

Organic Waste Digestion Project Protocol v1.0



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BioCycle West Coast Conference

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Carbon Credits

- **Tradable credits from avoiding the methane emissions of traditional organic waste management (landfills & lagoons)**
- $1 \text{ mt CH}_4 = 21 \text{ mt CO}_2\text{e}$
- The US market for carbon credits is growing
 - Numerous certification standards
 - Voluntary and pre-compliance markets
 - Soon to be a compliance market (AB32)
- Carbon financing makes anaerobic digestion projects more attractive





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The Climate Action Reserve

- 501(c)(3) non-profit chartered by CA legislation in 2001
- Develop high quality standards
 - Convene stakeholders and lead development of standardized protocols for carbon offset projects
 - The Reserve “is considered the premier pre-compliance offset standard.” (*State of the Voluntary Carbon Markets 2009*)
- Manage independent third party verification
 - Training and oversight of independent verification bodies
- Operate a transparent registry system
 - Maintain registry of approved projects
 - Issue and track serialized credits generated by projects





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Our Protocols

- Developed with broad public input
- Goal is to create a uniform standard that is widely recognized and builds on best practice
 - We incorporate the best elements of other protocols
 - We do not accept protocols from other programs (i.e. CDM, Gold Standard, VCS, etc.)
- Designed as step-by-step instructions on project development





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OWD Protocol Timeline

Public Kick-Off Meeting

November 11, 2008

Workgroup development and drafts

February – July 2009

Public comment period

August - September 2009

Public workshop

August 26, 2009

Protocol adopted by Reserve Board

October 7, 2009



OWD Workgroup Members



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Atmosclear.org

Bluesource Canada

California Air Resources Board

California Integrated Waste Management Board

Californians Against Waste

Cantor CO2e

City of Los Angeles

City and County of San Francisco

Climate Check

CR&R Inc.

First Environment, Inc.

Greenhouse Gas Services, LLC.

Humboldt Waste Management Authority

Microgy, Inc.

Recology, Inc.

Ryerson, Master and Associates, Inc.

TerraPass, Inc.

Tetra Tech

University of Washington

Waste Management, Inc.

Western United Dairymen





Project Definition

- The digestion of one or more eligible organic waste and/or agro-industrial wastewater streams in an **operational** biogas control system (BCS) that captures and destroys methane gas that would otherwise have been emitted to the atmosphere in the absence of the project.
- **Includes:**
 - Co-digestion with manure
 - Centralized digesters
 - Unused capacity at POTWs
- **Excludes:**
 - Organic waste materials or digester feedstocks that are commonly managed through non-anaerobic methods
 - Treatment other than digestion with biogas capture (i.e. combustion, composting, gasification etc.)



Eligibility Rules

I:	Location	→	U.S. and its territories
II:	Project Start Date	→	Within 6 months of project becoming operational (back to October 7, 2007 for initial 12 month grace period)
III:	Anaerobic Baseline (for wastewater treatment)	→	Demonstrate anaerobic baseline conditions
IV:	Additionality	→	Meet performance standard
		→	Meet Legal Requirement Test (for each waste stream)
V:	Regulatory Compliance	→	Compliance with all applicable laws
	Crediting Period	→	10 years, renewable one time





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Policies

- Project start date must be no later than 6 months after digester operation begins (exception for pilot projects)
- Eligible feedstocks
 - **MSW Food Waste:** Non-industrial food waste consisting of uneaten food, food scraps, spoiled food and food preparation wastes from homes, restaurants, kitchens, grocery stores, campuses, cafeterias, or similar institutions
 - **Agro-industrial Wastewater:** Organic loaded wastewater from industrial or agricultural processing operations that, prior to the project, was treated in an uncontrolled anaerobic lagoon, pond, or tank at a privately owned treatment facility.
 - **Exclusions:** breweries, ethanol plants, pharmaceutical production facilities, and pulp and paper plants.

