CLIMATE ACTION RESERVE

Biochar Protocol v1.0

Workgroup Meeting 1
November 4, 2021

Purpose

- To familiarize workgroup members with offset protocol development process – what we typically want in an offset protocol
- To present and solicit feedback from workgroup members on key considerations for the Biochar Protocol Version 1.0
- To provide roadmap for protocol drafting

Housekeeping

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  - Ask that you keep yourselves muted unless / until would like to speak
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- Observers are free to submit questions in the GoToWebinar question box
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- The slides and a recording of the presentation will be posted online

AGENDA

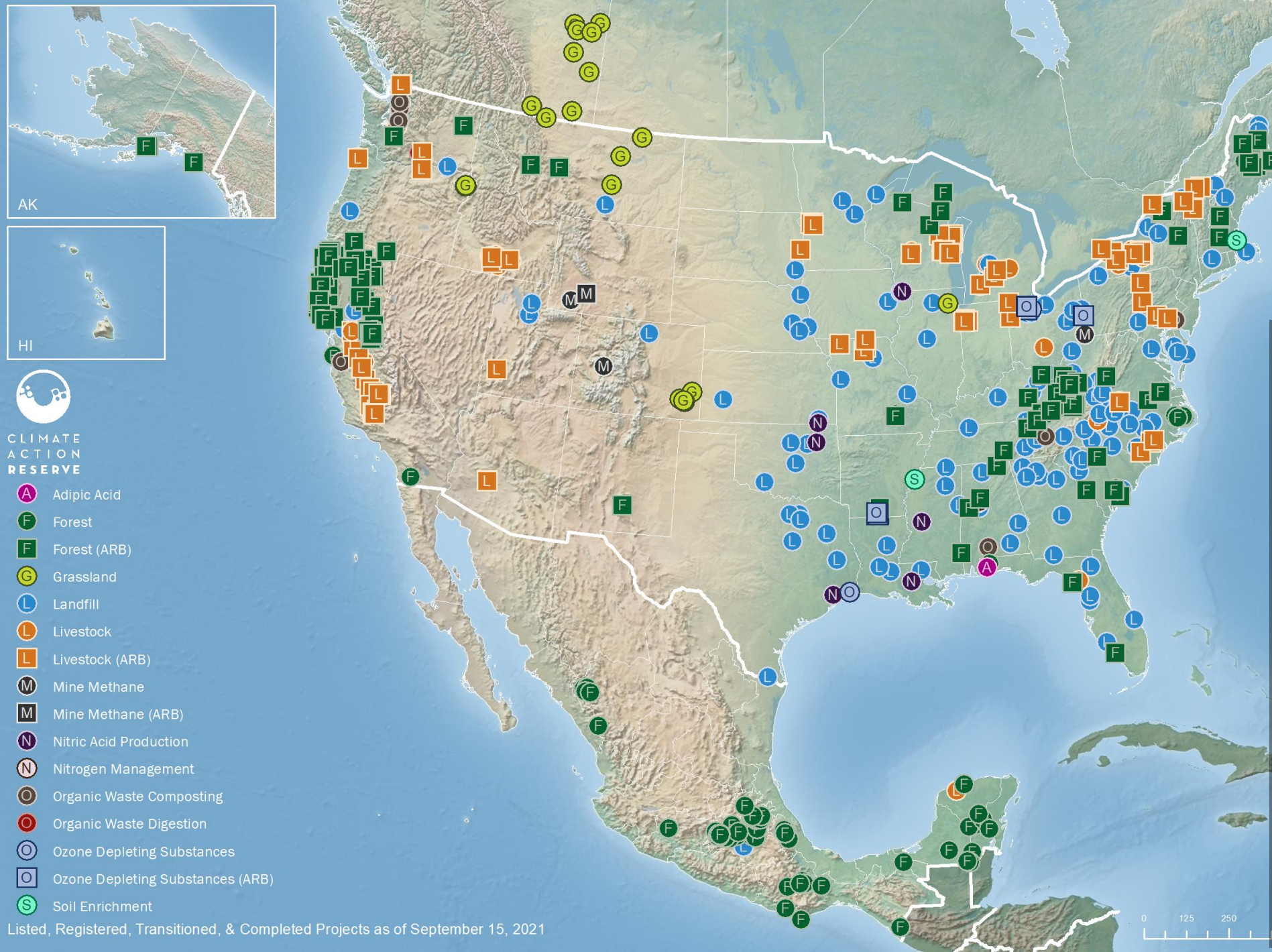
- Introductions
- Process overview
- Overview of proposed approach
- Protocol considerations
  - Eligibility
    - Project definition
    - Ownership / Aggregation
    - Additionality
    - Permanence
  - GHG assessment boundary
  - Quantification
  - Monitoring / Reporting / Verification
- Open Discussion
- Next steps

