U.S. Forest Projects (Reforestation, Improved Forest Management, Avoided Conversion)

U.S. forest offset projects sequester carbon through three project types that increase and/or conserve forest carbon stocks, increasing the removal of CO_2 from the atmosphere, or reducing or preventing the emissions of CO_2 to the atmosphere. The eligible project types include Reforestation, Improved Forest Management, and Avoided Conversion. More information about each of these project types can be found below.

Reforestation
Reforestation projects involve the restoration of tree cover on land that currently has no, or minimal, tree cover.

Improved Forest Management
Improved forest management projects involve management activities that increase carbon stocks on forested land relative to baseline levels of carbon stocks.

Avoided Conversion
Avoided conversion projects consist of specific actions that prevent the conversion of privately owned forestland to a non-forest land use by dedicating the land to continuous forest cover through a conservation easement or transfer to public ownership.

CO_2 offset allowances are awarded based on the amount of net additional carbon sequestered within the offset project boundary during each reporting period, as represented in short tons of CO_2. For each type of Forest Project, quantification proceeds in seven steps:

1. Estimating baseline onsite carbon stocks
2. Estimating baseline carbon in harvested wood products
3. Determining actual onsite carbon stocks
4. Determining actual carbon in harvested wood products
5. Calculating the offset project's primary effect
6. Quantifying the offset project's secondary effects
7. Calculating total net GHG reductions and GHG removal enhancements

A reversal occurs only if: (1) total net GHG reductions and GHG removal enhancements for the year are negative; and (2) CO_2 Offset Allowances have previously been awarded to the Forest Project.

To ensure that CO_2 offset allowances awarded for U.S. forest projects represent permanent carbon sequestration, the RGGI States require a

legally binding ***permanent conservation easement*** approved by the relevant state agency where the offset project is located. The conservation easement must:

1. Be granted by the owner to a qualified holder of a conservation easement in accordance with the conservation easement enabling statute of the state in which the project is located;
2. Be perpetual in duration;
3. Expressly acknowledge that the Participating State is a third party beneficiary of the conservation easement with the right to enforce all obligations under the easement and all other rights and remedies conveyed to the holder of the easement. These rights include standing as an interested party in any proceeding affecting the easement.

Reforestation, Improved Forest Management, or Avoided Conversion projects that have been awarded credits under a voluntary greenhouse gas reduction program provided certain conditions may be eligible to apply to be a project under the RGGI U.S. Forests category.

For more information, please consult state regulations and the U.S. Forest Projects protocol.

Parties evaluating potential offset projects in multiple RGGI States should also consult the Model Rule, which was the basis for the development of individual state regulations. Note that the Model Rule is provided for informational purposes only, and state regulations apply.

Tools and Guidance Documents:

Assessment Maps:

Identify which Supersection the project is located in using the Assessment Area Data File.

Assessment Area Data File (XLS)

Northcentral (PDF)

Northeast (PDF)

Northwest (PDF)

Southeast (PDF)

Southwest (PDF)

US Overview (PDF)

Supplemental Quantification Guidance (Consistency Application Form 2.3 – Baseline Modeling and Form 2.4 – Monitoring and Verification Plan)

The guidance provides best management practices for project sponsors and independent verifiers in developing project estimates and baselines. Adherence to the guidance in this document will help to ensure sound inventory practices (including inventory update processes), standardize data conversions, understand risks associated with the use of regression estimators for tree heights, and model project baselines. Furthermore, adherence to the practices outlined in this document will do much to prepare projects for verification.

Supplemental Quantification Guidance (PDF)

Biomass Equations:

The Methods and Equations for Estimating Aboveground Volume, Biomass, and Carbon for Trees in the U.S. Forest Inventory (Woodall 2010) document provides cubic foot gross and sound volume models. The accompanying "Coefficients Database (ZIP)" is used to determine the correct coefficients to use for gross and/or sound volume.

Use the Coefficients Database (ZIP) to find the appropriate coefficients by project location and species. Coefficients for the same species may be different in two different locations. Gross cubic foot volume (VOLCFGRS) must be converted to sound cubic foot volume (VOLCFSND) by subtracting rotten and missing cull volume.

The standing dead tree carbon pool must be adjusted for density reduction and structural loss using the approach established in Accounting for density reduction and structural loss in standing dead trees: Implications for forest biomass and carbon stock estimates in the United States (Domke 2011).

Decay class, density reductions factors (DRFs), and structural loss adjustment (SLA) factors are necessary to complete calculations for standing dead trees. Decay class and DRFs are found in Appendix B of Differences Between Standing and Downed Dead Tree Wood Density Reduction Factors: A Comparison Across Decay Classes and Tree Species (Harmon 2011) under the column labeled "SD." Where species are missing DRFs, identify a value by appropriate decay class from within the same genus. If this is not possible, use the hardwood/softwood default values found in Table 6 of Harmon (2011). Please cite the source of

the DRF and column within the source for ease of verification.

SLA factors can be found in Table 2 of Domke (2011) for decay classes 1-5 for top, bark, bole, stump and roots. These SLA factors are applicable to all species.

Biomass is then calculated for individual tree components following the Component Ratio Method.

