Composting Project Protocol

Public Kick-Off Meeting
December, 9, 2009
Portland, OR

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Information for Remote Participants

- **Conference Call: 1-712-432-3100**
- **Conference Code: 961845**
- All remote participants are muted, except during Q&A Sessions
  - Please stay on topic, there will be time at the end for questions/comments on topics not covered
  - If questions go unanswered, please send them to policy@climateactionreserve.org and we will respond

Kick-Off Meeting Purpose

- Provide overview of the Reserve's composting protocol development plan
- Engage stakeholders in development process
- Feedback on direction and scope of protocol
- Gather information and input on key issues

Agenda

- Climate Action Reserve background
- Protocol development process
- Goals for the Composting Project Protocol (CPP)
- 1st (brief) Q&A
- Components of CPP
- Building from the OWD protocol
- 2nd Q&A
- Issues specific to composting projects
- Next Steps
- Final Q&A

What is the Climate Action Reserve?

- Non-profit GHG offsets registry
- Develop high-quality project standards and register/track offset credits in public online system
- Ensure environmental integrity and quality of offset credits
- Intended to be the premier place to register carbon offset projects for North America
- Reserve stats:
  - 184 account holders
  - 169 projects total with 107 projects listed
  - 20 projects registered with ~ 1.9 million CRTs issued
  - Projects in 40 states

Principles of Reserve Project Accounting

- **Real:** Reductions have actually occurred, and are quantified using complete, accurate, transparent, and conservative methodologies
- **Additional:** Reductions result from activities that would not happen in the absence of a GHG market
- **Permanent:** Reductions verified ex-post, risk of reversals mitigated
- **Verified:** Emission reports must be free of material misstatements, confirmed by an accredited verification body
- **Owned unambiguously:** Ownership of GHG reductions must be clear
- **Not harmful:** Negative externalities must be avoided
- **Practicality:** Project implementation barriers should be minimized

The Standardized Approach

Benefits to a top-down approach:

- Low up-front costs to project developers
- Efficient review and approval of projects
- Transparency and consistency
- Same approach applies across projects
- Prescriptive guidance to eliminate judgment calls

But...high initial resource investment to program

Our Protocols

- Designed as step-by-step instructions on project development

Current Protocols :

- Forestry
  - Improved forest management
  - Avoided conversion
  - Reforestation
- Urban Forestry
- Landfill gas capture (US & Mexico)
- Livestock methane capture (US & Mexico)
- Coal Mine Methane
- **Organic Waste Digestion**
- Nitric Acid Production

Protocol Development Process

- Internal protocol scoping
- Form multi-stakeholder workgroup
- Draft protocol internally
- Send draft through workgroup process
  - Workgroup provides technical expertise and practitioner experience
  - Period meetings and individual consultation when needed
- Draft protocol released for public review
- Public comments incorporated
- Protocol submitted to Reserve board for adoption

Composting Protocol Timeline

Composting Issues Paper	Fall 2009
Kick-Off meeting	December 9, 2009
Drafting of protocol	December – February 2010
Workgroup process	Late January – Early March 2010
Public review period and public workshop	Early April – Early May 2010
Adoption by Reserve Board	Late June 2010

Composting Project Protocol (CPP) Development Goals

- Develop a *standardized* approach for quantifying, monitoring and verifying GHG reductions from projects that avoid methane emissions to the atmosphere by diverting certain organic wastes from landfills to composting operations
- Building from work done for Organic Waste Digestion Protocol
  - CPP will largely be an extension of OWD protocol
  - CPP will integrate Eligibility and Calculation guidance from OWD
- Ensure accuracy and practicality of projects

Composting Project Protocol Components

Define the GHG reduction project	Section 2
Determine eligibility	Section 3
Establish the GHG assessment boundary	Section 4
Calculate GHG reductions • Baseline emissions • Project emissions	Section 5
Monitoring requirements	Section 6
Reporting requirements	Section 7
Verification guidance	Section 8

OWD Protocol Components Relevant to CPP

- Eligibility Guidelines
  - Start Date Policy
  - Eligible Waste Types, as determined by OWD research, and re-affirmed in Composting Issues Paper (Section 4.2.1)
  - Assessment of Legal Requirement Test
- Crediting Period
- Structure of baseline calculation for food waste

Project Definition

- GHG project is a specific activity or set of activities intended to:
  - Reduce GHG emissions
  - Increase carbon storage or
  - Enhance GHG removals from atmosphere
- Project definition will delineate what activities are “creditable” under protocol
- Will be similar to OWD (i.e. definition will be diversion of eligible organic waste from landfill to composting operation)

