

Applying a Performance Standard Approach to Determine Additionality – USEPA Climate Leaders Program

Maurice LeFranc
Senior Policy Analyst, Climate Change
Division
U.S. Environmental Protection Agency

EPRI Offsets Workshop
September 9, 2008





Overview of Presentation

- Background on Climate Leaders Program
 - Description of USEPA Accounting Protocols
- Additionality Discussion
- Project Examples
 - Commercial boilers
 - Manure management: anaerobic digesters
 - Afforestation/Reforestation

Offsets in USEPA Climate Leaders Program

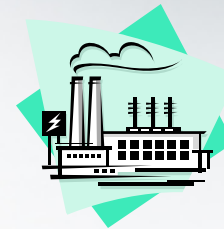
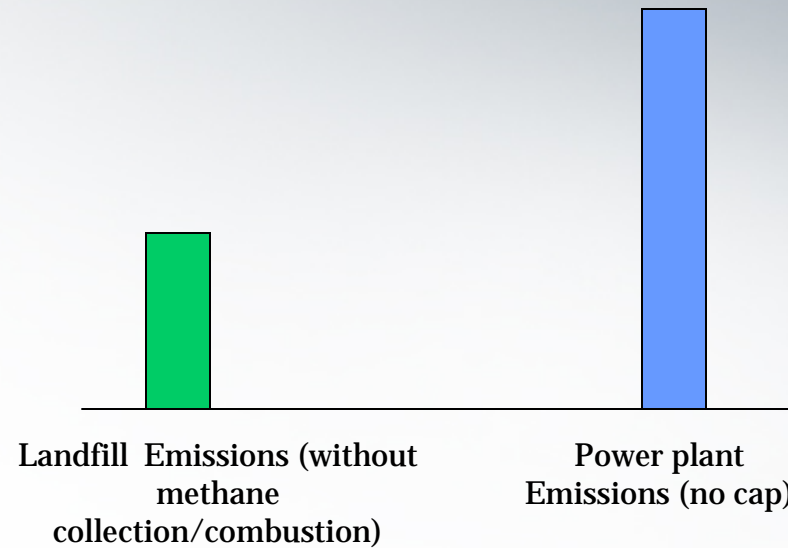


- ***Climate Leaders*** is an EPA industry/government partnership that works with companies to develop comprehensive climate change strategies
 - Partner companies (numbering more than 200) commit to setting aggressive greenhouse gas reduction goals and annually reporting progress to EPA
- An important objective of the ***Climate Leaders*** program is to focus corporate attention on achieving cost-effective reductions within the boundary of the organization
- Partners may also use reductions and/or removals that occur outside of their corporate boundary (i.e., external reductions or offsets) to help to meet their goals
- EPA's Climate Change Division has developed offset guidance based on a top-down performance standard approach to address additionality and to select and set the baseline

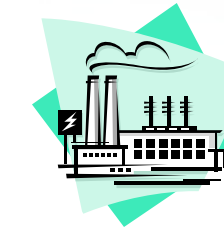
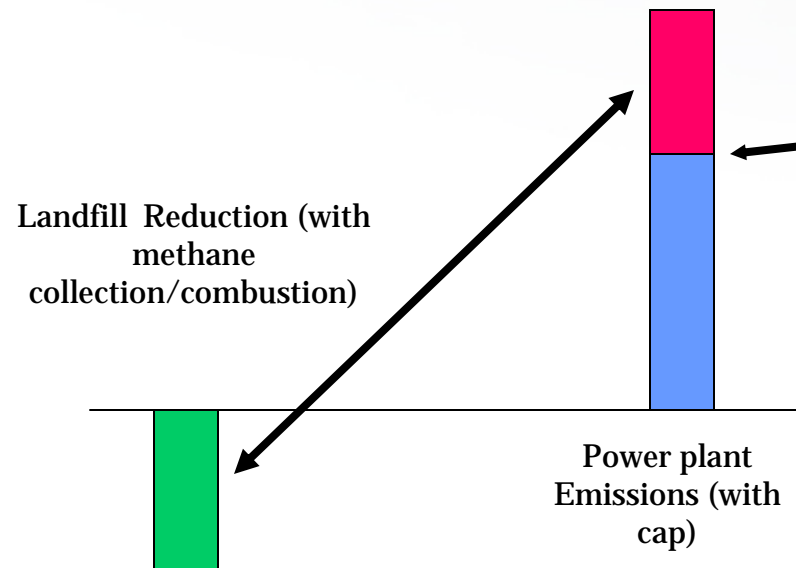
Importance of Additionality



