Eligible Biochar End Uses List

March 19, 2024

The end uses listed below are eligible for inclusion under a biochar project registering under the Reserve's U.S. and Canada Biochar Protocol. All end uses for the application of biochar associated with a project must comply with relevant environmental laws and regulations, as described in the protocol. Environmental safeguards are specified in the table below for each eligible end use, including any contaminant limits that are to be applied when a jurisdiction lacks contaminant limits for the end use to which project biochar is applied. Permanence factors applicable to each end use are also indicated for use in Equation 5.12 in the protocol, as is an indication as to whether emissions associated with the transportation of biochar must be included in project emissions calculations. Finally, the assumed condition of biochar for application to each end use is identified to allow for an estimate of biochar processing emissions to be made in cases where biochar is processed not by the biochar producer but rather by the end user.

<table>
<tr><th>End use categories</th><th>Eligible uses</th><th>Environmental safeguards, including default material standards</th><th>Permanence factor (P_{EU})</th><th>Biochar transportation emissions?</th><th>Assumed condition for end use</th></tr>
<tr><td rowspan="3">Agricultural, horticulture, home gardening, and/or forestry applications</td><td>Direct soil amendment</td><td rowspan="3">Compliance with soil amendment or compost regulatory requirements, including contaminant limits, relevant to the end use location.

When biochar is derived from any of the following feedstocks in any amounts, contaminant testing must occur every 3 months in the absence of new Initial Parameter Sampling:
Construction and lumber waste treated with PVC, heavy metals, or wood preservatives
Municipal solid waste (not including sewage sludge/biosolids)
If standards for heavy metals and toxicants are not available for soil amendments or</td><td rowspan="3">$P_{EU} = c_{hc} - m_{hc}(H{:}C_{org})$

From Woolf et al. (2021)

Value for $H{:}C_{org}$ based on laboratory analysis.

Mean annual temperature spatial layer available on the Biochar Protocol webpage and is used to determine the applicable coefficients for c_{hc} and m_{hc}:<table><tr><th>Mean annual temp (°C)</th><th>c_{hc}</th><th>m_{hc}</th></tr><tr><td>≤ 5</td><td>1.13</td><td>0.46</td></tr><tr><td>5.1 – 10.0</td><td>1.10</td><td>0.59</td></tr><tr><td>10.1 – 15.0</td><td>1.04</td><td>0.64</td></tr><tr><td>15.1 – 20.0</td><td>1.01</td><td>0.65</td></tr><tr><td>≥ 20.1</td><td>0.98</td><td>0.66</td></tr></table></td><td rowspan="3">Included</td><td>Any</td></tr>
<tr><td>Agricultural water filtration, with eventual field application or landfill disposal</td><td>Any</td></tr>
<tr><td>Compost additive</td><td>Coarse particles (≥1 mm)</td></tr>
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		compost in the jurisdiction in which the biochar is applied, the standards specified as applicable to all soil amendments and to biochar by the USDA NRCS Conservation Practice Standard for Soil Carbon Amendment (Code 366) (United States only) must be applied for soil amendments. For biochar used as a compost additive, the additional standards for compost specified under Code 366 also apply.			
	Animal bedding, with eventual field application	Compliance with animal bedding regulatory requirements relevant to the end use location, including any limits on contaminants			Any
	Horticultural growth media	Compliance with horticultural growth media regulatory requirements relevant to the end use location, including any limits on contaminants			Coarse particles (≥1 mm)
Construction/ engineered materials	Cement additive	Compliance with laws and regulations for cement content	100%	Included	Fine particles (<1 mm)
	Gypsum additive	Compliance with laws and regulations for gypsum wallboard content			
	Mineral plaster additive	Compliance with laws and regulations for plaster content			
	Clay additive	Compliance with laws and regulations for clay composites content			
	Asphalt additive (cold-mix applications to asphaltic mix only)	Compliance with laws and regulations for asphalt content	20% (based on low end of lifespan ranges for traditional asphalt road applications relative to 100 years, i.e., 20 years = 20%)		

	Wood polymer composites	Compliance with laws and regulations for wood polymer composites content	30%		
Environmental remediation/ stabilization and wastewater sanitation	Effluent polishing	Compliance with relevant environmental laws and regulations for environmental remediation/stabilization and wastewater sanitation, including any limits on contaminants	Same as for agricultural applications, as indicated above	Included	Fine particles (<1 mm)
	Erosion control				Any
	Septic and transpiration trenches				Any
	Soil remediation				Fine particles (<1 mm)
	Stormwater management				Fine particles (<1 mm)
Permanent storage structures	Spent oil/gas wells	Compliance with relevant environmental laws and regulations for oil and gas well retirement, including any limits on contaminants	100%, unless biochar was applied to an intermediate end use prior to application in a permanent storage structure. In such cases, the permanence factor for agricultural applications must be used.	Included	Any
	Subsurface mine remediation	Compliance with relevant environmental laws and regulations for subsurface mine remediation, including any limits on contaminants			Any
	Landfill disposal, including as alternative daily cover and landfill solidification/ stabilization	Compliance with relevant environmental laws and regulations for contents of materials disposed of in landfills (or as alternative daily cover, as applicable), including any limits on contaminants			Any
Urban applications	Non-food/-feed soil applications, e.g., urban trees and/or landscaping, green roofs	Compliance with soil amendment regulatory requirements relevant to end use location, including any limits on contaminants	Same as for agricultural applications, as indicated above	Included	Any