Eligibility Rules

I:	**Location**	→	**U.S. and its territories**
II:	**Project Start Date***	→	**Project must submit no more than 6 months after project becomes operational ***
III:	**Additionality**	→	**Meet performance standard**
		→	**Exceed Legal Requirements**
IV:	**Regulatory Compliance**	→	**Compliance with all applicable laws**
Crediting Period		→	**10 years, renewable one time**

*See Reserve Website for more info on new project start date policy: http://www.climateactionreserve.org/how/program/program-manual/

Additionality criteria

- Performance threshold, technology standard and/or other conditions
  - Standard of performance applicable to all CPP projects, constituting better than Business-As-Usual (BAU) Waste Management
  - CPP will incorporate OWD Performance Standard Criteria
- Legal Requirement Test
  - Is the activity required by law?
  - CPP will incorporate OWD Legal Requirement Test Criteria

The OWD Performance Standard Test

- Based on assessment of the common practice waste management of various potential feedstocks:
  - Project passes the PS test if at least one eligible organic waste stream is consistently, seasonally, or periodically digested in the project's biogas control system (BCS)
- Eligible Waste Streams:
  - ***MSW Food Waste***
  - ***Agro-industrial Wastewater***

Development of the OWD Performance Standard

- Contracted with SAIC to conduct research and analysis on BAU waste management practices and regulatory environment for:
  - Food processing solid waste (pre-consumer)
  - Agricultural solid waste
  - Ag/Industrial wastewater
  - MSW Organics (Post consumer food waste and yard waste)

Goal:

- Provide data and suggestions for defining a performance threshold for organic waste management
- Provide regulatory information to inform the regulatory additionality test requirements

Results of Performance Standard Research

- Solid waste materials from agricultural and food processing:
  - Strong economic incentive to extract and recover solids from waste streams for secondary uses. (e.g. Animal feed, biofuel, compost, cosmetics, soil amendments, etc.)
  - Recommendation:
    - Common practices for these waste streams are already those with low GHG emissions. **Therefore, a performance standard showing significantly improved GHG performance cannot be established**

Results, cont.

- MSW Food Waste
  - Commonly sent to landfill, except a few jurisdictions that specifically ban or restrict this activity.
  - Studies estimate 2.6% of food waste was diverted from landfill in 2007
  - Recommendation:
    - **Diversion of post consumer (MSW) food waste from a landfill would meet a stringent performance threshold.**
- Yard Waste
  - EPA estimates 64% of total yard trimmings were diverted from landfill to compost or mulching in 2007. Diversion from landfill is therefore considered common practice.
  - Recommendation:
    - **A performance standard showing significantly improved GHG reductions cannot be established.**

Results -Biosolids (sludge)

- Sludges are generally managed via aerobic processes. The overall GHG emission baseline appears to be low for WWTP sludges and there is little justification for developing a performance standard to further reduce emissions.

Biosolids Management – Largely Aerobic

Biosolids Management Options	Biosolids Management Estimates (%)	
	U.S. EPA Sludge Treatment[1]	CIWMB [2]
Landfill Disposal	14-17%	6%
Alternative Daily Cover at landfills		12%
Compost	60+%	16%
Land Applied		54%
Incinerated or Stored	15-22%	8%
Other/Surface Disposal	-	4%

[1] USEPA Advanced Notice of Proposed Rulemaking, Identification of Non-Hazardous Materials that are Solid Waste – Wastewater Treatment Sludge http://www.epa.gov/epawaste/nonhaz/pdfs/trtmntsludge.pdf

[2] California Integrated Waste Management Board Organics Materials Management: California Association of Sanitation Agencies (CASA) http://www.ciwmb.ca.gov/Organics/Biosolids/

The Legal Requirement Test

- Legal Requirement Test is applied to each eligible waste stream used by the project.
- Project developers required to submit signed Regulatory Attestation for each verification
- If an eligible waste stream later becomes subject to a legal mandate, the waste stream will remain eligible up until the date that the legal mandate takes effect.

