FOREST CARBON OFFSETS: A Scorecard for Evaluating Project Quality

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Summary

Forests worldwide play a vital role in removing CO_2 from the atmosphere. Forest offset projects are an appealing and abundant type of offset project, particularly in the voluntary carbon markets, in part because of the many other societal values forests provide, such as clean water and wildlife habitat (Hamilton et al. 2008). However, forest projects present some unique challenges for technical legitimacy, in particular the issues of additionality, permanence, and leakage. With this scorecard we provide a relatively simple scoring system to evaluate the technical rigor of any forest offset project. It is the first publicly available ranking tool tailored specifically to forest carbon offset projects.

The Manomet Forest Offset Scorecard is intended for project developers, potential offset buyers, and anyone interested in evaluating the technical rigor of a forest offset project. Through a series of 'yes/no' questions, the scorecard examines eight general components of offset projects: (1) contract structure; (2) baselines; (3) additionality; (4) monitoring, measurement, reporting, and verification; (5) permanence; (6) leakage; (7) transparency; and (8) co-benefits/costs. The scorecard contains 43 questions derived from an analysis and synthesis of the work of many different organizations and individuals. The scorecard was designed to be comprehensive, thorough, and unbiased toward any particular greenhouse gas registry or protocol.

The scorecard can be used in many possible ways: as an informal tool for identifying an offset project's areas of weakness that might be strengthened prior to a carbon offset transaction, as a way to compare the characteristics of one project to another, or as a means to inform offset buyers and sellers about issues that are important to consider when evaluating or creating a carbon offset project. No project is likely to earn a perfect score because of the inherent limitations of forest offset projects. Rather, the scorecard is intended as an educational tool for understanding the components of high-quality forest offset projects.

This scorecard focuses on the *technical* legitimacy of forest offset projects; however, *social* legitimacy is also important in determining whether forest offsets are widely accepted. Technical rigor supports social acceptance. Forest offsets must have a strong technical and scientific grounding for the public to view them as credible. To this end, we hope this scorecard will lead to a greater availability of high-quality, technically rigorous forest offset projects in the marketplace and thus enhance the role of forests in mitigating climate change. We welcome recommendations for improvement.

Acknowledgements

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Introduction

Addressing climate change may be one of the greatest challenges humans have ever faced. This complex problem resulting from human emissions of greenhouse gases (GHGs) requires multifaceted solutions that reduce fossil fuel use and encourage carbon sequestration. Forests are a key part of any solution because they are an important part of the global carbon cycle. The world's forests annually sequester 25% of global anthropogenic emissions from fossil fuel use (Wofsy 2001). At the same time, almost 20% of our annual GHG emissions come from forests, primarily human-caused deforestation (IPCC 2007). Hence, many efforts to reduce GHG emissions include forests for the role they play as both a source of, and solution to, climate change.

Reducing human-caused GHG emissions has become a major priority for countries, businesses, and individuals all around the world. Some programs, such as the European Union Emissions Trading Scheme and the Regional Greenhouse Gas Initiative in the northeastern United States, are mandatory government GHG cap-and-trade programs. Other programs, such as the Chicago Climate Exchange, the California Climate Action Registry (CCAR)[1], and numerous other independent efforts, are voluntary emission reduction programs.

Both mandatory and voluntary programs often include emission "offsets," which neutralize a GHG emission by either: (1) removing an equivalent amount of GHGs from the atmosphere (e.g., planting trees), or (2) preventing an emission that otherwise would have occurred (e.g., avoided deforestation, methane capture on dairy farms). The premise of offsetting is, rather than reduce your own emissions, you pay someone else to reduce their emissions (or, in the case of most forest offsets, to remove CO_2 from the atmosphere). For any offset to be legitimate, it must result in no net increase in atmospheric GHG levels.

"The voluntary offset market is already under pressure from standards confusion, reputational challenges and a lack of transparency."

(Verdantix 2008)

Carbon offset markets are growing rapidly and, in the voluntary market, forest carbon offsets are one of the most traded offset types (Hamilton et al. 2007 and 2008). Five types of forest carbon offset projects are commonly recognized by carbon markets: afforestation, reforestation, avoided deforestation, forest management, and urban forestry (see Definitions section). In a rapidly growing marketplace with no standardization of rules and little oversight, the quality of available offsets is highly variable (Hamilton et al 2007). Here we provide a scorecard to objectively evaluate and score the quality of forest offset projects.

Challenges of Forest Offset Projects

Addressing climate change through the use of offsets, especially forest offsets, is controversial because of challenges posed in managing the issues of additionality, leakage, permanence, and co-benefits.

Additionality: An offset project must result in GHG emission reductions or removals that are *in addition to* those that would have occurred in the absence of the project. Additionality is key to the credibility of offsetting—offsets must represent new emission reductions or removals because those offsets are intended to compensate for new emissions someplace else. Without additionality, a project may actually cause an increase in GHG levels, undermining the purpose (and credibility) of the offset market. Demonstrating additionality can be difficult, sometimes impossible, due to the subjectivity of project "baselines."

[1] CCAR was created by California Senate Bill (SB) 1771 in 2000 to provide a voluntary mechanism for documenting, tracking, and certifying GHG emission reductions in California. In 2006, the California Assembly passed AB 32, establishing GHG reduction goals for the state. Early steps to implement AB 32 include adoption of the CCAR forestry protocols.

For most forest offset projects, both the base year and BAU approaches lack the ability to assess unequivocally whether, or to what extent, an offset project's impact is additional.

A baseline is the reference point(s) against which a project's carbon storage or GHG emission reductions are measured. Carbon sequestration levels or emission reductions in excess of the baseline level are considered additional and, thus, available for sale as offsets. Therefore, setting an accurate baseline is a crucial—and controversial—step in designing an offset project.

Two types of baselines are frequently used in forest carbon projects. The first type is the "base year" approach, which compares actual measurements of a project's carbon stocks or emission levels from one reporting period to the next (Figure 1a). The second type of baseline is the "business-as-usual" (BAU) approach, which compares a project's carbon stocks or emissions to the estimated amount that would have occurred without the project (Figure 1b). With both approaches, any net increases in carbon stocks or reductions in GHG emissions relative to the baseline are considered additional.