CLIMATE ACTION RESERVE

INTRODUCTIONS

Climate Action Reserve

- Mission: to develop, promote and support innovative, credible market-based climate change solutions that benefit economies, ecosystems and society
- Develop high-quality, stakeholder-driven, standardized carbon offset project protocols across North America
- Accredited Offset Project Registry under the California cap-and-trade program
- Serve compliance and voluntary carbon markets
- Reputation for integrity and experience in providing best-in-class registry services for offset markets
- Based in Los Angeles, CA



Listed, Registered, Transitioned, & Completed Projects as of September 15, 2021

Climate Action Reserve

Nonprofit, founded 2001

Voluntary & compliance

>550 Projects

165M+ Credits Issued

Nature-based solutions protocols

Forest

Grassland conservation

Livestock manure

Nitrogen management

Rice cultivation

Soil enrichment

Urban forest

Introductions

Reserve Staff:

- Jon Remucal, Associate Director of Nature-Based Solutions
  - Protocol development lead
- Heather Raven, Senior Project Coordinator
  - Development process coordinator
- Holly Davison, Associate Director of Programs & Marissa Schmitz, Forestry Manager
  - Protocol development support

External drafting support:

- John Nickerson, Dogwood Springs Forestry

Workgroup Members

Name (alphabetical)	Organization
Akio Enders	International Biochar Initiative
Allison Flynn	Arq
Bruce Springsteen	Placer County Air Pollution Control District
Daniel Sanchez	University of California - Berkeley
David Morell	Sonoma Ecology Center
Hannes Etter	South Pole Carbon Asset
Jeff Cole	Royal Dutch Shell
Johannes Lehmann	Cornell University
Jonah Levine	Biochar Solutions
Jonathan Alcock	Viresco Solutions

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Kevin Fingerman	Humboldt State University
Matt Ramlow	World Resources Institute
Melissa Leung	GECA Environment
Micah Elias	Blue Forest Conservation / University of California - Berkeley
Nate Anderson	US Forest Service
Patricio Ortiz	ACT Commodities
Phil Saska	Blue Forest Conservation
Rachel Rubin	Woodwell Climate Research Center
Shawn McMahon	Aster Global
Tristan Brown	SUNY College of Environmental Science & Forestry

Funding support

U.S. Forest Service
Wood Innovations Program

CAL FIRE
Forest Health Grant

Funding also supporting:

- Companion market analysis by Blue Forest Conservation (with additional funding support from the Doris Duke Charitable Foundation)
- Pilot projects to test protocol and demonstrate its viability and versatility

PROCESS OVERVIEW

Protocol Development Overview

- **GOAL**: To create a robust Biochar Protocol that provides best practices for GHG accounting to generate Climate Reserve Tonnes (CRTs)
  - Adhere to high quality offset criteria and Reserve's principles
  - Leverage lessons learned from emerging technologies, other offset protocols and projects, other regulatory programs, other conservation programs and biochar standards
  - Solicit and incorporate expert stakeholder feedback

