Carbon Markets for Improved Cooking Stoves

A GIZ guide for project operators

Revised edition – January 2011

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On behalf of
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Carbon Markets for Improved Cooking Stoves
A GIZ guide for project operators
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Abbreviations

AMS II.G	CDM approved small-scale methodology for "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass"
BMU	Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (Federal Ministry for Environment, Nature Conservation and Nuclear Safety)
CDM	Clean Development Mechanism
CER	Certified Emission Reduction (from CDM project)
CPA	CDM Programme Activity
CPA-DD	CDM Programme Activity Design Document
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
ER	Emission Reductions
EU-ETS	European Emission Trading Scheme
FAO	Food and Agriculture Organisation
GS	Gold Standard
GS TAC	Gold Standard Technical Advisory Committee
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (Geman Technical Cooperation)
GWP	Global Warming Potential
HERA	GIZ's program for Poverty-oriented Basic Energy Services
IPCC	Intergovernmental Panel on Climate Change
ITL	International Transaction Log
ODA	Official Development Assistance
PDD	Project Design Document
PIN	Project Idea Note
PoA	Programme of Activities
PoA-DD	Programme of Activities Design Document
UNFCCC	United Nations Framework Convention on Climate Change
VER	Verified Emission Reduction (voluntary market)

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Preliminary Remarks

This guide can only pass along information based on past experiences of the former Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) and current experience of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ); it cannot provide ready-made “one size fits all” solutions, particularly since many rules, regulations and applied project approaches are still in a process of continuous adaptation and change. Please always refer to the most recent CDM and Gold Standard documentation for clarification. GIZ shall not be held liable for any consequences of actions taken based on information in this guide book. This guide is being revised continually to our best knowledge. We need and welcome your feedback to help us keep this guide up to date, so please do not hesitate to contact GIZ’s Program for Poverty-oriented Basic Energy Services (HERA) with your comments: HERA@giz.de .

1. Overview and background

The social and environmental benefits of improved biomass cooking stoves are indisputable. They reduce workloads involved in fuel collection, and by reducing indoor air pollution, they can reduce the risk of respiratory diseases, especially for women and children. Improved stoves also contribute to environmental protection by reducing biomass consumption and hence greenhouse gas emissions, mainly CO_2, when the combusted biomass originates from non-renewable stocks. In spite of the numerous positive impacts of improved cooking stove projects and more than 30 years of project experience in stove dissemination in Africa, Asia and Latin America, the potential for large-scale emission reductions (ER) from efficient cooking stove projects went unrecognised by the carbon market community for a long time. Revenues achievable from greenhouse gas emission (GHG) reductions from household level biomass stoves were thought to be insufficient to cover transaction and project costs.

The purpose of this guide is to provide an overview of the international carbon market's main regulations, requirements, opportunities and challenges for improved biomass cooking stove programmes. The guide is intended to facilitate successful project development from the very beginning.

Background, existing regulations and methodologies

The largest and most elaborate carbon market segment is the Clean Development Mechanism (CDM), which allows projects in developing countries to generate emission credits (Certified Emission Reductions, CERs) that can be bought by industrialized countries and used to fulfil their emissions commitments under the Kyoto Protocol and the European Emission Trading Scheme (EU-ETS). With the approval in February 2008 of AMS II.G, the first small-scale methodology under the CDM to assess baseline and monitoring for activities promoting energy efficiency in biomass use, recognition of the carbon market potentials of improved cooking stoves began to grow, especially in terms of a programmatic approach.[1] In June 2008, the approval of a methodology for

Development of the carbon market for improved cooking stoves

June-July 2007
*Adoption of procedures for bundling project activities as one **Programme of Activities** (PoA) under the CDM*

February 2008
*Approval of AMS II.G – small-scale methodology under the **CDM***

[1] Effective as of 1 February 2008, the UNFCCC EB approved two small-scale methodologies: AMS I.E: "Switch from Non-Renewable Biomass for Thermal Applications by the User" and AMS II.G: "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass." AMS I.E cannot be used by stove projects disseminating efficient biomass cooking stoves, as it only applies to projects introducing 100% renewable energy and zero emission technologies such as solar or biogas cookers. This handbook focuses only on projects disseminating biomass cooking stoves under AMS II.G.

large-scale projects on the voluntary market[2] by Gold Standard (GS), a premium carbon credit labelling organization, once again focused the attention of the carbon market community on activities to promote improved cooking stoves. Especially project developers searching for project concepts with strong impacts on the social aspects of development became involved in planning stove dissemination projects.

Following a stakeholder consultation workshop on 26 October 2009 in Bonn, the CDM Executive Board (EB) approved a new version of AMS II.G (Version 2) in December 2009, which came into force on 18 December 2009. Version 2 of the methodology is a first attempt by the EB to make AMS II.G more "user friendly" and facilitate the development of more cooking stove projects under the CDM. In February 2010, the Gold Standard introduced a revised edition V.02 of its cook stove methodology. In fall 2010, a simplified GS methodology V.03 (very similar to AMS II.G) was published for comments. The final version of GS V.03 is expected to be published in early 2011. The Gold Standard has also announced the development of a streamlined methodology for micro-scale project activities.

June 2008
Approval of Gold Standard Cooking Stove Methodology V.01 for the ***voluntary market***

December 2009
Revision of AMS II.G (Version 2)

February 2010
Revision of Gold Standard Cooking Stove Methodology (V.02)

Spring 2011 (expected)
Introduction of GS V 0.3

Market Overview

Although stove projects still account for a negligible share of the global voluntary and CDM carbon markets, the carbon market for improved stove projects has been growing rapidly since the introduction of the two methodologies. New stakeholders and project approaches have become involved in stove projects. The first cooking stove project under the CDM was successfully registered in October 2009. The project is located in Nigeria and has also been registered under the Gold Standard to generate high quality carbon credits. The other four CDM projects currently under validation are located in Lesotho, Nepal and India (2). All these projects have additionally sought registration under the Gold Standard.

There are six registered Gold Standard VER projects located in Uganda (already issued VERs) Ghana (2, 1 already issued), Mali (already issued), Madagascar, and Lesotho (micro-scale). There were 18 more VER stove projects in the Gold Standard pipeline in December 2010 with a strong regional focus on Africa (Kenya (7), Senegal, Benin, Eritrea, Sudan, South Africa, Ghana, Malawi) and one project each in Honduras, Bolivia, Brazil and India. Moreover, one cook

The carbon market for improved cooking stoves ***(AMS II.G, & GS Methodology)***

Stove projects in the pipeline

CDM	*12 (8 PoAs)*
GS VER	*19 (1 PoA)*

Stove projects registered

CDM	*1*
GS VER	*6*

Expected annual CER volume from existing and upcoming stove projects (incl.8 PoA-CPAs)
624,800 CERs

Expected annual GS VER volume from existing and upcoming stove projects
1,136,763 VERs

Data from http://cdmpipeline.org/ and https://gs1.apx.com/ as of December 2010

[2] Carbon credits generated by voluntary market projects are called voluntary emission reductions (VER); these credits are not recognized under the Kyoto Protocol or the European Emission Trading Scheme (EU-ETS).

stove VER PoA in Peru is under registration review. So far, approximately 210,000 VERs have been issued.

Currently, eight cook stove CDM Programme of Activities (PoA – see chapter 4.2) using the CDM methodology AMS-II.G are under validation. They are located in Bangladesh, Mexico, Guatemala, El Salvador, Nigeria (2), Zambia and one regional PoA covering East Africa.

Opportunities and Challenges

Carbon finance can be used to facilitate access to improved energy technologies for the poor on a larger scale than public funding alone could do. Despite all efforts to improve access to cooking energy and 30 years of experience with improved stove dissemination all over the world, more than half of the world's population is still cooking with solid fuels and traditional biomass.[3] Revenues from carbon credits could stimulate the production and dissemination of improved cooking stoves on a large scale, reducing their purchase price and hence making them more affordable for customers. Large-scale production and commercialisation of improved cooking stoves can also stimulate the host country's economic development. Strict monitoring requirements during the entire crediting period of carbon market projects can help to ensure long-term project sustainability. However, while the carbon market provides new opportunities for stove activities in developing countries, its underlying processes are highly complex and require skilled personnel. Monitoring requirements in particular can be very elaborate, a situation that can be a significant challenge to project management. The initial project planning phases are time-consuming and costly. The crediting period and issuance of the first emission certificates, which are then sold on the carbon market, do not begin until about two years (or later) after the onset of a project. The bulk of transaction costs arise during this two-year initial planning phase. A lack of preliminary financing can be a considerable barrier. Stove projects for the carbon market should be thoroughly planned and their benefits as well as risks well assessed before project implementation.