The base year approach is controversial because it does not consider the amount of sequestration or emissions that would have occurred had the project not been implemented, creating uncertainty about whether the project led to any real changes in sequestration or emission levels. Many BAU baselines are controversial because they use hypothetical projections of sequestration or emission rates made many years, sometimes decades, into the future. Of course, the future is impossible to predict with accuracy, and so it is impossible to predict with accuracy how much carbon would have been sequestered under a BAU scenario. Who can say with great certainty what BAU would be 10 years from now, especially for a forest managed for timber and thus dependent on regional and global market forces? Therefore, for most forest offset projects, both approaches lack the ability to assess unequivocally whether, or to what extent, a project's impact is additional.

Leakage: Leakage occurs when a project causes emissions to shift to other locations. For example, a project might prevent one forested area from being converted to house lots, but the developer could simply move the project to another forest in a neighboring town. Unless demand for forestland or forest products decreases, leakage is almost certain to occur, whether locally, regionally, or internationally. Because a project's leakage impacts can be geographically dispersed, leakage can be difficult or impossible to measure or prevent.

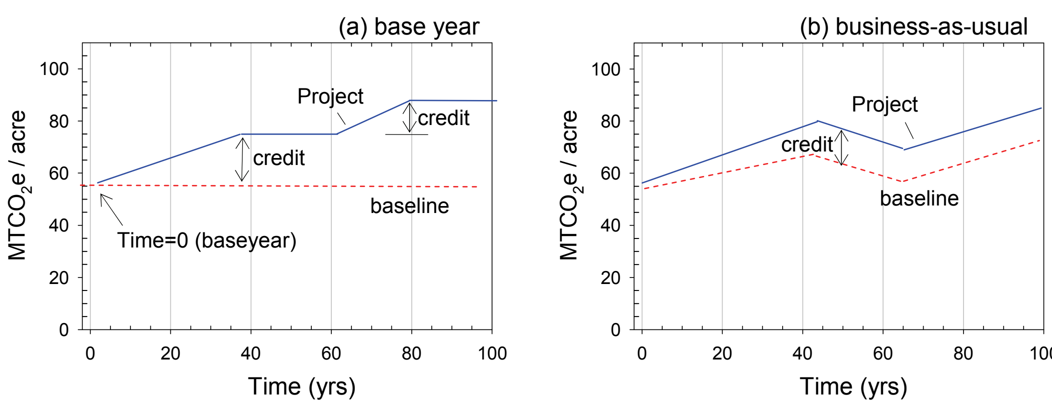

Figure 1. Amount of carbon credits (metric tons of CO_2 equivalent, $MTCO_2e$) generated in hypothetical examples of (a) the **base year** baseline approach and (b) the **business-as-usual** baseline approach. Under each approach, the "additional" carbon that can be sold as offsets is represented by the difference between the blue (solid) and red (dashed) lines. The business-as-usual approach requires modeling the amount of carbon that would have been on the project lands had the project not occurred; thus, the baseline level is dynamic over time reflecting how the owner would have managed the forest. By contrast, the base year approach uses the carbon stocks at T=0 (project starting year) as the baseline throughout the life of the project (although only increases in carbon stocks net of those that have already been sold as offsets are available for sale).

Permanence: For an offset project to truly offset an emission, it must remove CO_2 from, or prevent it from entering, the atmosphere for a time period at least as long as the emitted gas is contributing to climate change (which depends on the decay rate of the particular GHG). However, permanence is defined differently under different programs. Some projects are required to store carbon in perpetuity, while others are designed to sequester carbon for a specified, finite number of years. Regardless of program requirements, all forest offsets are vulnerable to "reversal" due to unforeseen events—such as fire, disease, or severe weather—that cause stored carbon to be lost.

Co-benefits: Co-benefits are the positive ancillary environmental, social, and economic outcomes that result from an offset project. One argument for supporting forest offset projects over other types of offset projects is their ability to generate both atmospheric benefits and co-benefits for local communities and the environment (e.g., places to recreate, clean water, wildlife habitat). Offset projects that provide strong co-benefits to local communities or to other interest groups may earn stakeholder buy-in, regardless of weaknesses related to additionality, permanence, or leakage. Forest projects often can be structured to achieve both co-benefits *and* GHG reductions. Many offset programs explicitly or implicitly include co-benefits in their standards.

One argument for supporting forest offset projects over other types of offset projects is their ability to generate both atmospheric benefits and co-benefits for local communities and the environment.

Existing offset programs have their own requirements for addressing additionality, permanence, leakage, and/or co-benefits. These requirements vary for many possible reasons. For instance, different programs value additionality, leakage, permanence, and co-benefits differently and, therefore, arrive at different ways of managing the tradeoffs associated with those issues (mainly, the tradeoffs between cost and credibility [USGAO 2008]). Also, programs were developed at different points in time, while our understanding of carbon science and accounting is constantly changing and improving (Malmsheimer et al. 2008). Program requirements may also vary because of differing perceptions about the future—what will our climate look like in 50 or 100 years, what will the state of technology be, and how will forest carbon be affected by those changes?

While it is challenging to create technically rigorous, broadly accepted forest offset projects, there is political and social support to include forests as a legitimate offset mechanism. Some view the carbon market as a way to mobilize funds for forest conservation, but it is important to remember that the primary goal of the carbon market is to reduce GHGs in the atmosphere. If forest projects are not sufficiently rigorous, and do not make real reductions in atmospheric GHG levels, then forest projects may lose social legitimacy and be excluded from carbon markets. Given the inherent challenges facing forest offset projects, we created this scorecard to guide users in developing high-quality forest offset projects that can earn widespread public support.

Approach

The scorecard can be used by offset buyers and/or sellers to evaluate any type of forest carbon offset projects located anywhere in the world. It can be used to evaluate an existing project, screen a proposed project, or simply help prospective buyers or sellers of forest carbon to understand the key issues in developing an offset project. Below are the primary principles and underlying assumptions that guided the development of this scorecard.

The scorecard was designed to be rigorous. Our scoring for additionality, permanence, and leakage reflect what we believe to be the best, most rigorous approach to each of these challenges. We chose a 'yes/no' answer format to simplify the scoring system. We acknowledge there are significant gray areas within any one issue (e.g., within a 'no' answer, there may be a range of possible 'poor' to 'good' approaches); however, the scorecard only awards points for the approaches that lead to the strongest and most effective forest offset projects with respect to reducing GHG levels in the atmosphere.