No Offset/No Cap



Offset/Cap



Additionality - Applied



- Until a program or policy defines additionality it simply a theoretical discussion
 - How many angels can fit on the head of a pin?
 - What would otherwise occur?
- Additionality must be defined in the context of the objectives of the program of concern (either cap-and-trade or voluntary).
- Additionality should be determined for each project type included in an offsets program
- Any project that meets or exceeds the performance threshold is considered “additional” or beyond that which would be expected under a “business as usual” scenario
- “Realistic” objective - Minimize risk of accepting a project that is not additional or rejecting a project that is additional

Key Elements of Accounting Methodology



- Define Project Types
- Establish Regulatory Eligibility Conditions
- Define Terms for Additionality Determination
- Quantify Emission Reductions
 - Pre-project:
 - Selecting and setting baseline
 - Estimating project emission reductions
 - Post-project:
 - Monitoring
 - Quantifying actual project emissions and reductions



Additionality Defined - USEPA

- Proposed projects are required to demonstrate that they are additional by achieving a level of performance that, with respect to emission reductions or removals, or technologies or practices, is significantly better than business-as usual
 - Business-as-usual is determined by assessing performance of similar, recently undertaken or planned practices, activities or facilities in a relevant geographic area



Performance Standard Approach

- “Additionality” based on an analysis of a relevant sector in a specific spatial area
 - Data from (1) historic, (2) planned or (3) projections
 - Proxy for barriers, financial decisions and “intent” tests
- “Recent” historic performance is proxy for “near “ future performance
- Performance standard is specific to project type
 - Comprised of performance threshold (additionality determination) and baseline
 - Emissions rate, practice standard, technology standard
- Performance standard is periodically updated
 - Reflects continuous performance improvements in sector (e.g., changes in regulations, market trends, and technology developments are reflected in updates)
 - Adjustments made to “proposed projects,” not to existing

Advantages of Performance Standard Approach



- Project developers are aware of the accounting “rules” in advance
 - Methodologies prepared for specific set of project types
 - Equations needed for estimating and calculating emissions and reductions/removals are provided
- Reduces the complexity, cost and subjectivity of constructing individual project-specific arguments and subsequent review
- Historic “performance” is a proxy for what will occur; periodically update to reflect improvements
- Overall, consistent with WRI/WBCSD GHG Project Protocol, CCAR, RGGI
- Can be used for a variety of project types (sectors and geographic areas)

Additionality Determination – Commercial Boilers (1)



The type of performance threshold used for a commercial boiler project is an emissions rate. The threshold represents a level of performance (emissions rate) that is beyond that expected compared to the efficiencies of recently installed boilers. For both retrofits and new construction, a performance threshold of approximately the top 20th percentile has been selected.

Table Ia. Recently installed commercial boilers in New Jersey (1999)

| Project Type | Electric | Natural Gas | Oil |
|---------------------|-----------------|--------------------|------------|
| New Construction | 0% | 95% | 5% |
| Renovation | 34% | 66% | 0% |
| Grand Total | 14% | 83% | 3% |

Additionality Determination - Commercial Boilers (2)



Table 1c. Commercial Boiler Performance Thresholds Based on Emissions-Intensity criteria (1990-2003 CBECS Data)

| | Percentage of regional use in boilers - 1990-2003 | | | |
|--|---|-------------|-------------|-------------|
| | North-east | Mid-west | South | West |
| Fuel Oil Boilers | 7.9% | 1.7% | 0.6% | 1.2% |
| Fuel Gas Boilers | 43.0% | 46.1% | 35.6% | 43.9% |
| Electric Boilers | 49.1% | 52.2% | 63.8% | 54.8% |
| Estimated boiler efficiency at 25 th percentile | 82% | 82% | 81% | 82% |
| Estimated boiler efficiency at 20 th percentile | 83% | 83% | 82% | 83% |
| Estimated boiler efficiency at 10 th percentile | 85% | 85% | 84% | 85% |
| Performance threshold at 25th percentile (KgCO₂/MMBtu) | 64.7 | 64.7 | 65.5 | 64.7 |
| Performance threshold at 20th percentile (KgCO₂/MMBtu) | 63.9 | 63.9 | 64.7 | 63.9 |
| Performance threshold at 10th percentile (KgCO₂/MMBtu) | 62.4 | 62.4 | 63.2 | 62.4 |

Source: Energy Information Administration, 2003 Commercial Buildings Energy Consumption Survey.

