

Carbon Finance for Healthy Kitchens

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How can finance be found for the 2 billion people that need access to smoke-free kitchens? Carbon finance can help solve the problem. In early 2008 we can expect to see new approaches for large-scale programmes under the voluntary market and for small-scale multiple projects under programmatic CDM. The constraints and opportunities are described in the article, including the issue of grading renewability of biomass, and the requirement for rigorous monitoring.

Major funding of large-scale and small-scale projects disseminating improved stoves and kitchen practices is likely to be available from the “carbon market” within the next few months. To date funding has been very limited. The major obstacles have been:

1. Non-eligibility under the CDM process of wood-fuel stove projects claiming carbon credits for CO₂ reductions
2. Uncertainty as to how wood-fuels can be determined to be non-renewing, renewing, or something in-between
3. The absence of a CDM-style protocol or “methodology” for calculating emission reductions for stove projects
4. Difficulties in measurement of distributed GHG reductions where the reductions are made in very numerous small sites (in contrast to measurements at a single site)

The first obstacle has been overcome by the emergence of a voluntary market in GHG reductions. This operates independently of the formal market in “certified emission reductions” (CERs). It is now possible to sell and buy “Voluntary Emission Reductions” (VERs) which are endorsed by the same standards bodies that certify the CERs, so lending full credibility to their quality and authenticity. The voluntary market considers stove projects claiming CO₂ reductions to be eligible as potential sources of carbon credits¹.

The second obstacle is perhaps the most difficult of the four to overcome. In principle it is acceptable that an efficient wood or charcoal stove reduces GHG by reducing the amount of CO₂ emitted, in cases where there is insufficient re-growth of biomass in the area from which the fuel was extracted. If there are not enough trees growing in the collection area, the CO₂ from the stove is not absorbed, and it becomes a green house gas. The difficulty is to turn this principle into practice, since it implies that increments in tree size

must be measured, alongside measurements of removal of tree mass. The “renewability status” of any piece of wood burning in the stove will be a fraction, the increment divided by the removal. If the increment exceeds or equals the removal, the stick of wood in the fire will be 100% renewable; if it is less, the stick of wood will be partially non-renewable and partially renewable. If there were no growth at all in the collection area, the firewood would be 100% non-renewable; this is an unlikely situation since the presence of firewood extracted from an area implies that some wood is growing (to be 100% non-renewable it must be the last root extracted).

Various suggestions have been made as to a method of ascertaining renewability. One approach has been to bypass the problem of measuring wood-growth and harvest rates by assigning to the biomass saving, introduced by an efficient or renewably-fuelled cookstove, the GHG emission characteristic of a common fossil fuel like LPG.

It was also suggested that non-renewability of biomass (NRB) could be identified simply as the inverse of renewability of biomass (RB) as defined under the current CDM rules. Some stove projects have been validated on this basis. This approach implies that firewood is either 100% renewable or 100% non-renewable, a useful simplification that encourages people to use carbon finance to fund large-scale dissemination of fire-wood conserving stoves. Under this approach, stoves burning wood in an area where the ratio of increment/removal is, say, 66%, would have all their CO₂ emissions counted as green-house gas, rather than one third. Although this is a reasonable approach in some ways, it does not track a progressive transition from NRB to RB which is useful in the interests of sustainability; and since several measures aimed at increasing the sustainability of biomass in prac-



Figure 1. How can improved or renewably fuelled stoves become main-stream? Pioneer Carbon is assisting programmes to use carbon finance to significantly scale up production volumes and quality assurance. (Photo: Micheal Buick)

tice occur alongside each other it leads to a risk of over-estimation of emission reductions.

Consequently it has been proposed² that wood-fuels are described in terms of their increment/removal ratio, so that applications for carbon credits from improved stove programmes claim only the portion of CO₂ not absorbed by re-growth. In the example above, only one third of the CO₂ emitted by the stoves would count as GHG emissions and the carbon finance available would then be less than that claimed under the previous (“100% or zero”) approach. One advantage of the fractional approach is that it can be conservative: in cases where it is very difficult to measure the annual increment and removal, there is almost always enough evidence (derived from forestry studies, energy census data, and so on) to establish what the maximum possible renewability fraction is, and this figure can be used to ensure that emissions reductions are not over-estimated. A key further advantage is

that it complements co-ordinated efforts toward management of forestry resources and the tracking and grading of sustainability.

The question of how to improve the quality of data to derive accurate estimates of non-renewability still remains. In this context relevant work has been done³, which combines satellite imagery with studies and census data to identify areas of critical non-renewability – this promises to become a powerful tool for carbon finance baselines and monitoring.