The scorecard considers all six recognized GHGs because this more accurately accounts for a project's full impact on atmospheric GHG levels. Some forest offset programs consider only carbon stocks. For example, the GHG reduction benefit of an afforestation project would be partly negated if it employed machine-intensive land preparation and fertilizers—straight carbon accounting would consider only the project's carbon stock increases from converting non-forestland to forestland, while full GHG accounting would also account for the project's anthropogenic GHG emissions (e.g., carbon dioxide, methane, and nitrous oxide) associated with the land preparation and fertilizer application activities.

Each question is worth one point. However, because some scorecard sections (topics) contain more questions than others, some sections have greater weighting in the resultant overall score. This weighting was not intentional, but rather a result of our desire to cover each topic thoroughly.

A perfect score is virtually impossible to achieve given the inherent and unavoidable challenges facing forest projects.

A perfect score is virtually impossible to achieve given the inherent and unavoidable challenges facing forest projects. A perfect score may even be undesirable for certain users if our underlying assumptions differ from theirs; for example, some users may not believe it is necessary for a project to store carbon in perpetuity. Importantly, a project need not earn a perfect score to be worthy of implementation; ultimately that determination is for offset buyers and sellers to make based on their own goals and values. The scorecard simply identifies a project's strengths and limitations according to the scorecard criteria.

Methods

To create this scorecard, we reviewed the world's leading GHG registries, GHG accounting protocols, regulatory and voluntary emission reduction program requirements, project design and certification standards, as well as reports analyzing carbon markets and offset providers. Our review included the California Climate Action Registry (CCAR); Chicago Climate Exchange (CCX); Regional Greenhouse Gas Initiative (RGGI); Clean Development Mechanism (CDM); Voluntary Carbon Standard (VCS); Gold Standard; the Climate, Community and Biodiversity (CCB) Standards; and many publications from organizations including the World Resources Institute and Ecosystem Marketplace and New Carbon Finance (see the Literature Cited and Further Reading section for a complete list). Each of these GHG programs and standards has its strengths and limitations and we acknowledge the difficult balance they have sought to strike between thoroughness and practicality. Our scorecard has no biases for or against any of these programs or standards.

We also reviewed three publications with goals similar to those of our scorecard and containing criteria for evaluating carbon offset projects: Clean Air-Cool Planet's *A Consumer's Guide to Retail Carbon Offset Providers* (Clean Air-Cool Planet 2006), the Offset Quality Initiative's (OQI) *Ensuring Offset Quality* (OQI 2008), and Environmental Data Services' (ENDS) *The ENDS Guide to Carbon Offsets* (Ewing 2008). Our scorecard is the first open source scoring system to focus exclusively on forest carbon offset projects.

From our review of existing programs and literature, we distilled and synthesized carbon offset best practices. The result is a scorecard consisting of 43 questions that address: (1) contract structure; (2) baselines; (3) additionality; (4) monitoring, measurement, reporting, and verification; (5) permanence; (6) leakage; (7) transparency; and (8) co-benefits/costs.

How to Use the Scorecard

Answer each scorecard question by circling either 'yes' or 'no' for the particular forest project you are evaluating. Place a '1' in the Score column for each 'yes' answer and a '0' for each 'no' answer. Calculate subtotals for each section and then sum the subtotals to determine a total score. The higher the total score, the higher the overall quality of the offset project. Some of the questions may require significant data analysis to answer. If the data are not available, we recommend answering with a 'no'. Also, users may need to complete the scorecard over a period of time, as some questions may not be able to be answered until the later stages of project design or implementation.

Four of the questions (Questions 2.4, 2.5, 2.6, and 6.3) are 'either/or' questions. Each poses two separate questions that are intended to be mutually exclusive; users should answer 'yes' to only one of them. The Scorecard Supplemental Manual should be used as a side-by-side companion when completing each question; it contains supporting information and a justification for each scorecard question.

The Scorecard Supplemental Manual should be used as a side-by-side companion to assist the scorecard user in completing each question.

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The Manomet Forest Carbon Offset Project Scorecard

Instructions: Circle 'Yes' or 'No' to answer each question. If the answer is 'Yes,' place a '1' in the Score column; if 'No,' place a '0' in the Score column. The sum of the scores indicates the overall quality of the offset project.

General Project Information

Type of forest project (check one): ❑ Afforestation ❑ Reforestation ❑ Avoided deforestation ❑ Active forest management. ❑ Urban forestry

Project location:
State: ____________________ Country: ____

Contact person/title/information: ____

Standards & protocols used to create the project (list all): ____

Project start date: ____________________

Carbon crediting period (month/year): From: ______________________ To: ________________________

Length of carbon storage liability (# of yrs): ___________

Project size (# of acres/hectares): ___________

Amount of GHG reductions or carbon sequestration the project is expected achieve (measured in metric tons of CO_2 equivalent ($MTCO_2e$)): Annual: ____________ Total: ____________

			Score
1. Contract Structure			
1.1 Are ownership or tenure and use rights for the project lands legally documented and undisputed?	Yes	No	______
1.2 Is ownership of the carbon credits that will be generated from this project clearly documented?	Yes	No	______
1.3 Have project participants identified and confirmed compliance with all applicable federal, state, and local laws?	Yes	No	______
1.4 Does the contract specify whether credits are sold *before* (ex-ante) or *after* (ex-post) the associated carbon sequestration or emission reductions have occurred?	Yes	No	______
1.5 Does the contract clearly define the delivery of project carbon credits?	Yes	No	______
1.6 Does the contract specify the length of the project, carbon maintenance/replacement requirements, project monitoring requirements, and verification requirements?	Yes	No	______
1.7 Are dispute resolution mechanisms clearly described in the contract?	Yes	No	______
1.8 Are enforceable penalties for breach of contract specified and appropriate to fulfill the stated project commitments?	Yes	No	______
		Subtotal (out of 8) =	
2. Baselines			
2.1 Are both a qualitative description and quantitative calculation for the baseline provided?	Yes	No	______
2.2 Are all forest carbon pools included in the carbon baseline calculation?	Yes	No	______
2.3 Does the project baseline include an accounting of all six GHGs (i.e., carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_20), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)), even if levels of those gases are at or near zero?	Yes	No	______