Additionality Determination – Commercial Boilers (3)



Table 1. Performance Thresholds for Boiler Projects

| Commercial Boiler Project Type | Project Fuel Type | Thermal Efficiency | Performance Threshold, Emissions per Heat Output (KgCO₂/MMBtu) |
|---------------------------------------|--------------------------|---------------------------|--|
| Retrofit | Oil-fired | 86% | 85 |
| | Natural Gas-fired | 84% | 63 |
| New Construction | All fuels | 84% | 63 |

Additionality Determination – Manure Management: Anaerobic Digesters (1)



Additionality measure for manure methane anaerobic digester projects is practice based. The threshold represents a level of performance (practice) that is beyond that expected of a typical manure management system, and is based on the suite of current technologies and common practices taking into account state minimum requirements for waste systems for each animal type.

Table Ia. Dairy and Swine Operations in the U.S. by Manure Management System

| Animal | Number of Operations by Manure Management System | | | | | | Total |
|--------|--|--------------------|--------|---------------|---------------|----------|--------|
| | P/R/P | Anaerobic Digester | Lagoon | Liquid/Slurry | Solid Storage | Deep Pit | |
| Dairy | 72,487 | 62 | 4,453 | 4,345 | 9,494 | 1,147 | 91,989 |
| Swine | 53,230 | 18 | 6,571 | 6,303 | 1,129 | 11,643 | 78,894 |

Aerobic digesters in place on:

Dairy farms: 0.06%
Swine farms: 0.02%

Additionality Determination – Manure Management: Anaerobic Digesters (2)



Table 1c. Distribution of Dairy and Swine Operations by Geographic Location

| Animal | U.S. Region | Number of Operations by Geographic Location | | | | | | Total |
|--------|--------------|---|--------------------|--------|---------------|---------------|----------|--------|
| | | P/R/P | Anaerobic Digester | Lagoon | Liquid/Slurry | Solid Storage | Deep Pit | |
| Dairy | West | 1,460 | 21 | 1,639 | 916 | 936 | 221 | 5,192 |
| | Central | 3,244 | 2 | 1,634 | 1,061 | 1,514 | 399 | 7,854 |
| | Mid west | 45,748 | 24 | 238 | 202 | 36 | 0 | 46,248 |
| | South | 2,890 | 1 | 300 | 205 | 430 | 22 | 3,848 |
| | Mid-Atlantic | 19,146 | 14 | 643 | 1,962 | 6,578 | 505 | 28,847 |
| Swine | West | 3,891 | 1 | 29 | 33 | 5 | 58 | 4,017 |
| | Central | 10,255 | 8 | 143 | 133 | 24 | 248 | 10,812 |
| | Mid west | 21,811 | 5 | 5,112 | 5,542 | 959 | 9,989 | 43,418 |
| | South | 5,732 | 0 | 190 | 122 | 24 | 245 | 6,313 |
| | Mid-Atlantic | 11,541 | 4 | 1,097 | 473 | 116 | 1,104 | 14,334 |

West = AK, CA, HI, OR, WA
 Central = AZ, CO, ID, MT, NV, NM, OK, TX, UT, WY
 Midwest = IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, WI
 South = AL, AR, FL, GA, LA, MS, SC
 Mid-Atlantic = CT, DE, KY, ME, MD, MA, NH, NJ, NY, NC, PA, RI, TN, VT, VA, WV

Additionality Determination – Manure Management: Anaerobic Digesters (3)



Table Ib. Distribution of Dairy and Swine Operations by Manure Management System and Farm Size

| Animal | Farm Size | Number of Operations by Farm Size | | | | | | Total |
|--------|---------------|-----------------------------------|---------------------|--------|----------------|---------------|----------|--------|
| | | P/R/P | An aerobic Digester | Lagoon | Liquid/ Slurry | Solid Storage | Deep Pit | |
| Dairy | =500 head | 320 | 48 | 1,614 | 675 | 245 | - | 2,902 |
| | 200-499 head | 3,213 | 9 | 617 | 653 | 54 | - | 4,546 |
| | 1-199 | 68,954 | 5 | 2,223 | 3,017 | 9,195 | 1,147 | 84,541 |
| Swine | >2000 head | - | 14 | 2,581 | 1,084 | 297 | 2,774 | 6,749 |
| | 200-2000 head | - | 3 | 3,990 | 5,219 | 832 | 8,869 | 18,913 |
| | 1-199 head | 53,230 | 1 | - | - | - | - | 53,231 |

Additionality Determination – Afforestation/Reforestation




The type of performance threshold used for eligible reforestation/afforestation projects is practice-based.

The practice-based performance threshold represents a level of “performance” that is beyond that expected for the management of cropland or pasture, specifically regarding typical practices to convert such lands to forest.