Opportunities

- *Additional financial resources for large-scale stove dissemination*
- *Improved access to cooking energy for the poor*
- *Economic development through large-scale stove production*
- *Improved project performance due to strict monitoring requirements*

Challenges

- *Requires highly skilled staff and professional project management due to its complexity*
- *Time-consuming, costly procedures*
- *High upfront costs and investment risks*

Project Cycle

Section 2 provides a brief overview of the procedures relevant to project registration and credit certification under the CDM and Gold Standard labels. It illustrates the project cycles and their underlying overall timeframes from the initial planning through writing of the Project Design Document

The project cycle

1. *Initial planning*
2. *PDD*
3. *Approval of PDD by DNA*
4. *Validation by DOE*
5. *Registration*
6. *Monitoring*
7. *Certification/ Verification*
8. *Issuance of CERs/VERs*

[3] Kammen, D. (2007)

(PDD), validation, registration, verification and, finally, issuance of the carbon credits.

Available baseline and monitoring methodologies

Section 3 elaborates on the two methodologies for baseline assessment and monitoring of projects seeking carbon funding for the promotion of fuel-saving cooking stoves in areas where non-renewable biomass is used as cooking fuel.

Comparison of carbon market methodologies for stove projects

Table 1

	CDM AMS II.G	Gold Standard V.02 Methodology
Available for	CDM, voluntary market	Voluntary market
Scope	Small-scale (project activities up to 180 GWh total annual energy savings[4])	Large-scale, no restrictions in project scope
Assessment of baseline	Fossil fuel scenario	Real conditions
Eligible GHG emission-reductions	Only CO_2 during combustion	CO_2, CH_4 and N_2O during combustion and fuel production
Description of Monitoring requirements	Vague	Detailed and complex

There are currently two methodologies available for such stove projects – one approved by the CDM, the other by Gold Standard. The methodologies are based on similar assumptions but differ in scope, requirements and complexity. Whereas AMS II.G, the CDM methodology, can only be applied to small-scale activities with up to 180 GWh total annual biomass savings, the Gold Standard V.02 methodology places no limit on overall project scale. The latter also takes into account CH_4 and N_2O emissions as well as any emissions that are side effects of fuel production (when charcoal is used), whereas AMS II.G only concerns itself with CO_2 emissions from direct fuel combustion. Thus, applying the GS methodology might lead to more emission reduction credits than using the CDM methodology for a similar project. However, the Gold Standard methodology is limited to the voluntary market and rather complex in application. On the other hand, it provides more detailed guidance on baseline assessment and monitoring requirements. In comparison, AMS II.G remains vague in terms of project structure

[4] The number of stoves necessary for biomass savings of 180 GWh per year can vary considerably depending on factors such as baseline biomass consumption, stove efficiencies, and the fraction of non-renewable biomass in the project area.

and monitoring regulations, even though its revision and currently second version (since December 2009), are an attempt to alleviate some of the difficulties project proponents had been facing.

Organisational set-up and practical considerations

Section 4 provides recommendations regarding the organisational set-up for stove projects on the carbon market as an individual activity or within the framework of a Programme of Activities (PoA). Section 5 provides answers to frequently asked questions related to carbon market stove activities.

2. Project Cycle

For stove project developers considering the option of using the opportunities of the carbon market for their activities, it is very important to become familiar with the structures, rules, and requirements of the CER/VER-market and the standards and labels available. The UNFCCC CDM website (http://cdm.unfccc.int/) provides all regulatory information on the CDM, such as the documents required for formally approved projects and projects under consideration, rules and methodologies. For information on procedures in the voluntary market it is highly advisable to consult the GS website (http://www.cdm-goldstandard.org), since most of the existing stove activities on the carbon market have been registered under the Gold Standard label.

CDM and Gold Standard project cycle

Figure 1

Timeframe	CDM EB/ Gold Standard	Project Operator	DOE	DNA
		1. Initial Planning		
1 month		*Consider eligibility* *Select baseline* *Additionality Assessment* *Local Stakeholder Consultation* *Sustainability Assessment (GS)* *Gold Standard Passport (GS)*		
3–4 months		**2. Project Design Document**		
				3. Approval of PDD
6-12 months			**4. Validation of PDD**	
	5. Registration			
Free choice of interval		**6. Monitoring** *PDD* *Sustainable Development (GS)*		
2–3 months	**8.Issuance of CERs/VERs**		**7. Verification/ Certification**	

GS projects[5] must pass through an additional assessment of sustainable development impacts. Therefore, emission re-

[5] The GS can be applied to VER projects or used as a top-up for CER projects. Several other standards are also available for VER projects.

duction credits certified by this label demand a higher price level on both the CDM and voluntary markets. GIZ-HERA highly recommends certifying any carbon activity (additionally or exclusively) with the GS label, if eligible, whether the project in question is aimed at the CDM or the voluntary market. The individual steps of the project cycle for GS projects are explained in detail in the Gold Standard Tool Kit and Gold Standard Requirements.[6]

GIZ HERA highly recommends registration for Gold Standard certification

- *Label for premium carbon credit quality*
- *Proof of positive impacts on sustainable development*
- *Higher price level*

In the following section the individual steps to plan, register, implement and monitor an improved cooking stove carbon market project activity as illustrated in figure 1 above are explained.

2.1 Initial Planning

Consider eligibility

Existing stove programmes should start by analysing their overall carbon market potential. This includes a consideration of the existing stove production capacities and their potentials for expansion, the financial resources that would be needed to increase production to a larger scale, and the availability of the necessary raw materials. Furthermore, existing distribution and monitoring structures should be examined to find out whether they hold potential for additional activities. If after an initial feasibility check the plans for a carbon market stove project prove to be viable, an assessment as to whether the project meets the CDM and/or the Gold Standard criteria is necessary. Project eligibility is defined by the following seven criteria:

Analyse project eligibility for the carbon market using the following seven criteria:

- *Scale of project activity: < 180 GWh annual energy savings = small scale (CDM)*
- *Host country has created DNA*
- *Type of project activity: end-use energy efficiency*
- *Reduction of greenhouse gases CO_2, CH_4 and N_2O*
- *ODA funding issues*
- *Project timeframe: 10 or 3x7 years*
- *No double counting using multiple certification schemes*

1. *Scale of the project activity:* CDM projects can be registered as either large-scale or small-scale activities. However, there is no approved methodology for large-scale stove projects under the CDM. Hence, CDM projects disseminating improved cooking stoves must either stay below an annual biomass saving capacity of 180 GWh[7] or plan to register from the beginning as a Programme of Activities (PoA – for details see chapter 4.2) in which each sub-project stays below the limit. Projects for the voluntary market using the Gold Standard Cookstove Methodology V.02

[6] http://cdmgoldstandard.org/fileadmin/editors/files/6_GS_technical_docs/GSv2.1/GSv2.1_Toolkit_Clean.pdf and http://www.cdmgoldstandard.org/fileadmin/editors/files/6_GS_technical_docs/GSv2.1/GSv2.1_Requirements.pdf (URLs as of December 2010).

[7] The number of stoves necessary for biomass savings of 180 GWh per year can vary considerably depending on factors such as baseline biomass consumption, stove efficiencies, and the fraction of non-renewable biomass in the project area.

do not impose any restrictions in terms of energy savings.

2. *Host country or state:* Any non-Annex I country in the Kyoto Protocol, as defined by the UNFCCC[8], can host CDM projects. However, the host country must have established a Designated National Authority (DNA). The mandatory role of a DNA is to determine whether the project submitted contributes to the countries' sustainable development, and if so, to issue a so-called letter of approval (LoA). For the voluntary market there are no restrictions for host countries, so that any country is eligible as a host country for VER-Projects. However, the GS requires the host country to retire a number of emission allowances equivalent to the number of VERs generated by the project activity if the country has an emission cap. This regulation is necessary to guarantee that the project activity does not undermine the country's cap and trade system and result in higher greenhouse gas emissions than would have been produced without the voluntary carbon market activity.
3. *Type of project activity:* Improved stove projects are placed in the *end-use energy efficiency improvement* category because they reduce the amount of energy needed to satisfy the target group's cooking demands.

GHG under CDM/Gold Standard and AMS II.G and V.02 ***Table 2***

Greenhouse Gas	CDM	Gold Standard	CDM Methodology AMS II.G	GS Methodology V.01
Carbon dioxide (CO_2)	X	X	X	X
Methane (CH_4)	X	X	–	X
Nitrous oxide (N_2O)	X	X	–	X
Perfluorocarbons (PFCs)	X	–	–	–
Hydrofluorocarbons (HFCs)	X	–	–	–
Sulphur hexafluoride (SF_6)	X	–	–	–

[8] http://unfccc.int/parties_and_observers/parties/non_annex_i/items/2833.php; URL as of Dece,ber 2010

4. *Greenhouse gases:* The UNFCCC has identified six greenhouse gases for which projects are eligible to claim emission reduction credits under the CDM. However, project operators that apply the existing approved CDM methodology, AMS-II.G, to stove projects under the CDM can only apply for the certification of the reduction of CO_2 emissions. The GS generally takes into account three of the Kyoto GHGs [carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O)], and its large-scale methodology for stove projects allows for the certification of emission reductions for all three GHGs (see table 2).