2.4 Are the reported baseline and subsequent inventory estimates within 10% of the true mean at a 95% confidence level?	Yes	No	______
-OR-			
If not, are the baseline and inventory estimates adjusted to reflect the greater level of uncertainty?	Yes	No	
2.5 Will the project proponent forgo credits for carbon in harvested wood products?	Yes	No	______
-OR-			
If the project proponent is seeking credits for carbon in wood products, is that carbon pool included in the project baseline and subsequent measurements, and are the entity's GHG emissions associated with those wood products also included?	Yes	No	
2.6 Does the project use a base year approach?	Yes	No	______
-OR-			
If not, will the baseline be recalculated at any point during the project to "true up" the existing estimates?	Yes	No	
		Subtotal (out of 6) =	
3. Additionality			
3.1 Will the project exceed regulatory requirements and other legal mandates?	Yes	No	______
3.2 Can it be demonstrated that carbon credits will not be generated retroactively from activities that have already occurred?	Yes	No	______
3.3 Can it be demonstrated that the project will result in a net reduction of GHG levels in the atmosphere relative to the baseline?	Yes	No	______
3.4 Can it be demonstrated that none of the project's credits have been sold as offsets more than once?	Yes	No	______
3.5 Can it be demonstrated that project credits will be permanently retired once they are sold?	Yes	No	______
		Subtotal (out of 5) =	
4. Monitoring, Measurement, Reporting, and Verification			
4.1 Is there a monitoring/measurement plan(s) in place for the life of the project to ensure that project commitments are met?	Yes	No	______
4.2 Have the resources and capacity necessary to carry out the monitoring/measurement plan(s) been identified and secured?	Yes	No	______
4.3 Can it be demonstrated that all carbon stocks expected to decline by at least 5% between reporting periods are included in carbon inventory calculations?	Yes	No	______
4.4 Do the project's measurement/monitoring processes capture "trigger event" emissions, even if those GHGs were previously unmonitored?	Yes	No	______
4.5 Will the monitoring reports be submitted to the contracting entity?	Yes	No	______
4.6 Will a third party regularly review this project to verify accuracy and attainment of project goals?	Yes	No	______
4.7 Must the project proponent's calculations of carbon stocks and emissions be within 15% of the verifier's calculations to receive project verification?	Yes	No	______
4.8 Will adjustments be made if the verification process reveals that previous carbon credit payments were inaccurate?	Yes	No	______
		Subtotal (out of 8) =	

5. Permanence			
5.1 Is maintenance of additional carbon stocks contractually required for:			
At least 20 years?	Yes	No	______
At least 50 years?	Yes	No	______
At least 100 years?	Yes	No	______
In perpetuity?	Yes	No	______
5.2 Have all of the project's carbon risks been identified and risk management strategies been enacted to guard against carbon loss during the project's contractual obligation?	Yes	No	______
5.3 Must carbon stocks be restored or replaced if lost before the end of the project's contractual obligation?	Yes	No	______
Subtotal (out of 6) =			
6. Leakage			
6.1 Will all potential sources of internal leakage be assessed and prevented, and will these actions be confirmed by a third-party verifier?	Yes	No	______
6.2 Will all sources of potential external leakage be qualitatively and quantitatively assessed?	Yes	No	______
6.3 Will all external leakage be avoided and will these actions be confirmed by a third-party verifier?	Yes	No	
-OR-			______
If all external leakage cannot be avoided, will the unavoided leakage be subtracted from, or used to discount, the project's GHG reduction benefit?	Yes	No	
Subtotal (out of 3) =			
7. Transparency			
7.1 Are the methods and assumptions used to calculate the baseline and inventories fully documented and replicable by a third party?	Yes	No	______
7.2 Will project documentation be publicly available?	Yes	No	______
7.3 Will verification reports be publicly available?	Yes	No	______
Subtotal (out of 3) =			
8. Co-Benefits/Costs			
8.1 Will the positive and negative environmental and social impacts of the project (both inside and outside the project boundary) be assessed?	Yes	No	______
8.2 Will all negative impacts identified in Question 8.1 be avoided or mitigated?	Yes	No	______
8.3 Will the project's environmental and social impacts be evaluated by a third party against a recognized standard(s)?	Yes	No	______
8.4 Will the local community have input into the project?	Yes	No	______
Subtotal (out of 4) =			

Total Score = (out of 43)	

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Scorecard Supplemental Manual

This supplemental manual is intended to be a side-by-side companion to the Manomet Forest Carbon Offset Project Scorecard. It provides an explanation of each scorecard question and why a "Yes" answer to each question indicates a component of a high-quality forest carbon offset project.

1. Contract Structure

This section highlights key issues that should be addressed in a forest carbon offset contract to ensure a quality and lasting offset project.

1.1 *Are ownership or tenure and use rights for the project lands legally documented and undisputed?*

Ownership or tenure and use rights for the project lands should be clearly documented and legally recognized (e.g., through a title report or title insurance policy) to ensure the project cannot be challenged. A legally-binding project promotes stability and, therefore, helps guard against the risk of carbon loss.

1.2 *Is ownership of the carbon credits that will be generated from this project clearly documented?*

Ownership of the project's carbon credits should be clearly and legally defined to ensure that the seller has the right to sell the credits as offsets and claim revenue from the sale.

1.3 *Have project participants identified and confirmed compliance with all applicable federal, state, and local laws?*

To ensure legitimacy, the transaction between the buyer and seller of the carbon credits, as well as the project activities, should follow all applicable state and federal laws (e.g., securities and exchange laws, zoning regulations, forest practices regulations). Without legal legitimacy, the sale of project credits could be contested at some future time, risking the project's permanence.

1.4 *Does the contract specify whether credits are sold before (ex-ante) or after (ex-post) the associated carbon sequestration or emission reductions have occurred?*

The credit buyer should know prior to the transaction whether the credits are being sold before or after the actual carbon sequestration or emission reduction occurs. Timing of the sale has important implications for other components of the project, which the buyer should then evaluate accordingly. For example, an *ex-ante* project should be closely evaluated for assurances that the purchased credits will indeed accrue as estimated and that remedies are in place if such accrual does not occur. Conversely, an *ex-post* project should be scrutinized for additionality, because the project proponent receives revenue from selling credits after the project is already underway (indicating that the funds may not have been necessary to make the project a reality).

1.5 *Does the contract clearly define the delivery of project carbon credits?*

To avoid contract disputes, the contract should clearly state the seller's expectations and requirements regarding the delivery of purchased carbon credits (e.g., pricing and payment terms, when the credit transfer will be made).