Protocol Components

Eligibility

- Defining the project
- Ownership / Aggregation
- Start Date / Crediting period
- Project Location
- Additionality
  - Performance Standard Test
  - Legal Requirement Test
- Regulatory compliance
- Permanence

Defining GHG boundary

Quantification

- Setting baseline
- Quantifying project emissions/removals
- Sampling
- Leakage

Monitoring / Reporting / Verification

Protocol Development Timeline

1. Kick-off meeting (*August 12, 2021*)
2. Workgroup process (*November 2021*)
   - Formation (*Oct 2021*)
   - Meeting 1 (*today – Nov 4, 2021*)
   - Meeting 2 (*Jan 2022*)
   - Meeting 3 *(as needed, Feb 2022 – tentative)*
3. 30-day public comment period (*Mar – Apr 2022*)
4. Propose to Board adoption *(Jun 2020)*

~9 months

Possibility of accelerating this process to target April 2022 board meeting

Timeline Process Detail

	Aug	Sep/Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Public webinar	12th									
Workgroup formation										
1st workgroup meeting (webinar)			4th							
Drafting/content development										
2nd workgroup meeting (webinar)										
Drafting/content development										
Deliver workgroup draft for review										
3rd workgroup meeting (webinar)										
Workgroup review & comment on draft (1-2 wks)										
Staff revisions based on feedback										
Public comment period & webinar (~30 days)										
Staff revisions based on feedback										
Internal reviews/formatting										
Deliver Board draft										
Public Board meeting										

Workgroup members to provide input and engagement throughout the drafting process

Reserve staff role:

- Manage the development process
- Schedule and hold meetings (~2-3)
- Identify and solicit feedback on specific protocol criteria
- Produce draft protocol for review
- Revise protocol based on feedback

Workgroup role:

- Attend all (~2-3) workgroup sessions
- Be active participants: provide input and ask questions on protocol concepts and language
- After meetings, share additional input and expertise as needed
- Review draft protocol and provide written feedback to Reserve staff

Workgroup Process and Expectations

Process:

- Hold 2-3 workgroup meetings
- Reserve staff identify and solicit feedback on specific protocol criteria
  - **Specific questions for WG will be highlighted in red**
- Reserve staff will share draft protocol with WG

Expectations:

- Review, comment on and provide recommendations on specific protocol criteria
- Participate in meetings via webinar
- Provide written comments on draft protocol
- Be constructive, collaborative, and productive

OVERVIEW OF PROPOSED APPROACH

Biochar system eligibility

CLIMATE ACTION RESERVE

Feedstocks

- Business-as-usual fate: waste biomass
- Environmental safeguards

Production Technology/ Processes

- Regulatory compliance
- Environmental safeguards
- Other limits related to biochar stability and/or credit quantification?

End uses

- Soil applications (direct/indirect)
- Alternative storage applications
- Consider other applications relative to CH_4 and N_2O benefits
- Environmental safeguards

Focus on standardization and project efficiency – not trying to capture every possible configuration

Monitoring, Reporting and Verification

Chain of custody documentation

- Transfers of biomass from feedstock source to biochar producer to end user
- Feedstock characterization
- End use description

Data collection

- Amount of biochar produced
- Estimate of recalcitrance
  - Lab testing of biochar samples
  - Other means?