Guidance on MSW Regulations

- Federal Diversion Mandates
  - Currently none
- Statewide diversion mandates
  - AB939 in California
- Statewide diversion goals
  - Numerous states have non-binding goals that do not impose specific mandates on jurisdictions
- Regional bans on landfilling of certain materials

Establish GHG Assessment Boundary

- Delineates the sources and gases required to be assessed to determine net change in emissions from project activity
  - Primary effects
    - For CPP, reduction in methane emissions from landfilling of food waste
  - Secondary effects
    - Must be identified and assessed
    - Large, negative secondary effects can render project activity unviable
  - Draw from OWD assessment

Calculate GHG Reductions

- Develop standardized measurement and monitoring to:
  - Estimate baseline emissions
    - Drawing from OWD protocol
  - Calculate project emissions
- Procedures for collecting necessary data
- Frequency of monitoring
- Standardized calculation methodologies and default emission factors, where necessary

Baseline Emissions of Food Waste – OWD

- Methane that would have been released to the atmosphere from the landfilling of food waste:
  - FOD Model with standardized assumptions about landfills
  - Only site-specific variable is decay rate (k value)

Baseline Emissions from Food Waste - OWD

- Unique approach based on stakeholder/public support:
  - Avoided emissions are modeled for 10 year time horizon following the initial diversion, and summed. Avoided emissions from the 10 year summation are credited as annual avoided emissions in the year that the project activity takes place
  - LFG Collection Systems are assumed to be in place at all landfills, and come on-line 3 years after waste is deposited.

FOD Model Parameters that May be Updated for CPP

- Food waste baseline model parameters (closely tracking potential updates to EPA assumptions):
  - Decay rates (k values)
    - How much do external climatic factors impact decay rates at managed solid waste facilities
  - Other model parameters?

Verify Project Performance

- Reserve requires annual third-party verification by an accredited verification body
- Develop verification guidance for Composting activities

Q&A

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Issues/Challenges Unique to Compost Project GHG Accounting

- Various composting methods and technologies utilized
- Quantifying Project GHG Emissions of CH_4 and N_2O based on:
  - Treatment method
  - Process controls implemented
  - Monitored/Measured Parameters

Eligible Composting Technologies/Methods

- Passive Piles
- Turned Windrow
- Aerated Static Pile
  - Positively Aerated Systems
  - Negatively Aerated Systems
    - Biofilters
- Hybrids
- Other in-vessel technologies?

Project Emissions from Composting Operations

- Fossil Fuel and/or Grid Electricity Use
  - Must be tracked (likely not very significant)
- Emissions of CH_4 and N_20
  - Several Approaches to Quantification:
    - Default Deductions (EPA,IPCC, CDM emission factors)
    - Direct Measurement (potentially very expensive)
    - Combination of process control requirements and default deductions
      - Recent research suggests there are cost effective means to minimize emissions of GHGs

Process Controls to Reduce GHG Emissions

Fugitive GHG	Composting Process Control	GHG Emissions Reduction Potential	Source
CH_4	Keep moisture content of pile <60%	Elimination	Sommer and Moller, 2000
	Cover surface with 15 cm or more of finished compost	60-80% reduction	Jerry Bartlett, Cedar Grove; Fatih Buyuksonmez, San Diego State University
	Meet US EPA time and temperature requirements for pathogen reduction	This temperature is associated with rapid decomposition, and loss of moisture which will result in aerobic conditions.	Eklind et al., 2007
N_2O	Reduce ammonia formation by keeping temperature at about 55 C	50% reduction in ammonia at 55C in comparison to 67 C	Eklind et al., 2007
	Reduce NO2 concentrations by mixing finished compost into pile	73%	Fukumoto et al., 2006
	Have initial mix C:N ratio > 30:1	Studies with low C:N ratio saw higher release of N2O than studies with high C:N ratio	Brown et al., 2008
	Keep moisture content of pile <60%	Elimination	Sommer and Moller, 2000

Parameters to Monitor

- Moisture (frequency, # samples)
- Initial C:N Ratio
- Temperature (frequency, location)
- Frequency of Windrow Turning
- Others?

Workgroup Development Process

- Will primarily focus on determining conservative and accurate methods to quantify emissions from composting process
  - Effective process controls
  - Monitoring
- Will not re-address policy and baseline calculation decisions made during development of OWD protocol

Work Group Statement of Interest Forms

- Please return the completed form to policy@climateactionreserve.org no later than **Friday, December 18th**
- Work group will be largely technical in nature

Contacts

General Inquiries:
policy@climateactionreserve.org
213-891-1444 x4

Syd Partridge
Policy Manager
syd@climateactionreserve.org

Kathryn Bickel Goldman
Senior Policy Manager
kathryn@climateactionreserve.org

Heather Raven
Policy Coordinator
heather@climateactionreserve.org