1.6 *Does the contract specify the length of the project, carbon maintenance/replacement requirements, project monitoring requirements, and verification requirements?*

A thorough contract should specify project length, as well as the carbon maintenance/replacement, project monitoring, and verification requirements, so the buyer knows what to expect and can evaluate the quality of each of those items. The project length and carbon maintenance requirements are important because they tell the buyer how long the purchased carbon sequestration/emission reduction must last and what actions must be taken if carbon is lost during that time period. Details about the project monitoring and verification requirements allow the buyer to evaluate how carefully the project will be managed and whether the project activities and measurements will be substantiated by another party.

1.7 Are dispute resolution mechanisms clearly described in the contract?

The contract should clearly indicate how and under what circumstances disagreements among the participating parties will be resolved by arbitration or other specified means.

1.8 Are enforceable penalties for breach of contract specified and appropriate to fulfill the stated project commitments?

The contract should specify the legal resolution process for failure to honor the contract. The penalties should be enforceable by law and ensure that project commitments are met.

2. Baselines

This section addresses the development of a project baseline, the reference point against which future emission reductions or carbon sequestration are measured.

2.1 Are both a qualitative description and quantitative calculation for the baseline provided?

The qualitative baseline description is an explanation of the activities and management practices from which the quantitative baseline is calculated. Describing and fully documenting the qualitative and quantitative components of a baseline are important for promoting transparency and understanding the baseline calculations.

2.2 Are all forest carbon pools included in the carbon baseline calculation?

All carbon pools should be included in the project's carbon baseline, even if levels are at or near zero, to provide a reference point against which to measure future changes in stock levels. Carbon pools include live above- and below-ground tree biomass, dead above- and below-ground tree biomass, live above-ground non-tree biomass, litter, and soils. A comprehensive baseline that includes all possible carbon pools is a first step toward determining which carbon pools need to be reported in future carbon inventories (see Question 4.3).

2.3 Does the project baseline include an accounting of all six GHGs (i.e., carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_20), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)), even if levels of those gases are at or near zero?

All projects should establish a project baseline that includes measurements of all six GHGs to provide a reference point against which future emissions can be measured. Even though some forest projects will never result in emissions of any GHGs other than CO_2, such emissions cannot be predicted if they result from an unanticipated or unintentional event, so it is important to have a baseline against which to compare future emissions. In addition, while there is a single project baseline (expressed in $MTCO_2e$), project proponents also should establish and track separate baselines for each GHG to promote transparency (in how the project baseline was calculated) and support the verification process.

2.4 Are the reported baseline and subsequent inventory estimates within 10% of the true mean at a 95% confidence level?

When estimating carbon stocks and GHG emissions for the baseline and subsequent inventories, project proponents should use measurement methods that result in estimates that are within 10% of the true mean at a 95% confidence level. While some carbon programs require the use of specific approved sampling methods or data sources, this outcome-based approach specifies parameters for the *results* of the measurements, rather than the methods used to achieve those results. The goal should be to achieve accurate measurements, rather than dictating specific methods of measurement, although programs typically specify both the measurement methodologies and accuracy parameters.

-OR-

If not, are the baseline and inventory estimates adjusted to reflect the greater level of uncertainty?

If a lower confidence level is used, estimates should be conservatively reported to adjust for the increased uncertainty. This can be achieved by discounting the baseline and inventory estimates by an appropriate percentage to reflect the higher level of uncertainty. Such adjustments ensure that carbon storage estimates are not overstated, resulting in too many credits issued.

2.5 Will the project proponent forgo credits for carbon in harvested wood products?

If a project does not involve harvesting for wood products, or if the project proponent is not going to seek credit for carbon in harvested wood products (HWPs), accurate and thorough tracking of wood product carbon is not relevant to the project. By default, such projects will earn one point for this question.

-OR-

If the project proponent is seeking credits for carbon in wood products, is that carbon pool included in the project baseline and subsequent measurements, and are the entity's GHG emissions associated with those wood products also included?

If a project does involve credit for carbon in HWPs, the HWP carbon pool should be included, along with the other carbon pools, in the project's overall carbon baseline calculations and subsequent measurement/monitoring activities. Project proponents should not create a separate baseline for the HWP carbon pool. Including HWPs with the other carbon pools ensures a comprehensive picture of the project's carbon stocks and flows and the movement of carbon between pools.

GHG gases, including CO_2, are emitted during the harvest, transport, and manufacture of HWPs. To prevent "cherry-picking" just the carbon *credit* associated with a project's HWP pool, project proponents should also account for their GHG *emissions* (debits) from making those products. This involves establishing baselines for each of the relevant GHGs and then measuring and reporting on their levels in subsequent inventories. A project proponent need only account for their own direct and indirect emissions resulting from the production of their wood products, not the emissions associated with those products after they leave the entity's ownership. "Downstream" entities are, theoretically, responsible for their own GHG emissions (and credits); therefore, entity boundaries should be drawn to avoid double-counting.

2.6 Does the project use a base year approach?

If a base year approach is used, credits are issued based on measurements of actual net carbon stock changes from one reporting period to the next (rather than a comparison to a hypothetical projection of expected future carbon stocks); therefore, there is no need to periodically update the baseline for accuracy. By default, any project using a base year approach earns one point for this question. [Note: The scorecard is not biased toward the base year approach. This question addresses only the *accuracy* of a project's baseline and, compared to the estimates that make up other baselines, base year measurements are likely to be more accurate.]

-OR-

If not, will the baseline be recalculated at any point during the project to "true up" the existing estimates?

Because forest carbon projects can last several decades, the carbon storage estimates calculated at the beginning of a project based on "business as usual" become increasingly uncertain the further out the projection. To increase the accuracy of baseline estimates, they should be recalculated periodically to reflect actual updated conditions (e.g., catastrophic weather events, fire, changes to relevant forest practices regulations, major changes to wood product markets) that would have affected business-as-usual operations. While it is impossible to know with complete certainty what "business as usual" would be, updating (or "truing up") the baseline is intended to improve the accuracy (and credibility) of the estimates.

3. Additionality

This section addresses the additionality of project emission reductions or removals, as well as the uniqueness of the credits being sold.

3.1 Will the project exceed regulatory requirements and other legal mandates?

A common test of additionality is whether the project activities are required by law (regulatory additionality). If so, those activities are not additional because they would have occurred anyway, regardless of the offset project. For a project to be additional, it must comprise activities that go beyond what is required by law.

3.2 Can it be demonstrated that carbon credits will not be generated retroactively from activities that have already occurred?