Verification

- Documentation and data review
- Site visit

PROTOCOL CONSIDERATIONS

Protocol Components

Eligibility

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- Start Date / Crediting period
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Defining GHG boundary

Quantification

- Setting baseline
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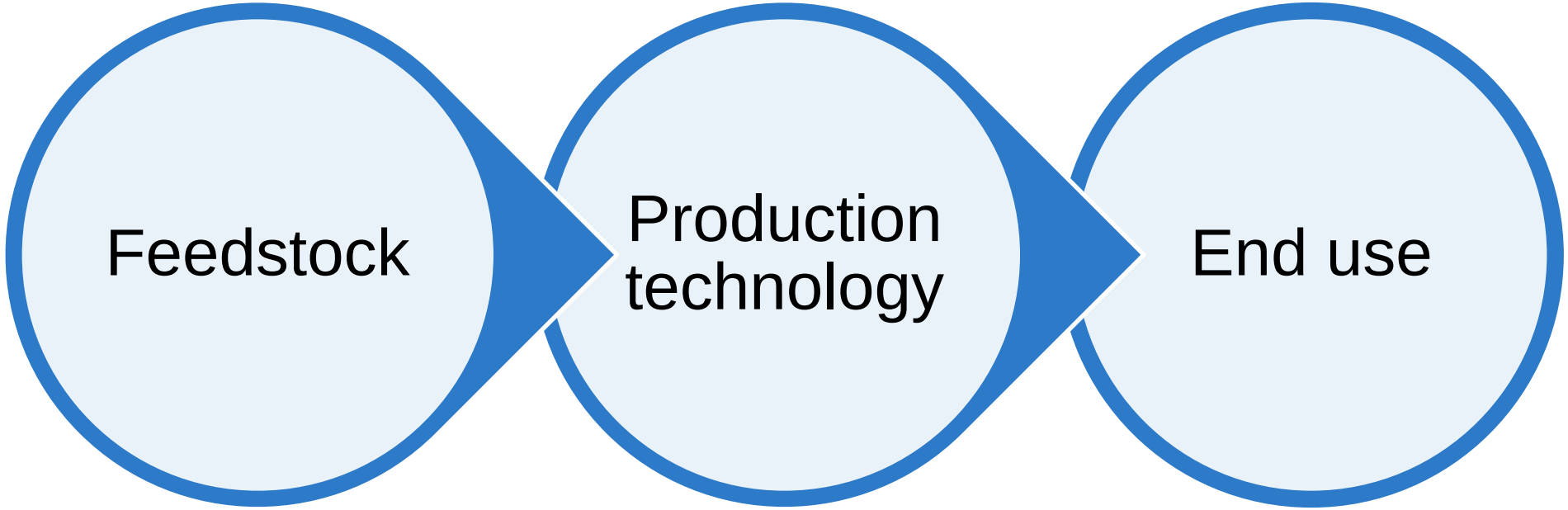
- Sampling
- Leakage

Monitoring / Reporting / Verification

ELIGIBILITY

Project Definition



The conversion of sustainably sourced waste biomass material into biochar, which can be used in soil and non-soil applications to facilitate the long-term sequestration of carbon.

Project Definition

Feedstocks

"Waste" biomass sources (i.e., typically have no economic use) to be converted into biochar, such as:

Forest fuel treatment material	Urban wood and green waste
Timber harvest residues	Aquaculture plant waste
Orchard/vineyard prunings	Animal manure?
Crop residues	Sewage sludge?

Sustainability standards for materials:

- Forest: Third-party certification (FSC, SFI, American Tree Farm); state-sanctioned management plan or operation under fuel management waiver; attestation by professional forester that feedstock site was sustainably harvested
- Ag: % of residues left onsite to prevent soil C loss

Project Definition

Feedstocks (continued)

No biomass grown for purpose of biochar/bioenergy production (avoid accounting challenges, including leakage)

No municipal solid waste (except urban wood/green waste)

May not contain:

- >2% contaminants
- >10% diluents/dilutants

Additional limits or exclusions?

Project Definition

Biochar production technologies/conditions:

Types of biochar production operations that may be eligible, e.g., pyrolysis, gasification, incomplete combustion, torrefaction

Intent is to allow flexibility for a range of technologies—existing as well as new and emerging.

- Is there a need to identify ineligible technologies and/or production conditions?

