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Forest Resource Management and Timberland Services

Timberland Investment
PERSPECTIVES

Carbon Arrives: Implications for Forest Landowners

by Sam Radcliffe, Vice President

A few years ago I made a presentation on timberland valuation at the "Who Will Own the Forest?" conference sponsored annually by the World Forestry Center in Portland, Oregon. During the Q&A session, I was asked why forest-based environmental services such as carbon sequestration are not considered in a property valuation. My response: because there is no market for such services, i.e. the forest owner cannot get paid to provide such services, then these are public goods, which add no value to a property for a private investor.

That was then. Fast-forward to June 2014: P&C's client The Forestland Group announces that it has been issued 1.7 million carbon offset credits by California's cap-and-trade program for its offset project on 220,000 acres in Michigan's Upper Peninsula. It represents the largest single project registered in California's program, which began in 2012. According to the project developer, the fund that owns the property will immediately receive "significant" revenues through pre-contracted sale of the credits to companies participating in the cap-and-trade program.

In other words, carbon has arrived, so appraisers and market participants must now give serious consideration to the potential value increment that generation of carbon offsets could provide to a property. This is a very large and complicated topic full of if's, and's, or's, but's and a dizzying array of acronyms. In this space we can provide only a brief introduction to carbon offset projects, markets, and valuation issues.

How Forest Carbon Projects Work

A carbon project generates credits that can be purchased by organizations to offset their own carbon emissions. These credits can be purchased on a voluntary basis or to comply with a regulatory requirement. In my opinion, it is the existence of compliance markets, where credit buyers have motives beyond altruism or "green marketing", that will drive demand for forest carbon projects. The U.S. compliance markets include the programs run by the California Air Resources Board (CARB) and the Regional Greenhouse Gas Initiative (RGGI), which has nine participating states in the Northeast. The programs are similar in many ways but for structural reasons RGGI offsets have achieved prices that are 60% lower than CARB prices.

The fundamental forestry carbon proposition is fairly simple: when landowners implement forest practices that result in fewer carbon emissions or greater carbon sequestration than "business as usual" practices, they are credited with the commensurate difference in carbon offsets. Three types of forestry projects qualify: Reforestation projects, Avoided Conversion projects, and Improved Forest Management (IFM) projects. Reforestation projects consist of artificially regenerating lands that are currently in non-forest use. Avoided Conversion projects involve protection of forestland from conversion to non-forest uses (e.g. residential development). Because of the scale required to overcome the considerable project costs, most U.S. forest carbon projects will be IFM projects.

IFM projects consist of forest practices that increase carbon storage over the "business as usual" level, which is termed the baseline. The baseline is defined by regional averages of inventory and growth for the specific forest types involved. To achieve an increase over the baseline, most U.S. forest projects will involve reduction of harvest levels below the sustainable harvest level defined by annual growth. This is an important point; harvest is reduced, not eliminated.

Carbon offsets are typically measured in terms of metric tons of carbon dioxide equivalent ($mtCO_2e$). Importantly, the carbon stocks that form the basis for comparison include not only the above-ground portion of live trees but also standing dead trees, the below-ground portion of both live and standing dead trees, and the carbon sequestered in forest products harvested from the project. Obviously, quantifying carbon stocks and flows for both the baseline and the project is not a standard forest inventory project – a significant amount of modeling is required.

Evaluating Carbon's Potential

A carbon project is a large undertaking with significant up-front costs, and ongoing costs of management and verification. The development, implementation and verification activities involve several third parties:

- The landowner typically does not have the systems or expertise to evaluate the financial feasibility of a carbon project, perhaps considering multiple programs for a given property. This is the initial role of a project developer.

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- An initial forest inventory and periodic verification inventories must be conducted by a qualified independent forest inventory consultant using specified standards. To avoid perceived conflicts of interest, this consultant should be different than the forest manager, who is charged with implementing the on-ground practices that lead to carbon offsets.
- Both CARB and RGGI standards require forest certification (FSC, SFI or Tree Farm), which involves third party certifiers and/or auditors.
- After determining the feasibility of a project and conducting required fieldwork, the project developer prepares a Project Design Document (PDD) that completely describes the project, growth and yield projections, carbon offset eligibility and calculations, and forest management practices in a format designed to specifically address the requirements of the project protocol.
- The project must be verified to the proposed standard by an independent verifying body that is approved or accredited by the compliance agency. This verification occurs in connection with registration of the project with an offset project registry, the body that formally approves projects and issues and tracks offsets. Typically the project developer becomes the project operator, who will manage the verification and registration processes.
- The offset project registry issues registry offsets based on documents submitted by the project operator and verified by the verifying body. This application-verification-registration process continues through the life of the project (50 - 100 years) each time the project operator files a claim for credits.
- Finally, compliance offsets are brought to market by the project operator or a specialized broker through a process by which they are canceled in the registry and issued to the project's account with the compliance agency. The sale of an offset involves its transfer from the carbon project's account to the purchaser's account. Sales can be achieved through private negotiations or via an exchange.