To ensure that project activities are additional, carbon credits should not begin accruing until the project is legally documented or registered with a GHG registry, verification, or trading organization. If the credit-generating activities have already occurred, the offset project was not needed to make the activities possible, meaning those activities are not truly additional.

3.3 Can it be demonstrated that the project will result in a net reduction of GHG levels in the atmosphere relative to the baseline?

Another additionality test is whether the project activities sequester more carbon, or avoid more emissions, than would have occurred without the project (environmental additionality). A net benefit to the atmosphere is the ultimate goal of a forest carbon offset project; however, it is not easy to determine. Many different kinds of baselines are used in GHG accounting (e.g., base year, regulatory standard, average stocking levels) to try to provide a standardized approach to answering this question, but ultimately, one must assess carbon stock changes at the individual project level to determine the net atmospheric benefit of a project. With projects using a business-as-usual baseline, it is often impossible to know what the true atmospheric benefit is when additionality is based on a comparison to a hypothetical scenario. At the same time, a base year approach uses actual carbon stock measurements to assess stock changes from one year to another, but there is no assessment of whether those stock changes would have occurred even without the project.

3.4 Can it be demonstrated that none of the project's credits have been sold as offsets more than once?

A project's emission reduction credits should be applied as an offset only once. If a credit, and hence the "right to pollute," is sold more than once (i.e., double counted), a net *increase* in GHG emissions will result. The project proponent must be able to show that the project's credits are unique and there is a system (e.g., an independent GHG registry) for tracking them in the carbon market so they will not be sold again. Such a system would prevent, for example, a forest owner, sawmill, and home builder from all claiming the same carbon credit from a wood product. It would also prevent a landowner from selling the same offset to multiple buyers.

3.5 Can it be demonstrated that project credits will be permanently retired once they are sold?

Building on the previous question, an emission reduction credit must be permanently removed from the marketplace when it is sold to prevent possible future double counting. The project proponent must be able to demonstrate that the credits being sold will be retired upon sale and, thus, never re-sold or credited to anyone else.

4. Monitoring, Measurement, Reporting, and Verification

This section describes the activities that should take place to ensure there is on-going and independent measurement and oversight of the project's activities, progress, and impacts.

4.1 Is there a monitoring/measurement plan(s) in place for the life of the project to ensure that project commitments are met?

On a scheduled timeframe throughout the project, the various goals, commitments, and calculations made at the start of the project must be re-assessed. This monitoring process should involve re-measurement of carbon stocks to determine progress toward carbon sequestration or emission reduction goals. Monitoring should also include re-assessments of project leakage and project environmental and social impacts.

4.2 Have the resources and capacity necessary to carry out the monitoring/measurement plan(s) been identified and secured?

In addition to having a comprehensive monitoring/measurement plan(s), the project proponent also must be able to adequately and completely carry out that plan(s). It is important that the funds and staffing needed to carry out the plan(s) be identified before the project starts, one example being the establishment of "stewardship funds" dedicated to ongoing monitoring and verification requirements.

4.3 Can it be demonstrated that all carbon stocks expected to decline by at least 5% between reporting periods are included in carbon inventory calculations?

Ideally, all carbon stocks that decline by any amount would be measured and included in project calculations. Realistically, however, some carbon pools are virtually unchanged by certain forest practices, making it unnecessary and costly to measure those pools. An approach for capturing significant declines in carbon pools is to set a threshold above which carbon pools must be measured. Any carbon pool that is expected to decline by at least 5% between reporting periods should be included in forest carbon inventories.

4.4 *Do the project's measurement/monitoring processes capture "trigger event" emissions, even if those GHGs were previously unmonitored?*

It is important that projects capture all significant GHG emissions, even if certain emissions are not released regularly. Some forest projects, such as those involving unmanaged forests, do not cause significant anthropogenic GHG emissions and, as such, do not require regular monitoring of those GHG levels. Such projects need only monitor and measure those GHGs if a "trigger event" occurs. An example of a trigger event is the use of heavy machinery to conduct salvage logging after a pest infestation. Because trigger events are sometimes unforeseen, all projects should have a formal process in place to account for those GHG emissions in case a trigger event occurs.

4.5 *Will the monitoring reports be submitted to the contracting entity?*

For transparency and accountability, the monitoring reports should be submitted to whoever has purchased the project credits (e.g., individual buyers, aggregators).

4.6 *Will a third party regularly review the project to verify accuracy and attainment of project goals?*

To give validity to the project proponent's monitoring activities, an independent third party should conduct a review and certification of project sampling methods, calculations, and results.

4.7 *Must the project proponent's calculations of carbon stocks and emissions be within 15% of the verifier's calculations to receive project verification?*

To test the accuracy of the project proponent's calculations, an independent third party should perform the calculations using a representative set of sample data and the same methodologies. A maximum margin of error (i.e., 15%) between the project proponent's calculations and those of the verifier should be established and agreed to, allowing for some discrepancy between the two sets of results.

4.8 *Will adjustments be made if the verification process reveals that previous carbon credit payments were inaccurate?*

The sale of carbon credits sometimes occurs after monitoring is complete, but before an independent verifier has confirmed the monitoring results. This can result in an inaccurate issuance of carbon credits. If too many (or too few) credits are sold, the project proponent receives too much (or too little) payment. A mechanism should be in place for making adjustments to correct for inaccurate payments. Adjustments might be monetary or crediting/debiting a reserve pool of credits.

5. Permanence

This section addresses the length of time carbon stocks must be maintained, if measures will be taken to help prevent carbon loss, and what measures will be taken if carbon loss does occur.

5.1 *Is maintenance of additional carbon stocks contractually required for at least 20 years, at least 50 years, at least 100 years, or in perpetuity?*

To truly and permanently offset an emission, a project must remove CO_2 from, or prevent it from entering, the atmosphere for a time period at least as long as the emitted gas is contributing to climate change. Different programs have different permanence requirements reflecting disagreement on both the need and feasibility of permanent carbon stock maintenance in forest projects. Because there is no consensus on how long CO_2 remains in the atmosphere, this question is structured to award more points to more conservative approaches; the longer the carbon will be maintained, the more points the project earns (e.g., a project with permanent carbon storage earns 4 points, while one with 20-year storage earns 1 point).

5.2 Have all of the project's carbon risks been identified and risk management strategies been enacted to guard against carbon loss during the project's contractual obligation?

