Types of carbon offset projects

Key points:

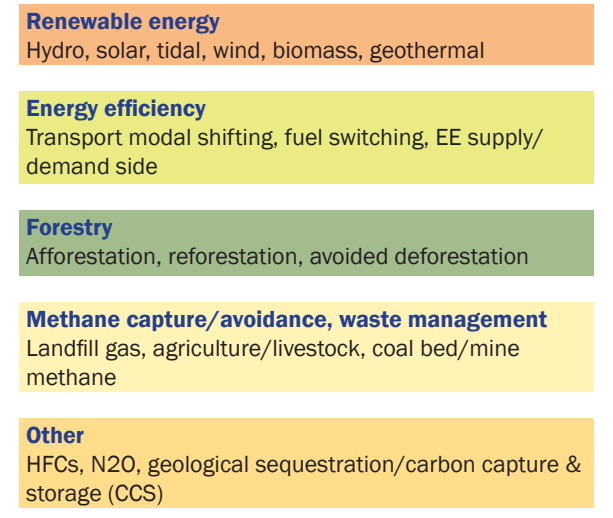
- Most of the bioenergy projects in the Clean Development Mechanism (CDM) are associated with large-scale operations, such as industrial livestock production.
- Small-scale forestry and bioenergy projects are commonly associated with offering greater opportunities for the rural poor than larger scale projects such as wind power and hydropower. However, there is little evidence on the impacts of either approach on poverty.
- Projects supporting tree planting on farmers' individual land, community forestry, clean cook stoves and involvement in renewable biomass production are often promoted for their potential benefits for the rural poor. However, there is little evidence on the impacts of these project types on poverty. These projects represent less than 1% of carbon offset projects worldwide.

The types of carbon offset projects that are implemented are diverse. They range from forestry sequestration projects (in which carbon credits are gained for the CO2 removed from the atmosphere when trees grow) to energy efficiency and renewable energy projects (which prevent CO2 emissions into the atmosphere).

This set of infosheets focuses on forestry and bioenergy carbon offset projects. This is because these project types are more abundant than other rural offset project types. Certain types of forestry, biomass energy and methane avoidance projects are also commonly associated with providing benefits to the rural poor compared to other types of offset projects. The reasons for this include:

1. These technologies can be implemented by poor people themselves as they are simple and have lower costs;
2. These activities directly tackle some of the main sources of emissions of the rural poor, namely deforestation relating to energy production and emissions from agricultural activities such as manure production and burning of agricultural residues;

Figure 1: Types of carbon offset projects



This information sheet is part of a larger resource pack, Understanding the social opportunities and risks in forestry and bioenergy carbon offset projects. The resource pack has been developed by the Overseas Development Institute (ODI) on behalf of the Ford Foundation. For more information, please e-mail CCEF@odi.org.uk.

3. Sequestration activities (where carbon is removed from the atmosphere), particularly through tree planting, do not rely on emissions being avoided, and are therefore also suitable in cases where there are few emissions in the first place. Tree planting is also applicable in rural areas, for obvious reasons.

There is very little available evidence regarding whether these rationale actually hold true. Available studies indicate that poor people often have difficulties in participating in projects, or the technologies are implemented in ways that are unsustainable in the long run. The report that accompanies these infosheets provides more information on the evidence.

What types of forestry and bioenergy carbon offset projects exist?

Forestry projects

Forestry carbon offset projects can take a range of forms depending primarily on whether they are planting trees to remove CO2 from the atmosphere or avoiding emissions of CO2 by preventing deforestation and degradation. They can also vary depending on different types of land available and forestry systems in place.

There are currently 50 forestry projects in the CDM project pipeline. 22 of these are 'small-scale' projects, which are more likely to be implemented over smaller geographic areas and have more community involvement according to rules under the Kyoto Protocol. 9% of the transaction volume in the voluntary markets

Afforestation	Defined under the UN's Clean Development Mechanism (CDM) as the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources
Reforestation	Defined under the UN's Clean Development Mechanism (CDM) as the direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land
Avoided deforestation (or Reduced Emissions from Deforestation and Degradation – REDD)	Could include various strategies to conserve forests such as increased financing to Protected Areas; Community forestry; establishing Conservation concessions; financial support to Reduced Impact Logging; intensifying agriculture; changing energy policies, etc.