Local Food Waste Diversion Mandates (Section 3.5.2.3)



Purpose:

Some otherwise additional projects may require a local food waste diversion mandate in order to secure necessary feedstock. Local mandates may be implemented *in conjunction* with a project.

Criteria:

A food waste stream subject to a local food waste diversion mandate passes the Legal Requirement Test if (and only if):

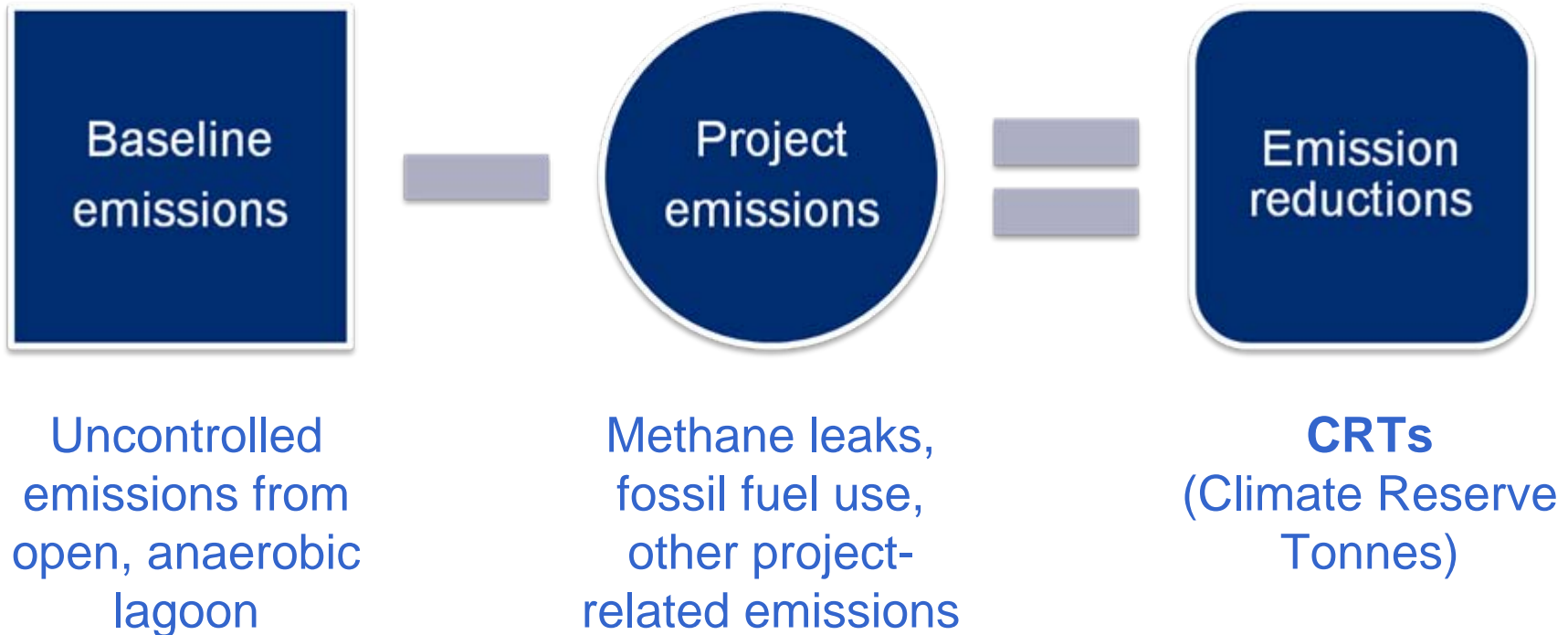
1. The project digesting the local food waste stream has an operational start date prior to, but no more than 6 months before, the date that the food waste diversion mandate is enacted by the local jurisdiction; or
2. The project is implemented subsequent to, but no more than 6 months after, the date of passage into law of the local food waste mandate.