However long the carbon maintenance requirements are for a project, the project proponent should take precautionary measures to help prevent carbon loss from occurring during that timeframe. Such measures could include site selection criteria (e.g., not planting in areas with frequent forest fires), a no-development conservation easement, third-party certification of sustainable forest practices, or a recorded memorandum connecting the carbon agreement with the property deed (this ensures that the carbon agreement is legally tied to the deed, should the land be sold during the project).

5.3 Must carbon stocks be restored or replaced if lost before the end of the project's contractual obligation?

If carbon loss does occur before the end of the contractual obligation, the project should have mechanisms in place for restoring and/or replacing lost carbon. Such measures could include, for example, a credit reserve pool comprising a certain percentage of the project's carbon credits (credits would be withdrawn from the pool to replace lost stocks) or replacement credits (the project proponent could purchase an equivalent amount of credits from another carbon project to replace those lost).

6. Leakage

This section addresses a project proponent's responsibilities for assessing and avoiding/accounting for the internal and external leakage that might result from their project.

6.1 Will all potential sources of internal leakage be assessed and prevented, and will these actions be confirmed by a third-party verifier?

Internal leakage is when some of the atmospheric benefit of a project is lost due to an increase in emissions elsewhere within the entity's ownership, even if that ownership crosses state, national, or other geographic boundaries. Theoretically, entities have control over activities within their ownership, no matter where those properties are located, and can, therefore, prevent leakage from occurring. For example, a landowner should not intensify timber harvesting on one property to compensate for a reduced harvest (to gain carbon credits) on another. All projects should include an assessment of the sources of any internal leakage that might result from the project's implementation and take clear steps to prevent that leakage from occurring. A third-party should then verify the leakage assessment and prevention measures.

6.2 Will all sources of potential external leakage be qualitatively and quantitatively assessed?

External leakage is when some of the atmospheric benefit of a project is lost due to an increase in emissions outside the entity's ownership boundaries. Projects should include an assessment of the sources of external leakage that might result from the project's implementation. The external leakage assessment should include both a qualitative description of the leakage sources and a quantitative measurement of the leakage amounts. We recognize that estimating external leakage is difficult to do with confidence and precision, and may make a project prohibitively expensive; nevertheless, it is a critical part of a quality offset project (Murray et al., 2004).

6.3 Will all external leakage be avoided and will these actions be confirmed by a third-party verifier?

Once the project's potential external leakage has been assessed, the project proponent should take steps, if possible, to ensure that the leakage does not occur. Preventing external leakage can be difficult or impossible because other businesses' activities are likely outside the project proponent's control. A third party should verify the effectiveness of measures to avoid external leakage.

-OR-

If all external leakage cannot be avoided, will the unavoided leakage be subtracted from, or used to discount, the project's GHG reduction benefit?

In cases where external leakage cannot be avoided, the amount of unavoided leakage should be subtracted from or used to discount the project's atmospheric benefit. This ensures that the project's GHG reductions are truly additional by subtracting out the amount of emissions that will be displaced to another location.

7. Transparency

This section addresses the availability of project methodologies, data, and documents to a project verifier and other third parties, including the public.

7.1 *Are the methods and assumptions used to calculate the baseline and inventories fully documented and replicable by a third party?*

A project should promote transparency and accountability by enabling an interested third party to easily access and fully replicate the calculations performed for the project baseline and inventories.

7.2 *Will project documentation be publicly available?*

Any interested party should be able to easily access information on key aspects of the project, including descriptions and justifications of the baseline, additionality, permanence, leakage, and co-benefits/costs, as well as the parties who are verifying, aggregating, buying, and selling the project credits.

7.3 *Will verification reports be publicly available?*

The public should be allowed access to the project's verification reports to view a third party's objective assessment of the project.

8. Co-Benefits/Costs

This section addresses the project's positive and negative environmental, social, and economic impacts; the actions taken to address negative impacts; and the community's role in the project.

8.1 *Will the positive and negative environmental and social impacts of the project (both inside and outside the project boundary) be assessed?*

Project developers and potential carbon credit buyers should understand a carbon project's overall environmental and social impacts. For example, some people may not want to support a project that achieves a significant carbon benefit at the expense of other environmental amenities/services (e.g., biodiversity) or the local community's wellbeing.

8.2 *Will all negative impacts identified in Question 8.1 be avoided or mitigated?*

Once the negative environmental and social impacts of a project are understood, the project proponent should take all possible steps to avoid and/or mitigate those impacts. Addressing negative impacts upfront helps maximize the overall benefit of the project while minimizing potential risk to the project's longevity and success.

8.3 *Will the project's environmental and social impacts be evaluated by a third party against a recognized standard(s)?*

To lend credibility to project claims regarding environmental and social benefits, project proponents should submit their projects for third-party evaluation against a legitimate, internationally recognized standard(s), such as the Climate, Community and Biodiversity Standard or Forest Stewardship Council certification.

8.4 *Will the local community have input into the project?*

Ideally, a project also should include a process for receiving and incorporating ideas and concerns from the local people affected by the project. By encouraging local stakeholder buy-in, a project is more likely to earn local support, which further minimizes risk to the project's success.

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Definitions

Active Forest Management: A type of forest carbon project that involves managing existing forestland to increase forest carbon stocks. Also referred to as "improved forest management."

Additionality: When carbon stocks, or GHG emission reductions, achieved by a project exceed those that would have occurred in the absence of the project. It is the amount of additional carbon/GHG emission reductions achieved through a project that generates saleable credits.

Afforestation: A type of forest project that establishes forest on land that is, and historically has been, in an unforested state. Programs typically specify the length of time land is required to have been unforested to satisfy their definition of afforestation.

Allowance: In the regulatory carbon market, one allowance represents the right to emit one ton of carbon dioxide. Allowances are used to meet a regulatory emissions limit and can be traded among regulated entities.

Anthropogenic Emissions: GHG emissions caused by human activities. Examples include carbon dioxide, methane, and nitrous oxide emissions from vehicle use; nitrous oxide from fertilizer applications; and carbon dioxide from the generation of electricity used to power a sawmill.

Average Stocking: A type of forest project baseline that reflects the average amount (or "stock") of carbon for a particular forest type in a particular geographic area.

Avoided Deforestation: A type of forest project that prevents a forest from being converted to an unforested state. Also referred to as "conservation" or "reduced emissions from deforestation and degradation (REDD)."