Pre-project Planning

 **Reforestation Afforestation Project Carbon On-Line Estimator (BETA)**

Welcome to the Reforestation/Afforestation Project Carbon On-Line Estimator (RAPCOE)

The Reforestation/Afforestation Project Carbon On-line Estimator allows you to estimate the net carbon offset produced by a reforestation or an afforestation project in the United States. For the purposes of this tool, reforestation and afforestation are the same activity, that of converting cropland and/or pasture to forest. The net offset is equivalent to the amount of carbon sequestered by the conversion to forest (gross carbon offset), less the amount of carbon estimated to have been sequestered had no project occurred (baseline), and less any CO₂ released elsewhere as a result of this project occurring (leakage deduction).

With this tool, net offsets can be estimated for both (1) proposed reforestation/afforestation projects, for which gross offsets are not known and must be estimated from existing carbon stock accumulation tables (pre-project planning)-- and (2) projects already underway -- where the gross offsets have been measured or verified (post-project monitoring). Click the appropriate tab below to choose the net offset calculation you wish to execute.

Pre-project planning tool
Click to estimate net offsets for a planned project.


Post-project monitoring tool
Click to estimate net offsets for an existing project with known gross carbon

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Project Location/Additionality Determination



 **Reforestation Afforestation Project Carbon On-Line Estimator (BETA)**

Step 1. Select the project location

Select the state and county where the project will be located. The location is used to determine: (1) the applicable forest types for that region and the rates at which these forest types store carbon; (2) the background rates of possible land-use transitions in that region (based on historic trends), including conversion of cropland and pasture to forest, the carbon effects of which must be deducted from the gross carbon estimates for the planted forest to determine the net carbon that would be considered to be an offset; and (3) the leakage rate.

State: County:

Determining Additionality: Applying the Performance Standard

A performance threshold is used to determine if a given afforestation or reforestation project is additional, or beyond that which would be expected under a "business-as-usual" scenario. For afforestation and reforestation projects, the performance threshold is practice-based, or based on typical practices to convert cropland or pasture to forest, in a given region. The information provided below provides an indication of how common a practice afforestation or reforestation is in this area. If these practices are common, the less likely it is to be additional.

Lincoln Co. falls primarily within the Southern Mississippi Valley Silty Uplands major land resource area (MLRA). Cropland within this MLRA is converted into forest, on average, at a rate of **0.27 %** every 5 years, and pasture is converted into forest at a rate of **1.40 %**. Therefore, there is a **99.73 %** likelihood that cropland afforestation/reforestation projects and a **98.60 %** likelihood that pasture afforestation/reforestation projects are additional in this region.

Click [here](#) for supporting data on these rates or to specify your own conversion rates calculating background rate of cropland/pasture conversion to forest.

Project Status

Project location:
State:
County:
MLRA:

Baseline afforestation rates:
From cropland:
From pasture:


Leakage rate:

Areas planted:
Cropland:
Pasture:

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Selecting Project Parameters

 **Reforestation Afforestation Project Carbon On-Line Estimator (BETA)**

Step 2. Set the project size

Enter the acres of each forest type that will replace cropland and/or pasture in the selected county. Click on the forest types to view FORCARB2 stocking value tables, which provide estimates of forest carbon stock on a per acre basis for that forest type, starting in year 5 after conversion and reporting at 5 or 10 year intervals. After entering acres of the appropriate forest types, either choose View Net Offset Estimates to proceed directly to the summary table displaying the net carbon offset estimates or choose the tab View Net Offset Estimates (including all calculation steps) to view the detailed estimation steps for calculating gross carbon estimates for the project, setting the baseline and applying the leakage factor.

| Cropland | Pasture | Destination forest types for Southern Mississippi Valley Silty Uplands |
|----------|---------|---|
| 100 | 0 | Elm-ash-cottonwood |
| 0 | 0 | Loblolly-shortleaf pine |
| 0 | 0 | Loblolly-shortleaf pine: high productivity and management intensity |
| 0 | 0 | Oak-gum-cypress |
| 0 | 400 | Oak-hickory |
| 0 | 0 | Oak-pine |

Project Status

Project location:

State:

County:

MLRA:

Baseline afforestation rates:

From cropland:

From pasture:

Leakage rate:

Areas planted:

Cropland:


Pasture:

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Setting the Baseline: Land-Use Conversion Rates





Reforestation Afforestation Project Carbon On-Line Estimator (BETA)

Baseline estimates: Land use conversion rates for Lincoln Co., Mississippi

The default rates used to project land use changes occurring independently of project activity are derived from National Resource Inventory (NRI) data - plot level data collected over a 15 year span (1982-97) for the area in which the project occurs. Because these data are becoming dated, and more recent data are not available at this time, users are allowed to either accept the default historical average or enter their own conversion rates by selecting the Enter rates below option above the percentage rate column. The sum of all land use transition rates cannot exceed 100%. Values for areas remaining cropland or pasture are calculated automatically to round the total rate to 100%. The next step in setting the baseline is to apply these rates to the project area.