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Basic Calculation



For biogas projects, you compare modeled baseline to metered output and use the lesser of these values



SSRs in the GHG Accounting Boundary (Table 4.1)

- Baseline:
 - CH_4 - Food Waste (landfill emissions)
 - CH_4 - A.I.W.W. (open anaerobic lagoon)
 - CH_4 - Manure (open lagoon or other anaerobic system)
- Project
 - CO_2 - on-site grid and FF combustion
 - CH_4 – un-combusted from BCS (includes venting)
 - CH_4 – liquid digester effluent storage
 - CH_4 & N_2O – aerobic treatment of digestate (composting)
 - CH_4 – landfilling of digestate
 - CH_4 – manure systems that have been affected by project activity

(SSR = source, sink, or reservoir)





Baseline Emissions (Section 5.1)

- Methane that would have been released to the atmosphere from:
 - Landfilling of **food waste**
 - FOD Model with standardized assumptions
 - Only site-specific variable is decay rate (k value) – see Figure B.2
 - See Table B.3 for calc results in units of MTCO₂e / MT waste (wet)
 - Uncontrolled anaerobic treatment of **wastewater**
 - Monthly Chemical Oxygen Demand (COD) Sampling
 - Option to use site-specific Bo based off sampling and lab analysis
 - Default MCF value
 - Uncontrolled Anaerobic **manure** management
 - Uses Reserve Livestock Protocol Calculation





Monitoring and Metering (Section 6)

- Food Waste Streams
 - Wet weight and county of origin by truckload, aggregated annually
 - Weight of Rejected Material, by truckload, aggregated annually
- Agro-Industrial Wastewater Streams
 - Daily volume of W.W. entering digester, aggregated monthly
 - Monthly COD
 - Optional – Bo sampling and analysis once annually
- Digester Liquid Effluent
 - Daily volume of liquid effluent prior to storage pond, aggregated monthly
 - Or, project may use the digester inflow as a conservative approximation of digester outflow
 - Quarterly COD
- Weight of Solid Digestate disposed anaerobically:
 - Wet weight by truckload, aggregated annually





Biogas Monitoring Requirements

- Total flow of Biogas from the digester
 - measured continuously
 - recorded every 15 minutes or totalized and recorded at least daily
- Total flow of Biogas delivered to each destruction device
 - measured continuously
 - recorded every 15 minutes or totalized and recorded at least daily
- Fraction of methane in the Biogas
 - measured with a continuous analyzer or with quarterly measurements (with a handheld device, for instance)





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Verification & CRT Issuance

- Project must be verified by accredited verification body at least once every 12 months
 - Can be more often if you choose
 - Site visit only required once per 12 months
- CRTs only issued after successful verification
- Once verification report is accepted, CRTs are issued directly into project developer's account
- CRTs can then be held, retired, or transferred to another account-holder
- No financial transactions within the Reserve software