Base Year: A type of baseline that uses the carbon stocks or GHG emission levels in the starting year of a project as a beginning reference point. Subsequent measurements of project carbon stocks or GHG emissions are compared to those in the previous measurement period; net increases in carbon stocks or reductions in emissions are considered additional.

Baseline: Carbon stocks or GHG emission levels that serve as the reference point(s) against which a project's carbon storage or GHG emissions reductions are measured to determine a project's net impact. Carbon storage or emission reduction levels in excess of the baseline level are considered additional. Forest offset projects employ one of two general types of baselines: (1) base year or (2) business as usual (BAU) (see BAU definition for types of BAU baselines).

Biological Emissions: GHG emissions from natural sources. Relating to forest projects, biological emissions are the carbon dioxide released naturally from dead and living forest biomass and soils.

Business As Usual (BAU): A type of baseline representing the carbon sequestration or emission levels that would have occurred under normal business operations or under certain specified parameters. There are at least three types of BAU baselines: 1) normal business operations, 2) regulatory standard, and 3) average stocking (see definitions for each).

Carbon Dioxide Equivalent (CO_2e): A standardized unit of measurement for all GHGs that uses the global warming potential of carbon dioxide as the conversion metric. Because each GHG has a different impact on global warming, CO_2e allows any given type and amount of GHG to be converted to its equivalent amount of CO_2.

Carbon Pool: Regarding forest projects, the components of a forest ecosystem that accumulate or release carbon, specifically, live and dead biomass and soil.

Carbon Sequestration: The uptake and storage of carbon dioxide in the form of carbon. Trees and plants sequester CO_2 in the form of carbon through the process of photosynthesis.

Carbon Sink: A natural system that absorbs and stores carbon dioxide in the form of carbon. The primary sinks in nature are oceans, soils, and plant biomass, including trees.

Carbon Stock: The amount of carbon held in a particular carbon pool at a particular point in time.

Co-Benefits: The positive, intended or unintended, environmental and social impacts associated with a project's implementation. Examples are job creation in local communities, enhanced biodiversity, and improved water quality.

Co-Costs: The negative, intended or unintended, environmental and social impacts associated with a project's implementation. Examples are reduced biodiversity, diminished groundwater supply from the selection of inappropriate tree species, and loss of habitat for native wildlife.

Emission Reduction Credit: An emission reduction credit (or "credit") represents one ton of GHG emissions either reduced or removed from the atmosphere. In the regulatory carbon market, credits typically are unused allowances that can be traded between regulated entities. In the voluntary carbon market, credits are surplus emission reductions or removals relative to the project baseline and can be sold as offsets.

Entity: For the purposes of this scorecard, the individual or business that owns the lands enrolled in the project. An entity's ownership may extend beyond the project lands to include other forestlands, processing facilities, or other parts of the timber/wood product supply chain.

Ex-Ante Credits: Project credits that are sold before they are actually generated (e.g., when carbon offsets are sold before the carbon has accumulated in the forest).

Ex-Post Credits: Project credits that are sold after they are generated (e.g., when carbon offsets are sold after the carbon has accumulated in the forest).

Greenhouse Gases (GHGs): Gases that trap radiation from the sun, causing the earth to warm. There are six GHGs recognized by the United Nations Framework Convention on Climate Change (Kyoto Protocol): carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_20), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Global Warming Potential (GWP): As defined by the International Panel on Climate Change (IPCC), the contribution of a particular GHG to global warming, relative to that of CO_2. For example, methane has a GWP of 23, meaning that over a 100-year timeframe a given amount of methane contributes 23 times more to global warming than does the same amount of CO_2 (Ramaswamy et al. 2001).

Harvested Wood Products (HWP): Products made from harvested wood. Some GHG programs recognize HWP as a carbon pool. A generally accepted source of guidance on calculating wood product carbon storage is the Department of Energy's (DOE) *Voluntary Reporting of Greenhouse Gases (1605(b)) Program Technical Guidelines* (DOE 2006 and 2007).

Leakage: GHG protocols and standards recognize several different kinds of leakage, which can be grouped into two broad categories: internal and external. Internal leakage is when some of the atmospheric benefit of a project is lost due to an increase in emissions outside a project's boundaries, but within the entity's ownership, even if that ownership crosses state, national, or other geographic boundaries. External leakage is when some of the atmospheric benefit of a project is lost due to an increase in emissions outside the entity's ownership boundaries.

Measurement: In this scorecard, measurement refers to the quantification of GHG emissions and carbon stocks.

Monitoring: In this scorecard, monitoring refers to the process for ensuring compliance with program requirements (if the project is registered under a program, standard, etc.) and/or progress toward project goals and commitments. Monitoring reports should contain both qualitative and quantitative assessments of a project.

Normal Business Operations: A type of baseline that estimates over the life of the project the amount of carbon stocks or GHG emissions that would have occurred with the continuation of existing business or forest management practices.

Offset: Technically, one offset represents the GHG emission reduction of one metric ton of carbon dioxide equivalent. A polluter can neutralize their own emissions by buying an equivalent amount of emission reduction offsets from someone else.

Permanence: A term that refers to the duration of a GHG reduction or removal. When GHGs have been removed from, or prevented from entering, the atmosphere through an offset project, those gases should remain out of the atmosphere for a time period at least as long as the emitted gas is contributing to climate change.

Project Boundary: The physical boundary of a project, as well as the limits of the carbon or GHG monitoring and measurements that must be conducted to asses the impacts of the project.

Project Proponent: The individual with authority to develop and/or implement the forest offset project. This person may be the landowner (entity) or a designated third party.

Reforestation: A type of forest project that re-establishes a forest on land that was historically forested, but currently is unforested.

Regulatory Carbon Market: When entities are required by law to control their GHG emissions, typically under a cap-and-trade system in which regulated entities can buy and sell carbon allowances to meet their obligations. Also referred to as the "compliance" or "mandatory" market.

Regulatory Standard: A type of baseline that estimates over the life of the project the amount of carbon stocks or GHG emissions that would have occurred by complying with prescribed regulatory standards, for instance, certain forest practices regulations.

Urban Forestry: A type of forest project that seeks to reduce GHG emissions by planting trees in urban or other developed areas. Urban forestry projects sequester carbon in planted trees and may also lead to reduced fuel consumption for heating and cooling by providing shade to adjacent buildings.

Voluntary Carbon Markets: Also called "over-the-counter (OTC) markets," voluntary markets are unregulated and driven by the desire of companies, governments, and individuals to reduce their GHG emissions.

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