The current absence of a CDM-style methodology has proved a difficulty in the sense that the quality of voluntary market carbon credits needs to be strengthened, if the full potential of VERs are to be realized. A strong voluntary market promises to:

- generate GHG reductions in large volumes through high-quality credits,
- integrate the carbon economy with human development needs,
- provide a place where new ideas and solutions can be quickly developed and tested

Very large-scale improved stoves programmes could make a huge and vital difference to the lives of the less wealthy quarter of the world's population, and carbon finance can finance them. To address this, a methodology has been developed by Pioneer Carbon which meets the requirement for CDM-level rigour. This has been reviewed by leading CDM advisory institutions and consultants and is expected to be available as a Gold Standard voluntary market methodology in April 2008. It is novel in several respects:

- it applies to any mix of fuel and any combination of stoves in the before-project situation as well as the during-project situation (for example it applies to coal stoves being replaced by biomass briquette stoves, or LPG and renewable-wood combined cooking being replaced by solar and more efficient renewable-wood combined cooking...both of which implies it is an eligible methodology under CDM with the NRB component omitted)
- it applies fractional NRB as described above,
- it approaches the kitchen and household energy situation in an integrated manner, allowing for linked conditions such as kitchen-based space heating and water-sterilization to be considered alongside cooking

- it introduces the concepts of kitchen surveys to define customer groups to ensure that sampling measurements are representative
- it can be used for projects with biogas components although full biogas cooking projects are preferably handled by specialist methodologies

A key feature of carbon finance is the requirement for monitoring. Although this is usually an added burden in cases involving distributed benefits such as improved stoves projects, it is actually its strongest advantage. To secure carbon finance, it is necessary to prove that emission reductions have actually been achieved, which in turn means that stove disseminators must measure actual fuel consumption patterns in variegated households in areas with poor roads and communications; and not only fuel consumption, but also the emissions characteristics of the stoves are better measured in actual use rather than in the lab. Even more demanding, these measurements need to be taken not only when the improved stoves are new, but as they age. Furthermore, how many are being used side by side with the old polluting stove? How many of the stoves sold are actually in use three or four years later? Drop-off rates must be measured.

This extremely onerous requirement is actually a necessity if we are to achieve our vision of healthy kitchens for all. Without quality control and quality assurance mechanisms it is unlikely improved stoves will ever make a serious impact or become main-stream. The monitoring requirement of carbon finance introduces a major quality assurance element into cook-stove programmes. It is also usually the case that the level of finance available, at current market prices for VERs, is sufficient to cover the cost of these extensive monitoring and quality assurance operations.

The second strength of carbon finance is closely related to the first; it is that the finance is paid after delivery of the measured output. As many people who have worked long years on sustainability and poverty-alleviation know, this is the missing link of development; that outputs are rewarded rather than inputs financed.

Having said this, carbon finance is also a source of the advance capital needed to prepare a large-scale pro-

gramme. For example, Pioneer Carbon can be approached for advance capital, which is paid back over the first few years of the programme in the form of emission reductions verified and assistance in preparing carbon finance documents – Pioneer will also provide all the assistance needed to apply the voluntary market cook-stove methodology, prepare relevant documents and design a robust project.

With the help of this recent work on the key tools for monitoring, and the help of tools such as the WISDOM analysis for NRB assessment, combined with a general protocol in the form of the Pioneer methodology, the challenge of high quality large-scale stoves programs can be met through the Voluntary carbon market.

Notes and References

1. In December 2007 it was decided that the CDM process would also develop during 2008 a method of doing this with respect to small-scale projects involving some 20 or 30,000 domestic installations each. This development is eagerly awaited alongside parallel development of programmatic approaches which would allow multiples of small projects to be approved in a stream-lined manner.

2. This proposal was made in March 2007 in a submission to the Gold Standard Foundation and is included within the methodology: "Improved Cook-Stoves and Kitchen Regimes" expected to be available as a Gold Standard large-scale voluntary market protocol in April 2008.

3. WISDOM: A GIS-based supply demand mapping tool for wood-fuel management Omar Masera, Adrian Ghilardia, Rudi Drigo, Miguel Angel Trossero Biomass and Bioenergy 30 (2006) 618–637

Profile of the author

Adam Harvey has worked on renewable energy in the developing world since the 1980s, mainly in Africa and Asia, and has lived in Asia for 7 years. He works for Pioneer Carbon, the projects arm of Climate Care, a leading emissions reduction company based in the UK. Pioneer has offices in Kenya, UK, Chile, Mauritius, Turkey, and Australia. Pioneer Carbon develops projects for both the CDM and voluntary markets and is committed to projects which promote human development alongside environmental protection. Information is available on www.climatecare.org and www.pioneer-carbon.com. Pioneer is a strong supporter of the Gold Standard programme for sustainable development in the carbon market.