5. *Official Development Assistance (ODA):* If the stove project receives financial resources according to the OECD definitions for ODA and some or all credits coming out of the project are transferred to the ODA donor country as a condition for the funding, the project is not eligible for certification by the GS. For CDM projects, ODA can be used if this is accepted by the host country. For clarification regarding a country's national regulations, it might be useful to contact the DNA.

6. *Project timeframe:* In general, a carbon market activity can have a crediting period of either ten years with no extension option or seven years with an option of up to two extensions for a maximum total of 21 years. There are specific GS regulations for projects that were announced and started operating before discovering the carbon market and for those that apply for retroactive crediting[9]. These are explained in detail in the Gold Standard Toolkit.[10] The Gold Standard also allows for parallel submission of projects to the CDM as well as to the Gold Standard VER voluntary stream. This possibility saves time in case the project is rejected by the UNFCCC. In such a case it might still be eligible for the voluntary market[11].

7. *Other certification schemes:* In general, emission reductions can only be claimed and counted once. It is

[9] Retroactive crediting is only permissible under the GS. Yet, if a project activity started operation before discovering the carbon market, the activity is not eligible, unless it can be demonstrated that changes justifying the news for carbon revenues have taken place. CDM projects can claim so-called Voluntary Carbon Units (VCUs) under the Voluntary Carbon Standard (VCS) for emission reductions prior to successful CDM registration. The resulting VCUs can be registered retroactively to the project start date, i.e. 28 March 2006 or two years prior to the completion of project registration, whichever is later.

[10] Gold Standard Toolkit 2.1 (2009): pp. 24f.

[11] Project rejected by the Executive Board of the UNFCCC may only be eligible to apply for registration under the GS if they have been rejected due to methodological applicability reasons.

imperative to avoid double counting. If an activity is already registered under a different label than the Gold Standard, the Gold Standard label can only be claimed for activities within the project resulting in emission reductions that have not yet been certified. Furthermore, it is important to ensure that crediting periods do not exceed the standard UNFCCC crediting periods.

Once the planned activity has proved to be eligible for the carbon market in one way or another, the project operator will have to assess additionality and methodological issues. A short overview of the project – the so-called Project Idea Note (PIN) is usually drawn up to present to prospective buyers of the credits.

The initial planning period takes at least one month. It usually results in a Project Idea Note (PIN).

Selection of baseline and monitoring methodology

In order to correctly calculate the emission reductions that can be achieved through the proposed activity, it is necessary to assess the emissions of the baseline scenario and set them off against the projected emissions after the implementation of the project activity (including possible leakage factors). All the key parameters of the proposed activity must be monitored throughout the lifetime of the activity in order to confirm emission reductions as projected. The methodologies approved by the CDM EB and Gold Standard provide a framework for baseline assessment, emission reduction calculation and monitoring of the project activities. The methodologies are available on the CDM and Gold Standard websites. For stove projects reducing the consumption of non-renewable biomass, there are currently two applicable methodologies: 1) the CDM-approved small-scale methodology AMS II.G "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass"[12] and 2) the Gold Standard-approved large-scale methodology "Improved Cooking Stoves and Kitchen Regimes"[13], which is only applicable for activities on the voluntary market. Moreover, a micro-scale cook stove methodology developed by the Gold Standard for very small projects is underway. Both methodologies are discussed in detail in Section 3 of this guide. If the planned project activity cannot be assessed with either of the existing approved methodologies, the project operator can develop a new methodology that better suits the project's ideas and propose it through a Designated Operational Entity (DOE) to

The CDM EB and Gold Standard approved methodologies provide a framework for baseline assessment, emission reduction calculation and monitoring of the project activities.

Stove projects have the choice between two methodologies:

1. CDM AMS II.G small-scale
"Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass"

2. Gold Standard Methodology V.02
"Improved Cooking Stoves and Kitchen Regimes"
(only voluntary market)

Or submit a new methodology

[12] http://cdm.unfccc.int/methodologies/DB/HVLUZ94B86UAM25MUWSLT2O98PBVAR/view.html (URL as of December 2010)

[13] http://www.cdmgoldstandard.org/fileadmin/editors/files/6_GS_technical_docs/manuals_and_methodolgies/V02_08-02-10_GS_Cook-stove_Methodology.pdf (URL as of December 2010).

either the CDM EB (if the project is to be registered for the compliance market) or one of the standards serving the voluntary market (e.g. the Gold Standard). For more detailed information on the process of submitting a new methodology to the CDM EB please refer to Annex 3 of the report of the 37th meeting of the EB[14] or Chapter 5 of the Gold Standard Toolkit[15]. However, for the CDM, this is a lengthy and expensive process, and methodology rejection rates exceed 50%.

2.2 Preparations for Project Design Document

Additionality Assessment

Additionality is one of the key terms in the carbon market debate. The general idea is that only activities that reduce GHG emissions compared to the status quo (the "business as usual scenario") can generate CERs/VERs and sell them through the various channels.

For a stove project, additionality basically means that it would not have been realised in the absence of the carbon market financing. This implies that projects which would have been financed and implemented by private sector or governmental institutions anyway – even without carbon funding – are usually not eligible for the carbon market. Furthermore, wherever national laws and regulations impose the implementation of a project (which might be unlikely for stove projects), additionality is not assured. If project additionality was not ensured, the carbon market would give rise to excess emissions. Therefore, the CDM EB has specified a tool to assess the additionality of project activities.[16] For VER projects under the GS, new tools for additionality assessment can be submitted to the label. Annex I of this guide provides a brief overview of the various steps involved in the UNFCCC additionality assessment. It is essential that planners of carbon market activities develop an in-depth understanding of the additionality concept and analyse precisely whether the project fulfils the additionality criteria.

"A carbon market project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the carbon market project activity"

(UNFCCC Marrakech Accords, 2001)

Early Consideration

The EB is becoming increasingly strict on proof of additionality to ensure the quality of emission reductions under the

[14] https://cdm.unfccc.int/Reference/Procedures/meth_proc02_v13.pdf (Dece,ber 2010) or for a more general overview https://cdm.unfccc.int/Projects/pac/howto/CDMProjectActivity/NewMethodology/index.html.

[15] Gold Standard Toolkit 2.1 (2009): 79.

[16] "Tool for the demonstration and assessment of additionality" (http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v5.2.pdf; URL as of December 2010).

CDM. One clear way to prove that additionality has not been met is to show that the decision to implement the project was made before taking carbon credits into account, meaning that there was no early consideration. Conversely, it is necessary to prove that carbon credits have been an integral component of the project since before the decision was taken to implement. There are a number of proofs which are accepted by the EB, including a) a public announcement which states that the project will go ahead thanks to the inclusion of carbon credits, b) correspondence with either the host country's DNA, the Gold Standard or the UNFCCC, c) inclusion of carbon revenues in the feasibility study, and/or d) a record of a board decision to implement the project as a result of the inclusion of carbon revenues. In the eyes of the EB, correspondence with a carbon consultant is not sufficient to prove early consideration. In addition to the CDM requirements for early consideration, the GS requires that there has been no previous announcement of the project that does not mention carbon revenues unless the project has subsequently been cancelled or the design has been significantly revised.

It is necessary to prove that carbon credits have been an integral component of the project since before the decision to implement was taken.

Local Stakeholder Consultation

It is mandatory for any planner of a project activity in the carbon market to conduct a *Local Stakeholder Consultation* in order to ensure the general acceptance of the project activity as well as willingness to participate (i.e. the monitoring process) of the target group and the neighbouring population. The consultation is to be based on either a detailed, substantive PIN or a draft PDD. The best approach for a stakeholder consultation is a meeting in which participation of marginalized groups can be assured. Questionnaires can also be distributed. If a single meeting for all of the stakeholders is not feasible, it is permissible to organise several smaller meetings with individual stakeholder groups. It must be kept in mind that not only the beneficiaries, but also local (critical) NGOs, governmental representatives and local carbon market experts should be invited in order to make sure that the consultation fulfils its purpose of a realistic reflection of overall perception of the project.

Consulting local stakeholders is obligatory to ensure acceptance of the project by affected groups.

Section E of the PDD calls for a description of the organisational aspects of the stakeholder consultation, a record of individual comments and who made them as well as the project operator's response to the stakeholders' comments. If possible, pictures should be taken or the meeting filmed to augment the minutes process. A feedback round to inform the stakeholders of how the project developer has reacted to their comments or, as the case may be, incorporated them

into the project planning is a possibility to increase the local population's participation.

