissions from Projects but disregards such emissions from Baselines. While biochar production facilities can release small amounts of methane emissions during production, essentially all other eligible Baseline biomass feedstock fates also generate some amount of methane including combustion of biomass for electricity or heat production, open-pile burning of biomass for disposal, mastication and piling of material, or use as mulch. We believe the proposed methane accounting approach unfairly penalizes biochar producers but also does not accurately represent baseline methane emissions.

We recommend applying a consistent accounting approach to both Project and Baseline methane emissions, either by neglecting such emissions in both or counting them in both. If such emissions are counted in both, we recommend including standardized emissions values for different biomass feedstock alternative fates in the Biochar CRT Calculation Tool. Such values can be found in numerous peer-reviewed publications.

Electricity Emissions

Under the proposed protocol, avoided emissions associated with electricity production are not counted while emissions associated with electricity consumption in transportation, feedstock processing, biochar production, and biochar processing are counted. We believe that electricity produced by biochar producers (i.e., as a co-product of biochar production) should be eligible to "offset" emissions from electricity consumption, provided that emissions associated with this electricity are accurately attributed using the adjustment factor equations. Under this approach, a biochar producer co-producing excess electricity (i.e., producing more electricity than they consume) would be able to reduce their overall Project emissions by counting all of their electricity consumption as derived from biomass sources, which is likely to have a lower carbon intensity than grid average electricity. Further, we believe this approach more fairly accounts for the benefits of converting pyrolysis gasses into low-carbon biomass electricity.

We also recommend that the proposed protocol provide additional guidance related to biochar producers that utilize electric vehicles to transport feedstock and biochar. While relatively uncommon due to present low vehicle availability, many biochar producers have investigated this approach and will likely do so in the future due to the ability to reduce emissions and thereby increase carbon removal credit revenue.

Adjustment Factor Calculation Approach

Under the proposed protocol, the adjustment factor for emissions related to biochar production (as opposed to co-products) is based on the thermal value (Btu) of materials being used for different purposes. While this approach may be viable for some biochar producers, for many biochar producers this will require submission of biochar samples for additional analyses than are included in common biochar analysis frameworks, such as the International Biochar Initiative (IBI) standards. We recommend that an alternative adjustment factor calculation framework, based on organic carbon, be provided as a lower cost approach that still achieves the same end goal of attributing emissions between biochar and co-products.

Analysis Metrics for Credit Calculation

Under the proposed protocol, values for $H:C_{org}$, DM_b, and OC_b used in carbon credit calculations are each based on a the conservative end of the 95% confidence interval limit. While we appreciate the desire to be conservative in estimating carbon removal credits under this proposed protocol, we believe this approach is excessively conservative. Further, using 95% confidence intervals for each metric assigns heavy weight to outliers, some of which could be analytical in nature and not representative of actual materials. The presence of individual outlier samples could thus create significant economic impacts to project developers, many of whom might then choose to collect

many additional samples, at significant cost in labor and analytical fees, to overcome the effects of individual outlier samples.

We recommend that a less conservative approach be used that could incorporate some of the following:

- Use median or mean values for each metric. Median or mean values, when based on 10+ samples, provide the best estimate for actual material properties. We believe that the most accurate estimate for carbon removal credits should be preferred over conservative estimates.
- If 95% confidence intervals must be used, we recommend using 95% confidence intervals for calculated removal credits rather than for each of these three individual values, the product of which are included in carbon removal credit calculations. That is, we recommend requiring calculation of carbon removal credits associated with individual samples which have been analyzed for $H:C_{org}$, DM_b, and OC_b. We believe this approach more accurately generates a conservative estimate without applying conservative values three times through the canulation.
- Provide a pathway for "re-analysis" of outlier values, particularly if a 95% confidence interval approach is used.

Sampling Requirements

Under the proposed protocol, project developers are subject to fairly burdensome sampling requirements and logistics including collecting and analyzing at least 10 samples for initial parameter sampling and then collecting and retaining samples periodically for retention sampling. While such sampling requirements may be feasible and economical for large scale biochar producers, this is unlikely to be the case for smaller scale biochar producers which represent a significant component of the existing biochar industry in the U.S and Canada. While small scale producers could become an increasingly small component of total production, small-scale mobile production units (e.g., air curtain incinerators) represent an important waste management tool that pairs well with agricultural waste management, forestry waste management, and fire-risk reduction thinning projects as an alternative to open pile burning.

