

Carbon Credits & Afforestation

by Thomas White and Werner Kurz



The Canadian Government has decided to ratify the Kyoto Protocol (KP). The protocol, and its parent treaty, the United Nations Framework Convention on Climate Change (UNFCCC), seek to reduce the rate of carbon-dioxide (CO₂) accumulation in the global atmosphere by encouraging signatory countries to decrease their greenhouse gas (GHG) emissions from fossil fuel use and increase their net uptake of carbon (C) from the atmosphere in terrestrial systems (e.g., forests and agricultural lands).

The KP sets country-specific targets for GHG emissions reductions relative to 1990, without specifying how the target must be reached. The KP recognizes the establishment of new forests on areas that have not recently or ever contained forests as one means by which countries can reduce their net emissions of GHGs. By taking up C from the atmosphere and storing it in woody biomass, the net effect on the atmosphere is, at least for the lifetime of the trees, similar to reducing C emissions. In its climate change plan for Canada, the Government of Canada (GoC) has proposed, amongst other measures, a Domestic Emissions Trading (DET) system that would establish reduction targets for large industrial emitters, facilitate emissions trading amongst parties covered by the system, and enable emitters to purchase offsets generated by forestry and agriculture activities that sequester C.

The Kyoto Protocol and the recent Marrakesh Accords are specific about how C in forests must be accounted for, and how C credits are defined. Whether any, all, or a portion of these credits can be sold as offsets in a DET is the subject of ongoing consultations between the GoC, provinces and territories, industry and other stakeholders. This article presents the basic rules of

the KP as it relates to newly established plantations and outlines some of the general areas of policy concern surrounding domestic trade in C credits.

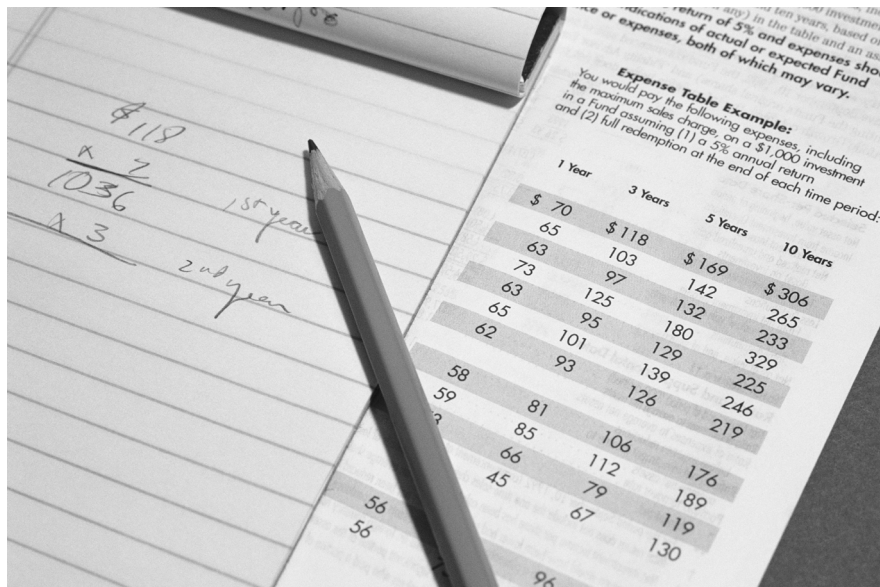
How are C credits calculated?

The formal definitions of afforestation and reforestation applicable to the KP were finalized at the 7th Conference of Parties to the UNFCCC in Marrakesh, Morocco, in 2001. Countries are required to report the C stock change during the first five-year commitment period (CP), January 1st 2008 to December 31st 2012, on areas affected by land-use change – afforestation, reforestation, deforestation – since 1990. Countries receive credits or debits depending on whether the C stocks on affected lands have increased (a C sink) or decreased (a C source).

Under article 3.3 of the KP, a new plantation is eligible for credit if it originated through human activity since 1990, on land that was not forested, or not in a forest use, before 1990. A plantation is termed afforestation or reforestation according to historical land use, but the reporting requirements are the same. Because of the requirement for a non-forest land use prior to 1990, reforestation, as defined by the KP, is not the same as regeneration following harvest.

Each instance of afforestation/reforestation would result in a positive credit to the national account based on the total C sequestered by that activity during the CP. The credit is based on the annual net change in each of several ecosystem C pools: above-ground biomass (tree stems, branches, foliage), below-ground biomass (roots), litter, dead wood, and soil organic carbon. The mere presence of C stocks in the pools during a CP does not result in a credit. Carbon that has accumulated before the beginning of the CP won't be credited, even if it results from an eligible activity that has occurred since 1990. Conversely, however, C losses prior to the CP are not debited either.

The KP allows countries some flexibility in determining the minimum size of the land units they wish to include in their accounts (0.05-1ha). Given the size of Canada, it is unlikely that areas smaller than 1 ha will be included in the accounting system since it would be impractical and not cost-effective to monitor smaller areas. Thus it is likely that only new forests larger than 1 ha would be eligible for credit as afforestation or reforestation.