Box 1

Recommended Participants for a Local Stakeholder Consultation

- Local people impacted by the project and their official representatives
- Local policy makers and representatives of local authorities
- Local NGOs working on topics relevant to the project
- For CDM projects under the Gold Standard, an official representative of the DNA of the host country
- Mandatory for Gold Standard projects,
    - local Gold Standard expert
    - regional representatives of relevant international NGOs supporting the Gold Standard

The Gold Standard requirements for reporting on planning, calling, conducting and responding to stakeholder consultations are more detailed than those of the CDM EB. Annex J of the Gold Standard Toolkit provides sample tables for tracking invitations, participant lists and evaluation forms as well as examples of non-technical summaries presented to the stakeholders in their local language, consultation minutes and descriptions of project developers' reactions to consultation outcomes. The Toolkit also gives detailed descriptions of possible consultation agenda items and adequate methodologies. The Gold Standard requires an individual report on the Stakeholder Consultation to be submitted to the Gold Standard Registry together with the PDD and the GS Passport[17].

Environmental Impact Assessment

The project has to comply with the host country's requirements for environmental sustainability.

The project must comply with the host country's requirements for environmental sustainability. An ex ante assessment of possible environmental impacts of the project must be included in section D of the PDD. The CDM only calls for Environmental Impact Assessments if they are part of the host country's DNA requirements. However, if considering application for the Gold Standard label, which requests a detailed assessment of the project's impacts on sustainable development, a sustainability assessment conducted by the project developers and local stakeholders is mandatory.[18]

[17] For details on the GS passport see Section 2.9

[18] A third party can be involved if certain issues call for an in-depth investigation.

Project Design Document

The Project Design Document (PDD) is the key document in the CDM project cycle and constitutes the basis for any evaluation of the project activity by the DNA, a DOE, public commentators, the CDM EB and the Gold Standard. The PDD describes the project's activities and set-up. It discusses the project's category, boundary, methodology and additionality and justifies the project's overall concept. Gold Standard stove projects are required to prove that the end users are aware of the nature of the project and willing to waive their rights to the carbon credits. Since project validation and registration depend solely on the argumentation presented in the PDD, it is essential that the PDD be based on strictly conservative estimates.

The Project Design Document (PDD) is the key document *in the carbon market project cycle.*

It describes and justifies the project's activities and set-up, baseline assessment scenario and projected monitoring methodologies.

The EB has developed a template for small-scale PDDs as well as guidelines for completing them properly.[19] Project participants are requested to submit their proposed project activities via online PDD templates. The Gold Standard label has published similar tools for all the steps of the project cycle, including a tool for all the mandatory components of a PDD. The whole process of writing a PDD (including additionality assessments and local stakeholder consultations) usually takes about three to four months if an approved methodology is applied.

If an approved methodology is used, writing and submission of PDD takes about three to four months.

2.3 Approval by the Designated National Authority

Project developers planning to register under the CDM and sell their CERs on the compliance offset market must contact their host country's DNA for official approval of the project. If a country does not have a DNA, it cannot host CDM projects. DNAs base their approval on sustainable development criteria; rejections have so far been rare. Some DNAs accept PINs, but most DNAs require the PDD, some a final validation report as well (see below). To approve the project, the DNA submits a letter of approval to the CDM EB stating that the host country will voluntarily participate in the project activity and the project contributes to the sustainable development of the host country.

The host country decides, through its Designated National Authority (DNA), which carbon market projects can be submitted to the CDM Executive Board.

2.4 Validation by a Designated Operational Entity

During the validation process the PDD (and - if Gold Standard requirements apply - the Local Stakeholder Report and

[19] The template can be downloaded here: http://cdm.unfccc.int/Reference/PDDs_Forms/PDDs/index.html; the CDM guidelines here: http://cdm.unfccc.int/Reference/Guidclarif/pdd/index.html (URLs as of December 2010).

other documents required by the GS) are reviewed by an independent auditor – a so-called Designated Operational Entity (DOE) – which checks the PDD's conformity with the CDM/GS rules. If the project developer plans to register under both the CDM and the GS, it is important to ensure that the DOE chosen for the project adheres to GS principles. A list of DOEs registered with the GS can be found in the Gold Standard Registry.[20] At the beginning of validation, the PDD and – for GS projects – the Passport and Stakeholder Consultation Report are published on the CDM and GS websites for public commenting for a period of one month.

Project activities must be validated by an independent third-party expert institution – the Designated Operational Entity (DOE).

In order to finalize the validation process, the project developer and the DOE must take into account and clarify any concerns raised by the public during the commenting period. The CDM EB may request further clarification of any element of the project documentation after receiving the validation report. The so-called request for review is made public on the UNFCCC website in order to assure the transparency of the process.

2.5 Registration

After the validation report has been completed by the DOE, it is submitted to the EB together with the PDD for final approval. For small-scale stove projects, the EB checks the documents within four weeks. If the documentation passes this review process and the registration fees have been paid, the project is registered immediately. However, the EB often identifies non-conformities and projects undergo the review process once again. The process can take six to twelve months from the start of validation until registration or longer if the project is reviewed more than once.

Approval by DNA, validation by DOE and registration by CDM EB and/or Gold Standard takes at least six to twelve months.

2.6 Monitoring of emissions reductions

Continuous monitoring of the emission reductions that have been achieved is mandatory for the entire duration of the project. After a time interval during which a sufficient amount of emission reductions have been achieved, the project operator prepares a monitoring report according to the methodology used in the PDD. Most projects choose yearly intervals. There is no fixed format for the monitoring report, but it must include the monitoring tables as set out in the PDD and the GS passport (additional sustainability monitoring plan). Furthermore, the project operator must submit data entry sheets of parameters monitored by the project itself including

To generate emission reduction certificates the project operator has to prepare a monitoring report that assesses emissions reductions.

[20] http://goldstandard.apx.com/resources/AccessReports.asp (URL as of December 2010).

a description of the current status of all parameters listed. The monitoring report should also include a description of the monitoring procedure and a section with results comparing the monitored project scenario to the baseline situation.

A DOE verifies the report so that the requested number of emission certificates can be issued. Again, a review can be requested by the EB.

2.7 Verification and certification by the DOE

For small-scale CDM projects, the same DOE that has validated the project's PDD can be commissioned to verify the monitoring report and certify the requested carbon credits. During verification the DOE is responsible for ensuring that the monitoring of the emissions reductions adheres to CDM and/or Gold Standard rules and modalities.

Verification guarantees that the project activity adheres to the CDM and/or Gold Standard modalities.

Box 2

During verification the DOE ensures that the...

- ...project activity has been implemented and is operating as described in the validated PDD and no other technologies or equipment are in use
- ...project operator has prepared the monitoring report and all the necessary supplementary documents in full adherence to CDM and/or Gold Standard requirements
- ...monitoring as implemented by the project operator complies with the plan set out in the PDD and the applied baseline and monitoring methodology
- ...data presented in the monitoring report is correct and based on conservative assumptions

Verification comprises not only an analysis of the relevant documentation and reports (registered PDD, methodology applied, any previous monitoring reports, relevant communication with the EB and/or GS) but also on-site visits wherever feasible. For projects under the GS label at least one on-site visit and verification by the appointed DOE is mandatory during the first two years after project implementation, and thereafter at least one every three years. A detailed description of the verification requirements can be found on the CDM website.[21] During the verification phase the DOE stays in close contact with the project operator in order to have short channels of communication in case the DOE has questions or a need for clarification.

[21] UNFCCC (2008): "Clean Development Mechanism Validation and Verification Manual" EB 44 Report Annex 3. URL as of September 2010: https://cdm.unfccc.int/Reference/Manuals/accr_man01.pdf

Verification under the GS and CDM should be done simultaneously. Certification counts as the DOE's assurance that during a specified period of time the project has reached the number of anthropogenic greenhouse gas emissions set out in the verification report. After the verification and certification reports are submitted to the Gold Standard and the CDM EB, a three-week period is provided for further feedback and clarification by the Gold Standard Technical Advisory Committee (GS TAC) and the GS Secretariat.

Certification is the DOE's assurance that the project has reached the number of anthropogenic greenhouse gas emissions as set out in the verification report.

2.8 CER/VER issuance

Once the GS TAC has resolved any remaining questions and the CDM EB has not requested a review, the requested number of certified emission reductions (CERs) or verified emission reductions (VERs) are issued to the ITL account (for CDM projects) or GS account in the Registry. Two to three months can elapse between submission of the monitoring report to the DOE and issuance of CERs/VERs.

Two to three months can elapse between submission of the monitoring report and issuance of CERs/VERs.

2.9 Additional Gold Standard requirements

In addition to the reduction of GHG emission, the Gold Standard label certifies additional project contributions to sustainable development of the host country in environmental, social and economic terms. Based on thorough technical reviews, it guarantees that the projected emission reductions are realistic and hence decrease the investment risks involved in carbon finance. The Gold Standard Label is available for two types of projects: a) Gold Standard VER projects using the Gold Standard stove methodology, b) as an additional quality label (by including the GS passport) for CDM CER projects using the AMS-II.G methodology.