We recommend significantly simplifying sampling requirements, and particularly those associated with retention sampling hold times.

Laboratory Accreditation

Under the proposed protocol, all analytical analyses must be completed by an accredited laboratory. While we support this goal in concept, there are, at present, very few laboratories in the U.S. and Canada analyze biochar samples, and those that do are primarily soil analysis laboratories, few of which are typically certified under those certifications included in the proposed protocol. We recommend loosening laboratory accreditation requirements.

Credit Stacking

The proposed protocol includes discussion of credit stacking, but the information provided is general and open-ended in nature. We recognize that credit stacking related to biochar is complex and evolving, however, we recommend that additional language be added to the proposed protocol, or in a future version of the protocol to provide additional clarity on credit stacking.

Among credit stacking opportunities for biochar, we recommend considering updating the language related to agricultural soil carbon credits. Specifically, while the carbon contained in biochar (for which a carbon removal credit is issued) should not be eligible for inclusion in soil-based carbon credits, we believe that additional carbon benefits from using biochar as a soil amendment should be allowed including reduced soil nitrous oxide emissions and increased accumulation of non-pyrogenic soil carbon (i.e., "negative priming"). While the science and monitoring, reporting, and verification associated with allowing such stacking may be complicated, we believe that technological advances in soil carbon monitoring, including the ability to differentiate between pyrogenic and non-pyrogenic carbon, may create opportunities for such credit stacking in the future.

Additionally, we recommend including additional guidance related to the embodied carbon associated with biochar that is sold "de-coupled" from its carbon removal credit. We anticipate that most biochar producers who use this proposed protocol will sell biochar carbon removal credits separately form the physical biochar in a de-coupled manner. Under this framework, the resulting physical biochar should be considered a zero-carbon material in the context of value-chain emissions accounting systems. We recommend including text to clearly indicate that physical biochar de-coupled from carbon removal credits should be considered zero-carbon.

Positive Eligible Biochar End Uses

The proposed protocol uses a positive list for biochar end uses, which includes many end-uses for biochar. While this approach may be viable, we are concerned that, with the rapid growth in the biochar industry and end-uses, that such an approach will create an impediment to creative, carbon preserving end uses. An alternative approach would be to create a negative list, that clearly defines non-carbon preserving end uses as not eligible under this proposed protocol. Such uses are generally confined to those uses where biochar is combusted or thermally destroyed such as when "biochar" is used as biocoal or as charcoal.

Municipal Solid Waste Biochar

Under the eligible biochar end use list attachment, biochar derived from municipal solid waste is ineligible to be used in agricultural end-uses. While we understand the intent of this provision is to limit the potential for heavy metal and other potential contaminants, we recommend removing this provision and instead indicating that project developers should consult relevant regulatory bodies for guidance.

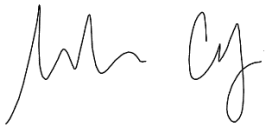
Currently, biosolids are widely used as agricultural soil amendments subject to significant regulatory requirements related to contaminant concentrations and loading rates (i.e.,

mass of contaminant applied per unit area) for heavy metals and organic contaminants. Pyrolysis of biosolids can dramatically reduce organic pollutant concentrations; heavy metals are generally unaffected by the pyrolysis process and are retained in the final biochar, albeit at higher concentrations than the feedstock biosolids. While this material clearly has the potential for creating heavy metals contamination in agricultural end-uses, low biochar application rates likely pose little or no risk. We believe that determination of acceptable heavy metals loading rates should be left to environmental and agricultural regulatory agencies.

Closure

We hope you will consider some of these recommended changes to the proposed protocol, as we believe they will increase the viability of this protocol among biochar producers while still retaining sufficient safeguards. Please feel free to reach out if you would like to discuss any of our recommendations.

Sincerely,



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