Component Ratio Method:

A Streamlined Approach to the Component Ratio Method (Monitoring and Verification Report Form 2.2 – Determination of Reporting Period Sequestration)

The Component Ratio Method (CRM) is a means to calculate biomass in various portions of the tree, including below ground, stump, bark, branches, and top, from biomass calculated in the bole of the tree using biomass equations provided by RGGI. The calculations can be complex and produce biomass estimates for portions of the tree that are not reported independently. For example, the U.S. Forest Projects Offset Protocol is only concerned with the biomass component of the bole for wood products calculations, and the rest of the tree for deriving estimates of standing live and dead trees. Since the sums of the streamlined and default CRM calculations are equal, the simplified methodology allows project sponsors to avoid unnecessary calculations and use only portions of the CRM that are pertinent to the protocol.

Streamlined Component Ratio Method (PDF)

Volume Equation References and Coefficients by Species for Supersections outside of California, Oregon, Washington, Alaska, and Hawaii (XLS)

Volume Equations for the United States outside of California, Oregon, Washington, Alaska, and Hawaii (PDF)

Biomass Coefficients for use with the Component Ratio Method (XLS)

Biomass Estimation using the Component Ratio Method (Appendix J, 2009)

Investigation into Calculating Tree Biomass and Carbon in the FIADB Using a Biomass Expansion Factor Approach: An Article Describing the Component Ratio Method (Heath et al. 2009)

Annual Monitoring Calculation Worksheets (Monitoring and Verification Report Form 2.2 – Determination of Reporting Period Sequestration)

The Annual Monitoring Calculation Worksheet is a tool that standardizes and simplifies the compilation of project data and provides greater assurance that the reported summary data are calculated without error. Separate worksheets are available for each of the U.S. forest project types.

Annual Monitoring Calculation Worksheet Guidance Document (PDF)

Annual Monitoring Calculation Worksheet – Avoided Conversion (XLS)

Annual Monitoring Calculation Worksheet – Improved Forest Management (XLS)

Annual Monitoring Calculation Worksheet – Reforestation (XLS)

Harvested Wood Products Worksheet (Monitoring and Verification Report Form 2.2 – Determination of Reporting Period Sequestration)

The reporting of harvested wood products, both in the baseline and in the project activity, is very complex. It involves many steps, including deriving estimates of the metric tons of CO_2e in logs delivered to the mill, the portion of the logs that are output as wood products, and the long term persistence of CO_2e in the generated wood products, both in and out of landfills. The worksheet is designed to ensure that project sponsors completely address the protocol requirements and perform their calculations with the appropriate values.

Harvested Wood Products Worksheet Guidance Document (PDF)

Harvested Wood Products Worksheet (XLS)

Sequential Sampling Worksheets (Monitoring and Verification Report Form 3.1 – Independent Verifier Certification Statement and Report)

Sequential sampling is a required method for independent verifiers to accomplish the task of ensuring that the project sponsor’s field measurements are within specified tolerances. The sequential sampling worksheets are tools designed to facilitate the verification of project data. Independent verifiers enter the project sponsor’s data into the worksheets and compare them to their own measurements. The worksheets advise the verifier when sufficient oversight of field measurements has been achieved.

Sequential Sampling Worksheet Guidance Document (PDF)

Sequential Sampling Verification Workbook (XLS)

Guidance for Verifying Project Inventories (PDF)

Verification Report Template (PDF)

Afforestation (CT and NY only)

Afforestation offset projects sequester carbon through the conversion of land from a non-forested to forested condition. Carbon sequestration is determined using a base-year approach, where the amount of carbon sequestered is measured relative to the base-year carbon measurement or previous reporting period carbon measurement. CO_2 offset allowances are awarded based on the amount of net additional carbon sequestered within the offset project boundary during each reporting period, as represented in short tons of CO_2.

To ensure that CO_2 offset allowances awarded for Afforestation projects represent permanent carbon sequestration, the RGGI States require a legally binding permanent conservation easement approved by the relevant state agency where the offset project is located.

The easement must require that all land within the offset project boundary be maintained in a forested state in perpetuity. In addition, the conservation easement must:

1. Include a requirement that the carbon density within the offset project boundary be maintained at long-term levels at or above that achieved as of the end of the CO_2 offset crediting period.
2. Require that the land be managed in accordance with environmentally sustainable forestry practices.

Net carbon sequestered during the reporting period is also discounted by 10% prior to the award of CO_2 offset allowances to account for potential project reversals of carbon sequestration, unless the project sponsor retains long-term insurance, approved by the relevant state agency where the offset project is located, that guarantees replacement of any lost sequestered carbon for which CO_2 offset allowances were awarded.

To qualify for the award of CO_2 offset allowances, Afforestation offset projects must:

1. Occur on land that has been in a non-forested state for at least 10 years preceding the commencement of the offset project.
2. Be managed in accordance with widely accepted environmentally sustainable forestry practices and designed to promote the restoration of native forests by using mainly native species and avoiding the introduction of invasive non-native species.

If commercial timber harvest activities are to occur, certification must be obtained, prior to any harvest activities at the site, through the Forest Stewardship Council (FSC), Sustainable Forestry Institute (SFI), American Tree Farm System (ATFS), or such other similar organizations as may be approved by the appropriate state agency where the project is located.

For more information, please consult Connecticut or New York state regulations.

For relevant state offset project application instructions and materials, please see Application Process.