The Gold Standard label certifies that a project also contributes to sustainable development in the host country in environmental as well as social and economic terms.

All necessary planning, registration, implementation and monitoring steps up to the certification of Gold Standard VERs or CERs are explained in detail in the Gold Standard Toolkit[22] and its Annex[23]. Although the core procedures of project planning, implementation and monitoring of the CDM project cycle are the same for Gold Standard certification,

[22] The Gold Standard Toolkit can be downloaded from CDM Gold Standard website. URL as of December 2010: http://cdmgoldstandard.org/fileadmin/editors/files/6_GS_technical_docs/GSv2.1/GSv2.1_Toolkit_Clean.pdf

[23] The Annexes to the Gold Standard Toolkit can be downloaded from the CDM Gold Standard website. URL as of December 2010: http://cdmgoldstandard.org/fileadmin/editors/files/6_GS_technical_docs/GSv2.1/GSv2.1_Annexes_A-N.pdf and http://cdmgoldstandard.org/fileadmin/editors/files/6_GS_technical_docs/GSv2.1/GSv2.1_Annexes_O-S.pdf.

there are slight variances. After registration under http://goldstandard.apx.com/ the project developer can view a list of DOEs that work with the Gold Standard and directly assign a DOE with the project's validation and/or verification. The project proponents are required to sign not only the Gold Standard Passport but also the Terms and Conditions of the Gold Standard (Annex M to the Gold Standard Toolkit) and then submit them together with a cover letter (Annex S to the Gold Standard Toolkit).

Gold Standard Passport

This document presents all information required for registration under the GS that is not already covered in the PDD. The Gold Standard Passport consists of the ODA Declaration Form completed by the project itself as well as its financiers, the Sustainability Assessment and the Sustainability Monitoring Plan.

Documents required for the Gold Standard passport

- *ODA Declaration*
- *Report on Sustainability Assessment*
- *Sustainability Monitoring plan*

ODA Declaration

The ODA declaration is a statement by the project developers that they have not invested in the project with official development assistance contingent on the condition that the credits will be transferred to the country donating the assistance. The ODA Declaration template can be found in Annex D of the Gold Standard Tool Kit.

Sustainability Assessment

Box 3

The Sustainability Assessment consists of the following four steps:

- "Do no harm" assessment
- Detailed impact assessment using the Sustainable Development Matrix
- Sustainability monitoring plan
- Environmental Impact Assessment (EIA), which is based on the host country's requirements for environmental sustainability and as such part of the PDD

The *"Do no harm" assessment* is based on UNDP safeguarding principles which have evolved from the Millennium Development Goals (MDGs). It involves vetting of the project outline by the project operator in terms of risk to the safeguarding principles listed in Annex II.

Box 4

Four categories of UNDP Safeguarding Principles

- Human Rights
- Labour Standards
- Environmental Protection
- Anti-Corruption

The Sustainability Assessment also requires a detailed assessment of the project's impacts on sustainable development within the project region and beyond. To this end, the GS has identified 12 indicators in environmental, social, economic and technological development.

Box 5

12 Gold Standard Sustainability Indicators

- Air quality
- Water quality and quantity
- Soil condition
- Other pollutants
- Biodiversity
- Quality of employment
- Livelihood of the poor
- Access to affordable and clean energy services
- Human and institutional capacity
- Quantitative employment and income generation
- Balance of payments and investment
- Technology transfer and technological self-reliance

Detailed information on the parameters and measurement of each indicator as well as any applicable mitigation measures must be presented in the form of a *Sustainable Development Matrix* (Annex I of the Gold Standard Toolkit). The matrix must also be completed during the Local Stakeholder Consultation to ensure that all potential impacts on the local population are considered.

The project's impact on sustainable development as described in the matrix is to be monitored according to a *Sustainable Monitoring Plan*. However, it is in the GS's interest to limit the project's complexity and expenditures. The GS therefore recommends a bottom-up approach by which the project operator should first revise existing structures that could possibly be used for monitoring purposes. The plan should depict parameters for measuring the sustainable development indicators. It should describe the current baseline

and projected future status of the parameters and the method of monitoring them. The template in Annex I to the Gold Standard Toolkit facilitates monitoring design and performance. Based on the monitoring plan the project will collect data and report on its sustainable development impacts, which will be subject to verification by the DOE in subsequent steps.

3. Baseline methodologies

The baseline for a stove project activity on the carbon market is the scenario that reasonably represents the GHG emissions that would occur in the absence of the project activity. Emission reductions are calculated by subtracting GHG emissions during the project activity and any leakage emissions from the emissions in the baseline scenario. Baseline, leakage and project emissions are calculated according to a methodology that must be approved by either the CDM EB (for compliance market activities) or the Gold Standard (for voluntary market activities with the GS label). The available methodologies also define the monitoring requirements for verification and certification of emission reductions.

The available methodologies regulate calculation of baseline, project and leakage emissions as well as monitoring requirements.

As mentioned above, the CDM-approved small-scale methodology AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" and the Gold Standard approved large-scale methodology V.02 "Improved cook-stoves and kitchen regimes" (which is only available for projects on the voluntary market), are the most suitable and feasible methodologies at the moment for a stove project that reduces non-renewable biomass consumption.

Both methodologies are based on the approach that, when less biomass is used for cooking, GHG emissions can be reduced, provided the biomass originates from non-renewable biomass (NRB) stocks. Biomass savings originating from renewable biomass stocks cannot reduce GHG emissions because the re-growing biomass reabsorbs the GHG emissions. For a detailed definition of (non-)renewable biomass, please refer to Annex 18 to the report of the 23rd meeting of the Executive Board[24] or the CDM EB-approved methodology AMS II.G. The percentage of non-renewable biomass within the project boundary must be provided based on reliable data gained from survey results, national and local statistics, and other sources of information such as remote sensing data. Project participants must be able to show that non-renewable biomass has been used since 31 December 1989.

Reducing the amount of biomass used for cooking reduces the emission of greenhouse gases if the combusted biomass originates from non-renewable stocks.

It is important to have sub-national instead of nationwide data because biomass demand and forest deterioration can differ significantly from one area to another. The Food and Agriculture Organisation (FAO) has developed a spatially explicit method for highlighting and determining wood-fuel priority areas. It is called "Wood-fuel Integrated Supply/Demand Overview Mapping" (WISDOM) and can be very helpful in determining the fraction of non-renewable biomass

The FAO tool WISDOM can be helpful for determining the fraction of NRB

[24] UNFCCC (2006): "Definition of Renewable Biomass" EB 23 Report Annex 13: http://cdm.unfccc.int/EB/023/eb23_repan18.pdf (URL as of December 2010)

in the project area.[25] Another means to assess the development of forest stocks can be maps showing the dispersion of woodlands at various points in time since 1989.

Box 6

Indicators that biomass is non-renewable (AMS II.G Version 2)

- Increase in time spent or distance travelled to gather fuel-wood (by fuel-wood users)
- Increase in transportation distances for the fuel wood transported into the project area
- Increasing trends in fuel-wood prices indicating scarcity
- Change (trends) in type of cooking fuel collected by users, suggesting scarcity of woody biomass

Non-renewable woody biomass (NRB) is the quantity of woody biomass used in the absence of the project activity minus the demonstrably renewable biomass (DRB) component. Non-renewability is considered proven if at least two of the above indicators are proven to exist. (AMS II.G Version 2)

3.1 The CDM methodology AMS II.G

Existing Versions of the Methodology

After introducing AMS II.G Version 1 in February 2008, the CDM EB approved a new version of AMS II.G (Version 2), in December 2009; it came into force on 18 December 2009. The validity period of AMS II.G Version 1 ended in mid August 2010. This guide is based on Version 2 of the methodology.

Project Boundary

The boundary of a CDM project activity needs to be clearly defined. It must encompass all anthropogenic GHG emissions and emission reductions attributable to the project activity. The project boundary is ”the physical, geographical site of the efficient system using biomass”.

Assessing baseline and calculating emissions

The methodology assumes that in the absence of the project activity, a fossil fuel (kerosene, liquefied petroleum gas, etc.)

Calculations are based on a fossil fuel scenario

[25] Masera O., R. Drigo and M. A. Trossero (2003): Woodfuels Integrated Supply/Demand Overview Mapping – WISDOM, Rome: FAO. URL as of December 2010: http://www.fao.org/DOCREP/005/Y4719E/Y4719E00.HTM.

would be used to satisfy local demand for cooking energy. Hence baseline emissions are calculated on the basis of the CO_2 emission factors of the fossil fuel that is most likely to be used to replace non-renewable biomass for cooking purposes in the project area. According to this formula the fraction of the total annual biomass savings originating from non-renewable resources is determined and multiplied by the net calorific value of the biomass actually used and the emission factor of the fossil fuel that would most likely be used in the project area in the absence of the project activity. The projected emission reductions will therefore be based on a fossil fuel scenario. Annual biomass savings in tonnes are calculated by multiplying annual biomass consumption in the baseline by the efficiency improvement of the new technology in comparison to the old stove (or three-stone fire). GIZ-HERA has developed an Excel-based Emission Reduction Calculation Tool for AMS-II.G[26].