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Gas Destruction

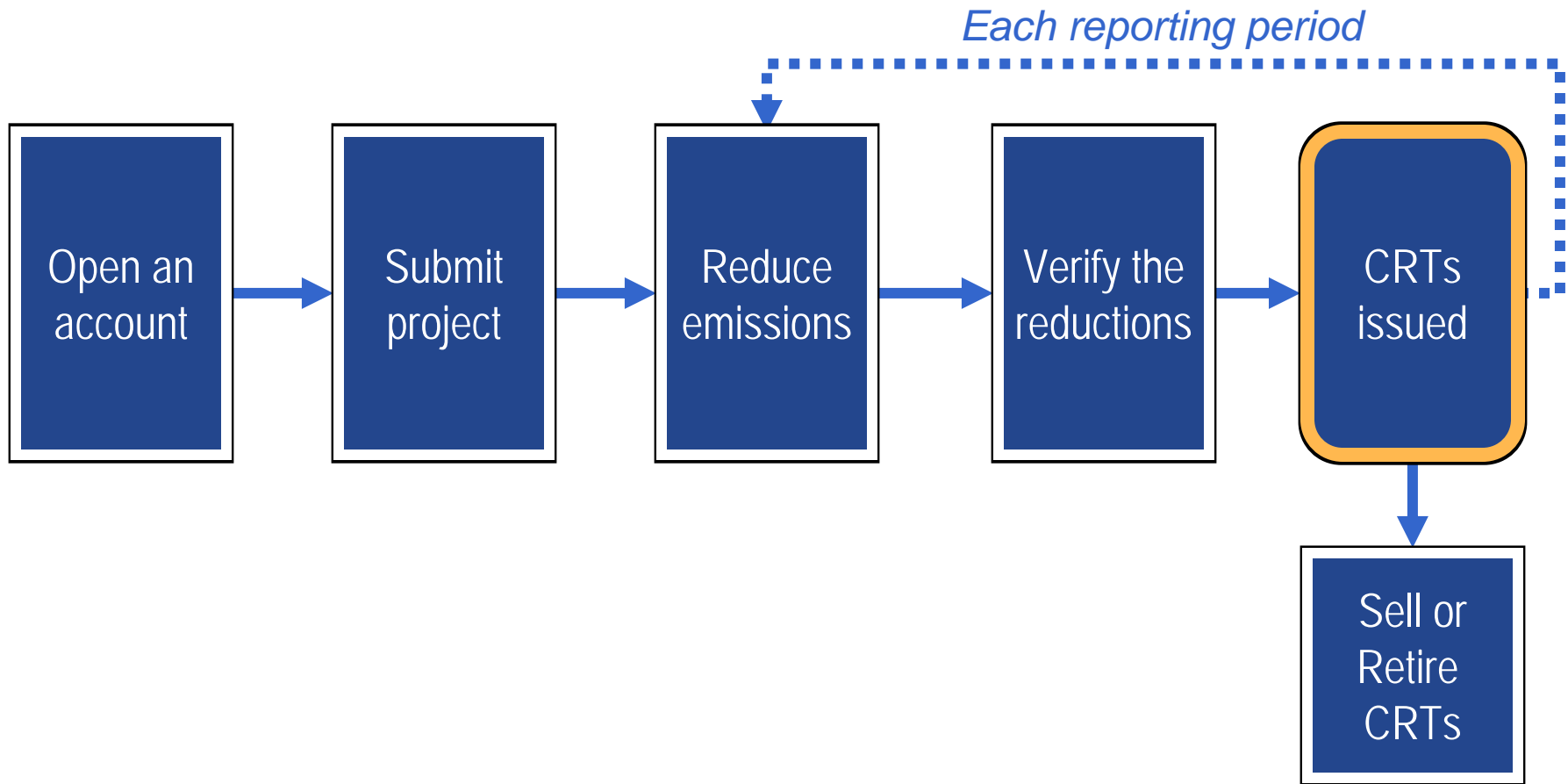
- On-site
 - Open/close flare, generator, fuel cell, turbine
- Off-site
 - Pipeline, vehicle fuel
- No credit given for renewable energy generation, but you may be able to earn RECs through another program
- Electricity use/sales are important financial driver for AD projects