Project Definition

End Uses

Eligible end uses for which permanence of sequestered C can be reasonably estimated, e.g., soil amendment, addition to livestock feed, addition to compost, construction materials

Similar to production technologies, intent is to allow flexibility for a range of end uses:

- Other eligibility requirements (regulatory and environmental safeguards) may screen out some potential end uses
- Should we define end uses that are specifically ineligible (e.g., energy production)?

Project Ownership

Who is issued offset credits?

- Biomass feedstock provider
- Biochar producer
- End user

Likely will assign the biochar producer as the project owner by default:

- Control over feedstock sourcing, biochar production, and transactions with end users
- But others may be project owner if able to secure agreement with producer

Project Ownership - Aggregation

Combining multiple actors, activities, and locations into a single “project” for purposes of monitoring, reporting, verification, and credit issuance.

Should projects be allowed to aggregate and under what conditions?

- Same or similar feedstock / production / end use configurations
- Geography

Start Date and Crediting Period

Start date

First date that production of biochar for which credit issuance is sought

Crediting period

10 years, renewable up to two times

Reporting period

Flexible, based on biochar batch production, with maximum of 12 months

CLIMATE ACTION RESERVE

Biochar Protocol v1.0

Workgroup Meeting 1 Follow-up
November 16, 2021

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Recap from first meeting

Main Concerns from Last Meeting/Comments

- Desire to include:
  - Project aggregation
  - Pathway for small producer participation
  - Mixed feedstocks
  - Feedstocks from public lands
  - Non-commercial end-uses
- Capability for frequent credit issuance (sub-annually)
- Verification of end use is a challenging but critical issue

Focus for today

Baseline scenarios

Non-sequestration GHG benefits

Determining and quantifying C permanence/recalcitrance

Leveraging other certification programs

Project Location

United States

Canada

Consider including Mexico? Likely not at this point.

Can feedstocks or end uses be located outside of the US/Canada?

Additionality

Ensuring only crediting for actions that go beyond what would occur in the absence of the project

Legal Requirement Test - Project activities must not be legally required

Performance standard - Likely allow simple categorical acceptance

- Biochar production remains uncommon
- Offset credits provide a financial incentive to produce biochar
- All other eligibility requirements met

Baseline scenario determination discussed later

Regulatory Compliance

Project activities must be in compliance with relevant laws and regulations

Focus is on laws/regulations related to biochar production

Feedstocks and end uses addressed largely through eligibility requirements

Permanence

Sequestered carbon must remain secured for 100 years

- Crediting of sequestered C is largely based on expected levels of recalcitrance for at least 100 years
- How best to estimate the durability of C in biochar

  → Addressed in quantification section

Releases of sequestered carbon are called ‘reversals’ and losses must be replaced

- Are there significant risks of reversals that would warrant discounting or buffer pool contributions? If so, how can these be monitored?
- Any *ex post* accounting for reversals would likely incorporate tonne-year accounting to recognize the climate benefits achieved prior to the reversal

GHG ASSESSMENT BOUNDARY

The GHG Assessment Boundary

Purpose

Account for significant GHG impacts from the project activity relative to the baseline.

- If emissions/removals related to a given source, sink or reservoir (SSR) are similar under the project activity and baseline ➔ not included in project accounting

Scope includes feedstocks, production process, and end use

Inclusion of any individual SSR depends on project configuration and applicable baseline scenario.

The GHG Assessment Boundary - Baseline

SSR	Description	Included Gas(es)	Quantification Method*
1	Feedstock transportation	CO_2, CH_4, N_2O	Default factors
2	Aerobic / Anaerobic decomposition emissions	CH_4, N_2O	Default factors
3	Feedstock combustion	CO_2, CH_4, N_2O	Default factors
4	Bioenergy production	CH_4, N_2O	Default factors
5	Fossil oil/gas or heat production	CO_2, CH_4, N_2O	Default factors
6	Electricity production (if baseline is not bioenergy)	CO_2, CH_4, N_2O	Default factors

*proposed

5 and 6 likely not included in jurisdictions under cap-and-trade

6 also likely not included if renewable energy credits are associated with the activity

- Are any SSRs missing from this table that should be included?
- Are any SSRs included in this table that should *not* be included?