An important factor in calculating emission reductions under the CDM methodology AMS II.G is the determination of efficiencies of the old (e.g. the three-stone fire or simple metal stove) and new cooking stove. The "Water Boiling Test"[27] is the most common stove performance test to determine stove efficiencies in a controlled laboratory environment by boiling water. It has so far been applied for most projects based on the AMS II.G methodology. This was encouraged by the fact that the AMS II.G methodology is using stove efficiencies in the calculation formula for the quantity of woody biomass saved. The test conditions of the "Controlled Cooking Test"[28] in general resemble field conditions much more accurately, as standard local cooking tasks are performed, still allowing for test conditions to be reproduced. The "Controlled Cooking Test" does not deliver data on stove efficiencies, but on an improved stove's specific fuel consumption needed to cook a given amount of local food. This initially caused confusion among project developers as it remained unclear whether data from Controlled Cooking Tests would be eligible under the CDM methodology. However, following an official request for clarification the EB confirmed in April 2010 that the quantity of woody biomass saved can also be calculated using the specific fuel consumption obtained from a

To assess stove efficiencies the "Water Boiling Test" is so far the most common stove performance test.

The "Controlled Cooking Test" resembles field conditions much more accurately and delivers data on the improved stove's specific fuel consumption

[26] Contact HERA to obtain the latest version of the GIZ-HERA Emission Reductions Calculation tool: hera@giz.de

[27] URL as of December 2010: http://ehs.sph.berkeley.edu/hem/hem/protocols/WBT_Version_3.0_Jan2007a.pdf

[28] URL as of 20 December 2010: http://ehs.sph.berkeley.edu/hem/hem/protocols/CCT_Version_2.0_with_appendix5_Aug2004a.pdf. and calculation sheet: http://ehs.sph.berkeley.edu/hem/hem/protocols/CCT_data-calculation_sheet_2.0.xls

relevant testing procedure including the Controlled Cooking Test.

Box 7

Parameters for baseline and project scenario

To be determined in the field

- Quantity of biomass used for cooking per year in project region in baseline scenario
- Efficiency of the stove that is to be replaced (e. g. three-stone fire) or the corresponding default values
- Efficiency of the new stove
- Fraction of non-renewable biomass in the project region
- Fossil fuel that is most likely to be used as a substitute for non-renewable biomass in the absence of project activity

To be taken from the IPCC Emission Factor Database

- Net calorific value of non-renewable biomass saved during project activity in TJ per tonne of biomass*
- CO_2-emission factor for the fossil fuel most likely to be used as a substitute for non-renewable biomass in the project region in tonnes CO_2 per TJ*

*The Intergovernmental Panel on Climate Change offers an online service listing default values for all relevant calorific values and emission factors; URL as of 21 January 2010: http://www.ipcc-nggip.iges.or.jp/EFDB/find_ef_main.php; the net calorific values for wood fuel and charcoal are given as 0.015 TJ/tonne and 0.03 TJ/tonne respectively.
IPCC default emission factors for kerosene = 71.5 tCO_2/TJ and for LPG = 63.0 tCO_2/TJ.

AMS-II.G provides optional default values for baseline stove efficiencies: an efficiency default value of 10% is used for very basic stoves or the three-stone-fire, 20% efficiency would have to be applied to any other inefficient but slightly advanced cooking system. The choice whether to use default values or to perform stove tests should be made based on a cost-effectiveness check: Testing might result in a lower and therefore more favourable baseline-stove efficiency, but the revenues from more carbon credits might be outweighed by testing costs.

In the realistic case that more than one stove has been in use in the baseline situation, AMS-II.G allows for using a weighted average efficiency.

A crucial factor to be considered when calculating project emissions is the continued use of old stoves in addition to the new ones. Project experience has shown that many households with improved stoves still use their traditional (baseline) stoves from time to time. If it cannot be guaranteed that the baseline stove is disposed off and not used

within the project boundary or region (e.g. by handing out improved stoves only in return of the traditional stove), the wood fuel consumption of the old stove in the project scenario has to be monitored and deducted from the quantity of baseline biomass consumption.

Leakage

Leakage Definition

Increase in biomass consumption (outside project boundary) as a direct result of project activity

The project activity's impact outside the project boundary must also be assessed. If the savings of non-renewable biomass within the project area result in an increase in non-renewable biomass consumption in neighbouring regions outside the project area, its value must be adjusted to account for this leakage.

Leakage assessment poses a general problem. AMS II.G requires ex-post surveys of users and biomass collection areas to gather data on leakage emissions. Illegal harvesting of wood fuel is difficult to detect. If people from outside the project boundary use non-renewable biomass that is claimed to be saved due to the project activity, exact values for leakage are difficult to define.

Box 8

Possible leakage sources according to AMS II.G

- Diversion of non-renewable biomass saved under project activity by non-project households that previously used renewable biomass.
- Transfer of equipment and technologies from outside the boundary to the project activity
- Use of non-renewable woody biomass saved under the project activity to justify the baseline of other CDM project activities. (only to be assessed if project is developed as or within a PoA)
- Increase in the use of non-renewable biomass outside the project boundary to create non-renewable biomass baselines for possible similar projects in the future (only to be assessed if project is developed as or within a PoA)

Monitoring requirements

Monitoring Definition

Recurring observation of factors and procedures on which baseline, project and leakage emissions are based.

Monitoring involves the repeated observation of factors and procedures on which baseline, project and leakage emissions are based. AMS II.G does not provide a very detailed description of the monitoring procedures for stove projects but states that monitoring is to consist of an annual check of all appliances or a representative sample[29] thereof. The EB has issued "Draft General Guidelines on Sampling and Sur-

[29] Sample requirement defined in AMS-II.G: 90/10 precision (90% confidence interval, 10% margin of error)

veys"[30], which are useful for determining samples within any monitoring activity.

Box 9

According to AMS-II.G, an annual monitoring survey should cover the following parameters:

- Efficiencies of stoves in use (if improved stoves are being replaced (e.g. because they have reached their projected life span), it must be ensured that the replacement stove has a similar efficiency as the stove being replaced).
- Disposal of old appliances and/or wood fuel consumption of old stoves that are still in use
- Leakage factors (see above)
- Fraction of non-renewable biomass

Although the methodology itself does not give further instructions on the monitoring plan and its implementation, it is clear that the requirements for monitoring are challenging. It is advisable to train additional staff to be solely responsible for the annual monitoring surveys and observations. A detailed monitoring plan and manual should help the monitoring staff with their surveys.

Additional staff should be trained for annual monitoring surveys.

It is recommended for project developers planning a CDM stove project to take the much more detailed monitoring requirements of the GS methodology into account. The GS procedures can provide instrumental suggestions for a credible monitoring process even under AMS-II.G. The GS procedures consist of instruments such as sales records, a customer database and kitchen surveys. For detailed information please check the monitoring requirements for the Gold Standard methodology below.

3.2 The Gold Standard methodology V.02

Revisions of the GS Methodology

The GS improved cook stove methodology V.01 was revised in February 2010. The biggest changes between V.01 and V.02 are related to the expansion of the methodology to water treatment activities: *"Project activities that reduce the amount of fuel wood consumed by changing kitchen practice from water boiling as a purification technique to the introduction of new zero emission technology that treats water (e.g. gravity household water filters)"* are also eligible under V.02 (section IV, Annex 3 of the methodology). Furthermore, a requirement for incentive mechanisms for stove users sur-

Changes between GS V.01 and V.02

- *expansion to water treatment activities*
- *incentives for surrendering old stoves required*
- *leakages regarding NRB added*
- *mean performance and CCT applicable for aging stoves*

[30] 47th meeting of the CDM EB, Annex 27

rendering their old stoves was added. Regarding potential leakages, two were added relating to NRB. Changes in the field of monitoring issues apply for the testing of aging stoves where mean performance might be used instead of lower bound. Also, a CCT can be undertaken with old and new stoves if the results are correlated with a Kitchen Test.

Project Boundary

The Project Boundary demarcates the physical geographical area in which the project activity is taking place. The *project area* can overlap, but is not automatically equal to the target area and the fuel collection area. The *target area* is defined as serving as an outer limit to the project boundary, meaning that it can be broader than the project area. The *fuel collection area* is only relevant if woody biomass (including charcoal) is used in the baseline scenario. It is the area in which woody biomass is collected and/or produced.