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How to Register a Project

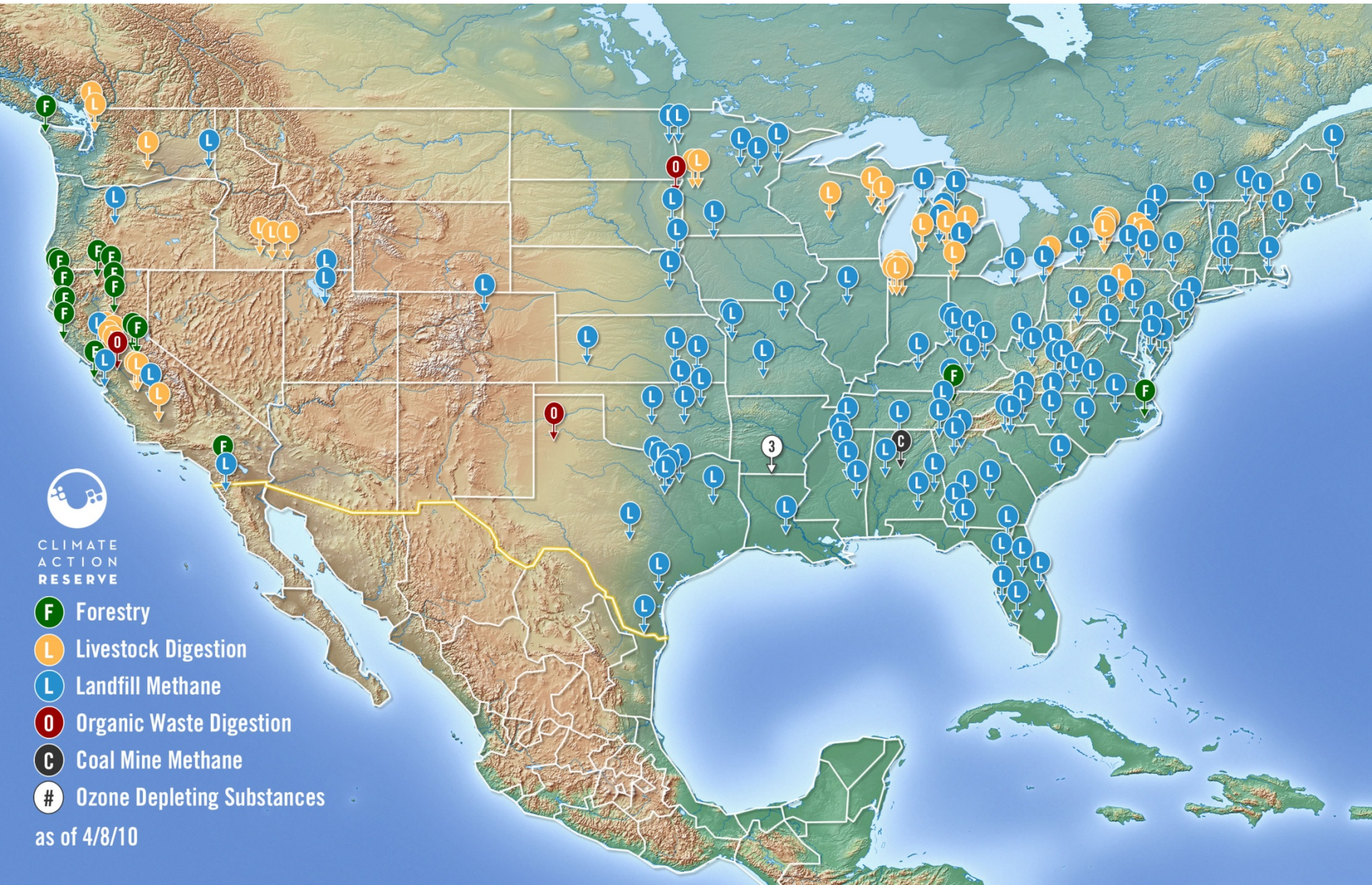




Project Costs & Revenues

- Reserve fees
 - Account maintenance \$500 annually
 - Project submittal \$500 once
 - CRT issuance \$0.20/CRT
 - CRT transfer \$0.03/CRT
 - CRT retirement FREE
- Verification costs
 - \$6k-15k, at least once every 12 months
- CRT revenue
 - Current prices are around \$5-7 per CRT
 - AD projects may generate 1,000 to 100,000 CRTs annually

Listed & registered projects



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- F** Forestry
- L** Livestock Digestion
- L** Landfill Methane
- O** Organic Waste Digestion
- C** Coal Mine Methane
- #** Ozone Depleting Substances

as of 4/8/10



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