The GHG Assessment Boundary - Project

SSR	Description	Included Gas(es)	Quantification Method*
1	Feedstock transportation	CO_2	Default factors
2	Feedstock processing	CO_2, CH_4, N_2O	Default factors
3	Auxiliary fuel/electricity for biochar production	CO_2, CH_4, N_2O	Default factors
4	Bio-oil/syngas processing	CO_2, CH_4, N_2O	Default factors
5	Biochar processing	CO_2, CH_4, N_2O	Default factors
6	Bio-oil/syngas use	CO_2, CH_4, N_2O	Default factors
7	Biochar *in situ*	CO_2	Sampling (at production site) / Default factors
8	Soil priming	CO_2	Default factors
9	Others from end use?	CH_4, N_2O	Default factors

*proposed

- Are there any SSRs that are missing or that should *not* be included?

QUANTIFICATION

Quantification

Baseline

Selecting and quantifying appropriate baseline scenario

- Bioenergy production
- On-site combustion
- Decomposition (aerobic or anaerobic)
- Assume 0 emissions

Quantification

Estimating recalcitrance

Propose to use assumed annual decay of 0.3% for biochar with $H:C_{org}$ <0.4

= 74% for 100-year permanence period

Applicable to soil applications

Applicable to non-soil applications? Is there sufficient understanding of decay under any other end uses to apply different factor at this time?

What about for biochar with $0.4 < H:C_{org} < 0.7$?

- Apply IBI BC_{100+} factor of 50%?

Are there conditions under which we would not require sampling and would apply default factors based on biochar production conditions?

Quantification

Can additional GHG impacts related to end uses be included:

- Other CO2
  - Soil priming – others have not included or only included as a discount
- N_2O
  - Soil emissions
  - Possibly related to livestock feed benefits
  - Possibly related to compost
- CH_4
  - Possibly related to livestock feed and enteric emissions
  - Possibly related to compost

If enough evidence to support inclusion, what eligibility requirements or other conditions would be applicable?

Leakage

Increases in GHG emissions outside of the project's assessment boundary as a result of the project activity,

- Example from forestry: reducing harvest intensity on the project site results in increased harvesting elsewhere

Are there any leakage risks associated with biochar projects?

Does co-production of biochar with bioenergy present a risk of leakage based on emissions from grid electricity generated to make up for the electricity that would have been produced by the biomass that was used to produce biochar rather than bioenergy?

MONITORING, REPORTING AND VERIFICATION

Monitoring / Reporting / Verification (MRV)

- Sampling and laboratory analysis standards
  - Likely rely on existing standards, such as IBI or EBC
- Chain-of-custody tracking to document transfers from feedstock source to biochar producer to end use
  - Provide option for off-the-shelf option (e.g., CarbonFutúre's tracking service) to streamline MRV?
- Standardized quantification/reporting tool to streamline reporting and verification
- Require physical verification site visits?

Can we leverage existing certification programs (e.g., IBI, EBC) to streamline our MRV process, including demonstration that some eligibility requirements have been met? Devil will be in the details.

OPEN DISCUSSION – FEEDBACK AND SUGGESTIONS

NEXT STEPS

Next Steps

- Email us with any feedback on topics discussed today
- **Submit comments/feedback by November 12**
- Reach out any time to discuss protocol topics or process
- Protocol drafting by Reserve staff – *ongoing*
- ***Share protocol draft with workgroup***
- ***Workgroup Meeting 2 – January 2021 (tentative, potentially sooner)***
  - Review DRAFT protocol, section by section
  - ~2-4 hour session via webinar

Key contacts

Protocol development lead:

Jon Remucal, Associate Director of Nature-Based Solutions

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General inquiries:

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