Which credits can be sold?

In its Climate Change Plan for Canada, the government has indicated its desire to allow the sale of credits generated by new investments in forest sinks as offsets in a DET. Current plans are to use credits resulting from business as usual activities to meet national emissions reductions targets. Restricting the sale of credits to those generated by new incremental activities ensures that these credits have an appropriate value relative to efforts to reduce C emissions in other sectors of the economy.

The evolving DET/offset trading framework will need to address the issue of leakage from incremental C sequestration projects. Leakage refers to the displacement of an activity outside the project boundaries where its effects may not be properly

accounted for. Leakage can have positive and negative effects.

Afforestation with fast growing species might increase wood supply in an area, leading to a decrease in harvesting elsewhere in the region, with a resulting additional increase in C storage outside the project boundaries. On the other hand, if planting trees results in the displacement of an agricultural activity,

and causes deforestation outside the project boundaries, the deforestation would result in a C loss. The issue of negative leakage is of national concern. In the latter example, while a private entity might benefit from the sale of C credits from tree planting, the public could be liable for the debit resulting from the deforestation. The DET framework will need to include appropriate policy measures that accurately scope incremental C sequestration projects to minimize and account for the negative effects of leakage.

Hosts of incremental C sequestration projects will need a measurement and monitoring system that enables them, and independent third party auditors, to validate the credit for the benefit of investors, regulatory authorities and interested observers. The Canadian Forest Service has been working on C accounting issues for more than a decade, and has developed the Carbon Budget Model for the Canadian Forest Sector (CBM-CFS2) that facilitates estimation of the C sequestered in forests, including C in the non-merchantable portions of trees, forest floor litter and woody debris, and in the soil. Through its work with the Model Forest Network and other partners, the CFS Carbon Accounting Team is designing tools and protocols for

operational scale C accounting that will be compliant with expected regulatory requirements. These tools could form a component of a cost-effective and proven monitoring system that specifically addresses C sequestration from newly established plantations.

Permanence and Risk

Unlike avoided emissions, which are forever prevented from entering the atmosphere, a unit of C sequestered in a plantation lacks permanence, existing only while the trees are alive and growing or the C is stored in dead organic matter on site. Any disturbance to the plantation – flooding, insects, fire, harvesting, etc. - resulting in a reduction of ecosystem C on site would also emit C to the atmosphere. This has important consequences for C credit trading. The buyers or sellers of C credits must assume liability in case of C losses during a commitment period, up to the amount of the credit previously claimed.

The issue of liability will be greatest for small entities that cannot adequately spread the risk of C loss across a number of plantations. Small producers could mitigate this risk through cooperative arrangements to jointly market credits based on the C sequestered annually in participating plantations. Larger entities could limit their exposure by regionally diversifying their plantation investments.

The lack of permanence may not be disadvantageous for the market positioning of C credits derived from plantations. John Bennet and Dave Mitchell of the Saskatchewan Soil Conservation Association, and Roger Sedjo, Gregg Marland and Kristy Fruit in a paper published by Resources for the Future, a Washington think tank, have suggested that renting rather than selling C credits from plantations would allow buyers and sellers to overcome the permanence issue in a mutually beneficial fashion.

C credits would be calculated based on the amount of C sequestered annually throughout the rental period, with the seller assuming the liability associated with any loss of the credit. At the end of the rental period, liability reverts to the buyer, who

could opt to renew the rental contract, purchase credits elsewhere, or who may by this time have achieved substantial energy efficiencies in their business processes and no longer require C credits.

Although the income from the rental of C storage would be lower than from the sale of the credit, there is less risk to the plantation owner, who does not assume liability for the C storage beyond the rental period. In this approach, lower cost temporary credits could be attractive to buyers who expect to meet their emissions reduction targets over a medium time frame, but need to purchase credits to meet short-term targets.

Plantation developers need to be aware of the KP rules regarding afforestation and reforestation if they wish to scope their activities to generate C credits. They also need to be aware of the unresolved policy implications of trade in C credits from forest sinks. Until a framework governing the sale of C credits within the proposed DET has been finalized, new plantation owners will need to exercise prudence in evaluating the opportunity to sell C credits. Clarifying these issues early to encourage the establishment of new forests will increase the potential benefits from C uptake during the first CP, as C uptake in new forests increases with time.

Readers interested in a project level perspective are referred to an article by Lemprière et al. appearing in the Nov/Dec 2002 issue of the *Forestry Chronicle*, titled *Saskatchewan Forest Carbon Sequestration Project*. The article describes a forest-based C sequestration project in Saskatchewan that was part of the Greenhouse Gas Emissions Reduction Trading (GERT) pilot. More information about C accounting can be found at the CFS- Carbon Accounting Team's web site online at <http://carbon.cfs.nrcan.gc.ca>. 🌲

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