Differentiation between

- *Project area*
- *Target area*
- *Fuel collection area*

Assessment of baseline

The Gold Standard methodology differentiates between fixed and evolving baselines. The fixed baseline approach can be adopted if all substitute stoves are installed at the start of the project activity and the surrounding conditions remain unchanged throughout the project period. Moreover, if convincing argumentation can be provided (e.g. in LDC contexts) a fixed baseline can also be considered (unless a baseline change is identified by Kitchen Surveys). If the stoves are installed progressively (as might be the case for most carbon market stove activities) an evolving baseline is required. Using an evolving baseline approach, the project operator observes fuel usage development in the baseline scenario (which is in this case set outside the project boundary) alongside the project activity.

Differentiation between

- *Fixed baseline*
  Dissemination of stoves at start of activity, surrounding conditions are stable.
- *Evolving baseline*
  Surrounding conditions change, baseline is monitored alongside project activity.

By clustering the population within the project boundary, the methodology helps to combine various fuel sources, cooking technologies and customer demands into one project activity. Therefore, the first step involves determining different ways of using fuel, types of stoves in use and other cooking/space heating habits. If the project operator is dealing with a homogenous target group, this step is unnecessary.

Clustering of project population allows for integration of heterogeneous stove use patterns into one activity.

Box 10

Necessary steps to determine stove use clusters

1. Establish pilot sales record

2. Provisionally assess fuel types and mix and kitchen regimes

3. Analyse renewability status of wood fuels

4. Divide sales records into customer groups or clusters

5. Kitchen Surveys (qualitative)

6. Refine demarcation of customer groups with survey results and create overall project database.

Step 1 *Establish a pilot Sales Record:* Names and contact details of stove purchasers and/or those using traditional stoves are collected to be available for subsequent surveys and tests to characterise pre-stove cooking habits.

Step 2 *Provisionally assess fuel types, fuel mix and kitchen regimes:* The project operator should specify the energy sources and fuel types used in the baseline and project scenarios. During this step an initial assessment can be made of how to group the project population; this assessment will be further verified by subsequent Kitchen Tests.

Box 11

Three energy source groups for fuel type/mix assessment

1. Renewable and non-renewable woody biomass (including charcoal)
2. Renewable energy fuels with zero GHG emissions (some agricultural residues, biogas, solar cookers, heat retention boxes)
3. Alternative fuels emitting GHG emissions during production or combustion (fossil fuels, dung, some crop residues)

Step 3 *Analyse renewability status of wood fuels:* The Technical Advisory Committee of the GS is accepting and reviewing submissions of new methodologies for estimating NRB which can be incorporated them into coming versions of baseline and monitoring methodologies. The fraction of non-renewable biomass can be calculated either by subtracting the mean annual increment from annual harvest data (if data is available) or by qualitatively assessing it through surveys and other methods.

Step 4 *Divide pilot sales records into customer groups/clusters:* After all the necessary factors have been assessed, the project population can be divided into groups according to their cooking demands (households, institu-

tions, wood-fuel users, charcoal users, etc.). Based on this analysis the introduction of different types of cookers can be justified. It is advisable to refer to the most conservative emission reduction scenario, e.g. combining purchasers of small and large stoves using the same fuel into a small stove cluster.

Step 5 *Carry out a qualitative survey (Kitchen Survey):* The surveys must be carried out on the basis of representative samples (recommended minimum sample sizes are given in the methodology) for each cluster. Kitchen Surveys involve observations, questionnaires undertaken by an expert survey team visiting customer households and telephone interviews to get a more precise picture of how the new stove affects fuel consumption patterns and hence GHG emissions in each cluster. A family might start cooking for a commercial purpose outside the family household, thereby even increasing their fuel consumption, while others may only cook for their families. The findings will help to define the clusters appropriately in order to make quantitative measurements representative. The outline of the baseline Kitchen Survey is the same as those conducted for subsequent monitoring purposes.

The Gold Standard recommends conducting qualitative Kitchen Surveys prior to quantitative tests.

The Kitchen Survey concludes with a formal report on its findings and a set of clustering options. It is advisable to always plan a conservative emission reduction scenario, e.g. to combine purchasers of small and large stoves using the same fuel into one small stove cluster. Although this could result in a loss of some potential VERs, it will save time and money for the baseline and monitoring process.

The project operator is not bound by the findings of the Kitchen Survey when formulating his PDD. However, the PDD should refer to the survey and justify as conservative and accurately measurable any steps that differ from the survey's recommendations.

Possible leakage factors and trends in year-on-year fuel consumption should also be assessed during the Kitchen Surveys.

Conducting Kitchen Surveys might seem laborious at first, but this effort pays off later. In addition to qualitative Kitchen Surveys, the project operator must conduct quantitative Kitchen Tests for each cluster. If the project operator can detect cluster resemblances based on the Kitchen Survey, he can convey Kitchen Test findings from one cluster to another, provided that the estimates stay conservative. This saves a great deal of time and effort.

Box 12

Data documented during Kitchen Surveys

- Customer's mobile phone number and/or address with land-line telephone number
- Stove and fuel type used by customer, including the new one
- Place of use, location
- Application of new stove/fuel combination: commercial food production, domestic, institutional, etc. (only for monitoring)
- Fuel mix typically used during the year: specify different types of fuel and fractions of total fuel use, noting variations in the mix at different times of the year, duration of each period, and reasons for variation. If possible note quantity of each fuel per year.
- Sources of fuels used with old/new stove (purchased or hand-collected etc.) and prices paid or effort made (e.g. walking distances, persons collecting, opportunity costs)
- Frequency of cooking activities per day and per week (if possible specify reasons for infrequent cooking, e.g. due to eating out, cooking to eat later either cold or reheated)
- Number of children below the age of 10 and adults eating
- Separate the questions/information above according to seasons of the year

Step 6 *Refine demarcation of clusters and populate Project Database:* The results of the Kitchen Surveys can be used to fine-tune the cluster grouping and to list customers properly (according to their cluster) in the Project Database. Furthermore, people that live within the project boundary but are not placed in either of the defined clusters should be recorded in the Project Database for subsequent monitoring because they constitute possible sources of leakage.

The Project Database comprises all necessary (up-to-date) customer information ordered according to clusters and customer groups

Calculating emission reductions

The Gold Standard methodology is basically similar to the CDM methodology in terms of calculating emission reductions. Similarly to the AMS II.G, the Gold Standard methodology involves multiplying the fraction of non-renewable biomass (NRB) by the annual amount of saved biomass and its emission factor. Contrary to the CDM methodology AMS II.G, however, the GS methodology is based on the assumption that NRB would continue to be used in the absence of the project activity. Therefore, emission factors are given for the type of NRB that is actually in use and not for a projected fossil fuel. Because the Gold Standard methodology takes not only CO_2 emissions but also CH_4 and N_2O emissions into account, emission factors must be indicated

No fossil fuel scenario, but calculation based on existing biomass usage

Calculation of additional greenhouse gas emissions, i.e. methane and nitrous oxide

Assessment of greenhouse gas emissions during wood-fuel production

for these GHGs, too. Thirdly, the Gold Standard methodology V.02 permits emission reductions during fuel production (i.e. charcoal production) to be considered and added to the project's total emission reductions.

The Gold Standard methodology sheet[31] provides exact calculation formulas. These formulas may seem daunting and act as a deterrent for some to familiarize themselves with this approach. Nonetheless, the GS methodology facilitates emission reduction calculations in many ways by giving concrete detail where the CDM methodology remains vague. It also allows for flexible project design.

When emission reductions are calculated, the relevant factors must be measured for each cluster individually (unless findings can be combined as described above) during quantitative Kitchen Tests. It has proven useful to work with paired samples (meaning that the same households are visited before and after the installation). The Gold Standard methodology provides a rather detailed description of how to estimate the size of samples necessary in order for these tests to be representative. This guide will not go into detail here, but recommends cooperating with a statistician for the Kitchen Tests.

Box 13

Parameters measured during Kitchen Tests

- Mass of woody biomass consumed during cooking in tonnes per year
- Mass of all alternative fuels used for cooking in tonnes per year

If only one fuel type is used for all cooking during the Kitchen Tests even though the Kitchen Survey shows that secondary fuels are used frequently, the value of the alternative fuel is displayed as a fraction of total fuel consumption. In such a case the calculation becomes slightly more complex.

If seasonal changes are part of the baseline (space heating in winter etc.), a Kitchen Test must be carried out either during the season with the most conservative results are ex-

Box 14

Additional parameters measured when an alternative fuel type is represented only as a fraction of total fuel consumption

- Fraction of renewable biomass used during cooking
- Efficiency of old biomass stove
- Efficiency of stove burning alternative fuel

31 http://www.cdmgoldstandard.org/fileadmin/editors/files/6_GS_technical_docs/manuals_and_methodolgies/V02_08-02-10_GS_Cook-stove_Methodology.pdf (URL as ofDecember 2010):

pected to be achieved or once during each season.

The IPCC default values can be used for the remaining parameters (CO_2, CH_4 and N_2O emission factors for the main fuel and all alternative fuels). If the project operator intends to account for the emission reductions achieved through a decrease in fuel production, such emission factors must be assessed locally as the IPCC has no corresponding default values.