Forestry case study: Kikonda Forest Reserve project

The Kikonda forest reserve project is a commercial plantation in central Uganda being implemented by German-based Company, Global-Woods AG and certified by the CarbonFix standard. 1000 Ha of trees have so far (as of September 2009) been planted on a National Forest Authority (NFA) owned Central Forest Reserve. 200,000 tCO2 are estimated to be sequestered within the first 1000 hectares that has been validated. The main aim of the plantation is to produce high quality saw log timber (mainly from pine trees) but additional funding for the plantation has been raised through the sale of carbon. The opportunities for communities surrounding the plantation are employment, support for private tree planting activities and direct payments for carbon through a community group.

was from forestry projects. Of the three major types of forest carbon projects, Afforestation/Reforestation projects transacted the highest volume of credits (59%), followed by REDD at 24%, and finally Integrated Forest Management at 8% (Hamilton, 2009).

Bioenergy projects

Bioenergy carbon offset projects can take a range of forms depending primarily on whether they are methane avoidance projects, reducing deforestation, or avoiding fossil fuel use. Bioenergy projects can vary substantially in the way they are implemented. Rural bioenergy projects can be implemented at the household level (e.g., through clean cook stoves to provide heat for cooking) or at the community/village level (e.g., through the use of crop residues to power small steam turbine generators for producing electricity). The list below, while not exhaustive, provides some examples of bioenergy project types.

It is important to note that, while roughly 516 (11% of CDM market) projects in the CDM pipeline are biogas projects (primarily in Asia), most registered projects are on commercial livestock farms (areas where the rural poor are unlikely to benefit given that the benefits will flow directly to the commercial enterprise). There are only about seven CDM biogas digester carbon offset projects using domestic biogas production for home use.

Biomass energy generation projects are also popular in the CDM, but are often implemented in industries such as rice mills, where the energy generated is used on site and therefore does not provide direct benefits beyond the project implementers themselves. There are very few which adopt more innovative supply chains in which farmers are involved in providing biomass for power generation and where they may also benefit from electricity produced for the grid.

Biogas digester (main form of several types of biogas technology)	Using biogas produced through anaerobic digestion of biomass, such as manures or municipal wastes as energy source. Carbon offsets are purchased from the implementers of these projects, with the money used to finance the technology
Biomass power generation using the 'Rankin' cycle	Agricultural/forest (biomass) residues are used to generate heat that is converted to electricity through combustion and boiling of water. This displaces the use of coal and other non-renewable fuels for electricity production. Carbon offsets are purchased from the project implementers, with the money used to finance the technology. Farmers can be involved through the biomass supply chain.
Improved solid fuel cooking stoves	Cook stoves where unsustainable fuel sources (e.g. charcoal from depleted natural forests) is replaced with sustainable biomass fuel sources. Or higher efficiency stoves reduce the amount of fuel used compared to traditional stoves.

Bioenergy case study: The Bagepalli Biogas project

The Bagepalli Biogas project is a Gold Standard CDM project implementing 5,500 household biogas digester units in the Kolar District of Karnataka State, India. Each household will use the dung of its cattle to feed a digester to produce biogas for cooking with the aim of replacing inefficient wood-fired stoves with renewable and efficient biogas stoves. Greenhouse gas emissions will be reduced through reductions in the use of non-renewable biomass for cooking and reductions in fugitive emissions from cow manure. 19,800 tCO2e per annum are expected to be reduced through the project. Finance from the sale of carbon will initially be used to cover the upfront investment costs and will then be channelled directly to owners through community organisations.

Further Resources:

CDM/JI Pipeline Analysis and Database: The CDM/JI Pipeline Analysis and Database contains all CDM/JI projects that have been sent for validation/determination. It also contains the baseline & monitoring methodologies, a list of DOEs and several analyses. Almost all information is from cdm.unfccc.int and ji.unfccc.int.