



CARBON DEPOSIT-REFUND FOR FOREST ROADS

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Roads lead to tropical forest destruction by making land clearing more profitable and increasing the incidence of fire. Forest degradation and loss now account for at least 20 percent of global carbon dioxide emissions. Development banks and governments have sought to minimize impacts by using Strategic Environmental Assessments (SEA), which, compared to the more traditional Environmental Impact Assessments, include more citizen participation and take a broader view of development and environmental impacts in the region where a project is being considered.

But SEAs will not adequately address road-induced impacts because they fail to deliver any new incentives for environmental protection. Once an SEA and funds are approved, the project developer – whether public or private – is given too little incentive to comply with environmental agreements. There is a variety of incentive-based tools to solve this problem. Among these options are performance bonds and insurance, environmental risk adjustments on interest rates, performance bonuses and conditional access to future credit. These are discussed in a longer paper.

A new mechanism that could exploit the emerging carbon market is a carbon deposit-refund system for forest roads. These systems are used to encourage proper disposal and recycling of beverage containers, car batteries, tires, appli-

ances and other sorts of waste. Here's how it would work with rainforest roads: road developers would buy credits equal to the net carbon emissions expected from deforestation along a new or improved road. The credits would be held as a "deposit" against expected deforestation in each of four five-year periods. At the end of each period the road developer could sell credits equal to the difference between expected and actual deforestation. In other words, she would redeem the deposit on all the forest maintained intact. Remaining

credits would need to be retired to cover deforestation that actually occurred.

One advantage of this system is that the project developer

continues to have a conservation incentive over a period of years when the deforestation threat is most intense, not just during the construction period. Further, it allows flexibility and innovation; the developer can reduce deforestation however she sees fit and reaps all the rewards of cost effectiveness. Finally, it provides an incentive for avoiding all deforestation, not just some of it, though the "last" hectares saved will very often have a marginal conservation cost well above the value of the carbon credits.

The system would yield environmental benefits by motivating developers to reduce their carbon footprint and, because the up-front

Table 1 – Carbon deposit-refund for hypothetical road

Years	1 - 5	6 - 10	11 - 15	16 - 20	Total
Expected deforestation (ha)	40,000	30,000	20,000	10,000	100,000
Actual deforestation (ha)	25,000	15,000	10,000	10,000	60,000
Avoided deforestation (ha)	15,000	15,000	10,000	0	40,000
Avoided emissions (tons C)	1.5 million	1.5 million	1 million	0	4 million
Credits held at end of period	8.5 million	7 million	6 million	6 million	



cost of credits could be quite large, by discouraging them from building roads in areas where the deforestation risk is high.

There are no limits on deforestation in the Kyoto Protocol, and no limits at all on most tropical countries' emissions. To make this system work, national-level goals for reduced emissions from deforestation and degradation (REDD) are not absolutely necessary but would be a big help. That's because the project developer buying the carbon deposit will be incurring an additional cost to curb deforestation she now causes for free.

REDD goals under a post-2012 successor to the Kyoto Protocol could give countries with dense tropical forest a reward for large reductions in deforestation, and the flexibility to pursue them by a variety of means, including "greener" roads. Each one could enact their own system of tradable forest carbon emission allowances that could be used as described above.

In the interim, to put a carbon deposit-refund system into place, lenders would have to insist on it as a best practice. But there are important questions of fairness to be considered. Now, road builders induce deforestation and create national and global externalities in the form of biodiversity loss and climate change. If they are required to buy credits to cover deforestation emissions, they will be shouldering the environmental costs, with all benefits going to the national and global communities.

Road developers have no reason to go along with this unless they can buy the credits at a discount. If the discount is deep enough, and forest conservation sufficiently inexpensive, they can actually make a profit on carbon because they can sell the credits at a higher (market) price than the discount price originally paid. The profits would be equal to:

$$\begin{aligned} & \text{market price of carbon credits} * \text{net ha protected} * \\ & \text{net carbon per ha} - ((\text{discount price of credits} * \\ & \text{credits held}) + (\text{cost per ha of protection} * \\ & \text{ha protected})) \end{aligned}$$

But the credit should not be provided free, because that would help finance forest road building that might otherwise not occur; the conservation of just one hectare would provide a net savings to the road project compared to the situation before the deposit-refund's implementation. With high enough market prices for carbon and low enough costs for some conservation, formerly marginal roads could become profitable and net deforestation would rise.

At present, forest conservation represents less than 1 percent of regulation-driven climate projects and 5 percent of voluntary ones. Of the total volume of carbon transactions in 2007, avoided deforestation accounted for around one-tenth of 1 percent by volume, even less by value. Looking forward to a post-Kyoto treaty, forests will need to play a role in addressing climate change. And the main drivers of tropical forest loss, such as roads, have to be considered in crafting solutions.

NOTES

1. *This brief is excerpted and adapted from a longer paper on reducing environmental impacts from infrastructure projects, sponsored by the Andean Development Corporation (Corporación Andina de Fomento). To obtain the full report in English or Spanish, please visit this link: <http://conservation-strategy.org/en/reports/reports>*

2. *Photos by Marcos Amend*