Needless to say, all of these activities and involvement of third parties translate to a stream of costs and revenues that will vary by project scale and complexity. The World Resources Institute[1] prepared a pro forma analysis of a hypothetical 2,400-acre project in Virginia to be registered with the Climate Action Reserve (CAR), a well-known offset registry. The assumed costs for this analysis are identified in Table 1.

By harvesting only 40% of annual growth, the property was projected to produce an average of about 2,900 offset credits per year, although about ten times that amount were produced in the first year because the project started above the baseline. These credits were assumed to be sold for $8.50 to $12.00 per $mtCO_2e$ gross of transaction fees.

TABLE 1: Assumed Costs for Pro-Forma Analysis

Item	Cost	$/Acre
Initial costs (development, technical support, inventory, verification, fees)	$70,000	$29.17
Annual costs of project management & verification	$12,500	$5.21
Additional field verification - every sixth year	$10,000	$4.17
Re-Inventory - every 10 years	$25,000	$10.42

Discounting the 100-year cash flow stream at 5% yielded a net present value of $155 per acre. However, that calculation does not take into account the opportunity cost of a higher timber harvest level. Assuming harvest is set at 90% of growth and annual growth is .60 cords per acre, the annual harvest foregone in the carbon project is .30 cords per acre. With those harvest assumptions, the breakeven average price per cord is about $26. Any price higher than that makes the carbon project financially inferior to the conventional forest management approach.

Considerations for Land Owners

Now that carbon credit production is a viable alternative for large forest properties, what issues arise for property owners, buyers, lenders and appraisers?

Feasibility: Clearly the number one question: is carbon production on the subject property financially feasible? There are a number of carbon project developers who offer free pre-feasibility studies that may be sufficient to answer this question or to at least provide a "probable" answer. But these studies may not include the opportunity costs (revenue foregone) associated with implementing the "business as usual" case, so there is plenty of analytical work left.

Risk: Carbon projects present several kinds of risk to the property owner:

- Counter-Party Risk: Entering a 100-year contract with anyone is risky enough, but this is a relatively new industry with few barriers to entry. Penalties for early termination of a carbon project contract can be severe.
- Political Risk: Carbon markets would not exist in the absence of government policy. Changes in policy could completely change the economics of a project. Not only cap-and-trade but also general forest policies could have an impact. For example, if a state adopted regulations that reduced the ability of landowners to harvest timber, then those regulations would cause the project baseline to shift upward because they would change "business as usual" practices.

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- Price Risk: Related to political risk, carbon prices are not freely determined in the market, because they are directly related to the emissions caps set by regulators. Even in the absence of government intervention, it is difficult to forecast either trends or volatility in this nascent market.
- Measurement Risk: The number of carbon credits earned is dependent on the difference between the baseline and the property's actual carbon stores. Estimation of those stores is dependent on an initial field inventory and subsequent periodic re-inventories, along with models related to the carbon in unmeasured forest components and growth and yield models. Forest inventory is a stochastic process subject to various types of error, and simply chance alone could lead to a mis-estimation that changes the economics of the carbon project. Of particular concern is the risk that a re-inventory causes a reversal in carbon stocks 10 years into the project.
- Risk of Reversals: A reversal in carbon stocks can be caused by weather, fire, insect or disease events. Carbon project protocols typically require a portion of credits earned to be set aside in buffers, which are intended to act as insurance pools to be drawn upon in the case of carbon reversals. However, in the event those pools are not large enough, the landowner would be required to re-pay the deficit in dollars rather than buffer pool credits.

Valuation Methodology: The income approach in the form of a discounted cash flow analysis is a straightforward methodology for valuing a carbon project. However, it may be possible to creatively implement the other valuation approaches (comparable sales and cost) as well. There are a number of methodological issues that should be considered when the objective is to estimate market value:

- Should carbon-related cash flows be evaluated at the same discount rate as other cash flows?
- What empirical evidence or expert opinion is available to forecast carbon prices?
- Is the management plan associated with the existing carbon project the optimal (value-maximizing) plan given current and projected market conditions? Would the cost of modifying the plan be adequately offset by increased revenues?
- Does the long length of the carbon contract require that a longer projection period be examined?
- When comparing a subject property encumbered by a carbon project with comparable sales that are unencumbered, how can the price adjustment be made? Does experience with conservation easements provide some guidance?
- In the cost approach, an estimate of the property's Gross Timber Value is usually the most critical component. If under a carbon project, should a portion of that timber be evaluated at carbon prices rather than timber product prices? How should the dead and below-ground carbon be accounted for as a property asset?

Clearly, property owners, buyers, lenders and appraisers have their work cut out for them when evaluating whether or not a carbon project is suitable. P&C stands ready to provide the critical thinking, modeling capability and quality field services necessary to help clients explore this new dimension of forestland ownership.

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[1] *Logan Yonavjak, Paula Swedeen and John Talberth, 2011. "Forests for Carbon: Exploring Forest Carbon Offsets in the US South" WRI Issue Brief 6 http://www.wri.org/sites/default/files/pdf/forests_for_carbon.pdf*

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