| | Historical data for Southern Mississippi Valley Silty Uplands MLRA | | | 15 year avg. | <input checked="" type="radio"/> Use 15 year Avg. <input type="radio"/> Enter rates below | |
|--|--|---------|---------|---------------|--|---|
| | 1982-87 | 1987-92 | 1992-97 | | | |
| Fate of Cropland (% changed over 5 year period) | | | | | | |
| remain as cropland | 98.90 % | 98.72 % | 98.69 % | 98.77 % | <input type="text" value="98.77"/> | % |
| to pasture | 0.72 % | 0.95 % | 0.86 % | 0.84 % | <input type="text" value="0.84"/> | % |
| to forest | 0.28 % | 0.22 % | 0.30 % | 0.27 % | <input type="text" value="0.27"/> | % |
| to developed land | 0.10 % | 0.12 % | 0.16 % | 0.12 % | <input type="text" value="0.12"/> | % |
| Fate of Pasture (% changed over 5 year period) | | | | | | |
| to cropland | 2.00 % | 1.38 % | 1.21 % | 1.53 % | <input type="text" value="1.53"/> | % |
| remain as pasture | 96.17 % | 97.59 % | 96.62 % | 96.95 % | <input type="text" value="96.95"/> | % |
| to forest | 1.61 % | 0.79 % | 1.79 % | 1.40 % | <input type="text" value="1.40"/> | % |
| to developed land | 0.22 % | 0.24 % | 0.37 % | 0.28 % | <input type="text" value="0.28"/> | % |

Project Status Reset

Project location:

State:

County:

MLRA:

Baseline afforestation rates:

From cropland:

From pasture:

Leakage rate:

Areas planted:

Cropland:

Pasture:


<< Baseline Estimates
Land use change >>

<< Gross carbon calculations
Leakage Calculations >>

[Gross Carbon](#) :: [Baseline Carbon](#) :: [Land Use Rates](#) :: [Land Use Change](#) :: [Carbon Accumulation](#) :: [Leakage Estimates](#) :: [Net Project Offset Potential](#)
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Net Offset Calculations

 **Reforestation Afforestation Project Carbon On-Line Estimator (BETA)**

Net Project Offset Potential
The net project offset potential is calculated as the annual carbon sequestered annually by the project, or the annual flux, less the baseline flux and any leakage. Results can also be viewed as carbon stock accumulation (the sum of fluxes) over the course of the project.

Show annual fluxes Show accumulated stocks

| Metric tons (CO2 eqivs.)/year | Annual flux Years 0-5 | Annual flux Years 5-10 | Annual flux Years 10-15 | Annual flux Years 15-20 |
|-------------------------------|-----------------------|------------------------|-------------------------|-------------------------|
| Gross CO2 estimate | 1,914 | 1,936 | 1,657 | 1,694 |
| Baseline CO2 deduction | 4 | 24 | 57 | 88 |
| Net Additional CO2 | 1,910 | 1,912 | 1,600 | 1,606 |
| Leakage deduction | 813 | 823 | 704 | 720 |
| NET OFFSET POTENTIAL | 1,097 | 1,089 | 896 | 886 |

Project Status

Project location:
State:
County:
MLRA:

Baseline afforestation rates:
From cropland:
From pasture:

Leakage rate:


Areas planted:
Cropland:
Pasture:

[Gross Carbon](#) :: [Baseline Carbon](#) :: [Land Use Rates](#) :: [Land Use Change](#) :: [Carbon Accumulation](#) :: [Leakage Estimates](#) :: Net Project Offset Potential
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Post-project Monitoring

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Climate Leaders Accounting Protocols



- Landfill methane (Practice-standard)
- Manure management – anaerobic digester (Practice-standard)
- Afforestation/reforestation (Practice-standard)
- Commercial/industrial boilers (Emissions rate/Technology Standard)
- Transportation – bus fleet (Emissions rate)
- End-use – landfills and manure management (Emissions rate)
- Forest management (in development) (Practice-standard)
- Coal-mine methane (in development) (Practice standard)



Contact Information

- Maurice LeFranc (lefranc.maurice@epa.gov)
- Melissa Weitz (weitz.melissa@epa.gov)
- Kimberly Todd (klunich.kimberly@epa.gov)

Resources

- *Climate Leaders* Offset Methodologies and Guidance (www.epa.gov/stateply/resources/optional-module.html)