Leakage

Under the GS methodology, leakage emissions must be accounted for in a more detailed manner than under the CDM methodology. The PDD should account for and present an estimate (and justification) for each possible leakage factor.

Box 15

For the assessment of fuel consumption it is important that...

- ...the fuel consumption data of the individual households tested is not in any way interrelated
- ...no tested households is also included in any other cluster
- ...if the Kitchen Tests reveal a household that does not belong in its cluster, moving it to another cluster has to be justified
- ...the households are randomly selected from the Sales Records – but it is legitimate to select only households that have purchased within a certain time frame, or to use a randomly selected Kitchen Survey group
- ...Kitchen Tests should cover about one week of pre-installation cooking and one of post-installation cooking; shorter periods (a minimum of three days, not including weekend days) are possible if conditions indicate daily repetition of a set pattern
- ...pre-installation and post-installation conditions must be the same; normally, the two phases should immediately follow each other to ensure this; if a gap in time is unavoidable, a shift in seasons should be avoided

Individual cases of leakage should be addressed in the context of suppressed demand and a satisfied level of service. The cases presented below would be sufficient to be considered a trend of increased fuel consumption during the baseline assessment.

Box 16

Suppressed demand

If it can be shown that a certain group of people is suppressing their demand in the baseline scenario (through comparison with their peers' baseline or a projected project level of service), the baseline must be adapted on a case-by-case basis. The amount of fuel consumption in the baseline scenario could be adapted according to observations in a peer group.

Box 17

Satisfactory level of service

In the baseline scenario the population is under-cooking due to wood fuel shortages. In consequence to an increase in efficiency, the project population might start cooking according to their actual demand and hence the cooking energy used in the project scenario becomes more than in the baseline scenario.

A similar scenario might be observed in terms of space heating. Due to an increase in efficiency of the new technology, the project population can "afford" to increase its fuel use.

Box 18

Possible leakage factors presented in the Gold Standard methodology

- Increase in fuel consumption within the project boundary after installation of new stoves to the extent that project emissions are higher than in baseline ("rebound effect")
- Project activity stimulates an increased use of high emission fuel outside project boundary
- Households that already use a stove type or fuel with emissions levels that are lower than those of the "improved" cooking stove could be encouraged to buy the new stove (in that case with higher emissions)
- The replaced traditional stoves are reused outside the project boundary, suggesting an increase in use in these areas
- Significant emissions from transportation or other activities relating to project activity (e. g. emissions from production/transport of stoves or fuels)
- The NRB saved under the project activity is used by non-project households who previously used renewable energy sources.
- The NRB saved under the project activity is used to justify the baseline of other project activities.

The data for a discussion of possible leakage factors should be taken from general observations and the Kitchen Surveys. Furthermore, the monitoring plan should account for the leakage factors that have been identified. Leakage risks can only be ignored if the PDD shows that they do not apply to the project area.

Monitoring requirements

To ensure unobstructed monitoring the project must maintain a Total Sales Record, a Detailed Customer Database and a Project Database. Kitchen Surveys and Kitchen Tests are repeated periodically as described above in order to review and revise the parameters needed for emission calculation and cluster definition. Kitchen Tests must be conducted individually for each stove age (new, one year, two years...).

The maintenance of a Total Sales Record is supervised and coordinated by the Project Coordinator.

Box 19

Sales Record data

- Name
- Telephone number/address (required for all bulk purchasers, nice to have for domestic end users)
- Date and location of sale
- Mode of use (resale/onward retailing, institutional, domestic)
- Model/type of stove purchased
- Number of stoves purchased

The results of the Kitchen Surveys are entered into the Detailed Customer Database. Initially the Detailed Customer Database only consists of data from the baseline Kitchen Surveys. Throughout the project, data gained from the monitoring Kitchen Surveys and monitoring Kitchen Tests is fed into the database.

Monitoring Kitchen Surveys must be conducted on a quarterly basis (every three months) to capture data for all seasonal variations (or once per year during the season which represents the most conservative scenario). The sample size for the Kitchen Surveys must be 10% of the number of customers, but a minimum of 25 randomly selected customers.

The Gold Standard calls for monitoring Kitchen Surveys (qualitative assessments) every three months.

The project operator must determine whether that is a feasible interval.

The monitoring Kitchen Surveys serve as a guarantee that cluster definitions are still tenable and that the monitoring Kitchen Tests deliver representative results. Home interviews should always be preferred to telephone interviews, make up at least 50% of the total number of interviews and

be conducted prior to telephone interviews. In order to have a representative sample that includes all socio-economic groups, project developers should be sure to include people without a telephone connection. Mandatory data results for Kitchen Surveys have been indicated above (under baseline assessment).

Box 20

Periodically monitored parameters – at least every two years...

- ...the fraction of non-renewable biomass is to be re-assessed.
- ...initially defined leakage factors and possible new leakage sources are to be identified/quantified.
- ...usage Surveys with same sample size as Kitchen Survey and Kitchen Tests for aging stoves are to be conducted to establish drop-out rates. Different efficiencies for different stove ages will have to be accounted for in the project emission calculations (mean performance and CTT applicable).
- If the baseline changes significantly with new customer groups, new baseline monitoring Kitchen Tests will have to be carried out.
- If new models and stove designs are launched, new Kitchen Tests will have to be carried out for them.
- Social and economic impact and their contribution to sustainable devel-

The Project Database comprises all necessary (up-to-date) customer information ordered according to clusters and customer groups

The Project Database is fed with the purchaser information from the Total Sales Record. In the Project Database the customers are arranged according to the cluster definitions. Sales that do not fall within either of the clusters are listed separately. The Project Database also comprises results of the Kitchen Surveys and Kitchen Tests as well as the emission reduction calculations. Emission reduction monitoring calculations are based on updated factors gained from monitoring Kitchen Surveys and Kitchen Tests.

It is recommended to number the stoves, use serial numbers, to facilitate monitoring and avoid double counting.

For reasons of quality assurance and quality control the Gold Standard recommends the employment of a third-party expert. The usage of serial numbers on the stoves is also recommended to facilitate monitoring and cross-checking and to prevent double counting.

3.3 Which methodology delivers more?

Only projects for the voluntary market can choose either of the two methodologies. CDM projects are bound to use the AMS II.G methodology. There is no clear answer to the question which methodology leads to higher carbon revenues. Therefore project developers must decide which methodology to apply for each project individually.

Despite its complexity, the GS methodology leaves room for new and innovative project outlines and for mixing fuels and technologies within one project. However, mixing stove and fuel types leads to extremely complex monitoring procedures. Prior to implementation, a project planner must carefully assess whether mixing fuel and stove types is a feasible option. The advantage of using the GS methodology V.02 for a project's emission reduction calculations lies in its all-inclusive approach. It not only accounts for CO_2 emission reductions during the cooking process, but also takes into account other GHG emission reductions, i.e. methane (CH_4) and nitrous oxide (N_2O), as well as emissions produced during fuel production. Although combustion of wood and charcoal does not give rise to high emissions of methane and nitrous oxide, even small amounts of these emissions constitute considerable CO_2 equivalents due to their strong global warming potentials (GWP): one tonne of methane equals 21 tonnes of CO_2, nitrous oxide has a GWP of 310. However, accounting for GHG savings other than CO_2 is a complex task under the GS and requires additional efforts in terms of monitoring.

Projects working with the Gold Standard methodology are more flexible in terms of mixing stove and fuel types in one project.

HERA recommends carefully assessing a priori whether mixing of fuel and stove types is feasible.

Comparison of CDM and GS methodology for stove projects

Table 3

	AMS II.G	GS V.02
Project Boundary	Area where biomass/ efficient stove is used	Area where biomass is used and supplied
Baseline Scenario	Projected fossil fuel scenario	Real biomass scenario - wood carbon content
Accounted emission reductions	Accounting for CO_2 emissions only	Accounting for GHG mix (CO_2, CH_4, N_2O) during cooking & production of fuel
Leakage Assessment	Only for project activity	For baseline & project scenario
Monitoring	Annual check of leakage factors, efficiency of all appliances in use, usage of stoves, amount of biomass saved.	As for AMS II.G plus biennial check of NRB and quarterly Kitchen Surveys
Time	Crediting only possible from date of registration	Pre-crediting of up to 2 years possible
Scale	Maximum energy savings of 180,000MWh/a, larger scale possible through PoA	Large scale methodology, energy savings uncapped

AMS II.G requires the use of fossil fuel values in the baseline, which has the effect of reducing the number of CERs that can be claimed. It has been shown that using the GS methodology can result in up to twice the number of emission reductions (for the above reason and because the GS methodology accounts for emissions from N_2O and CH_4), but this is negated to a certain extent due to the higher prices which CERs command and the fact that the difference can be as little as ten percent in other project scenarios. It must be decided on a case by case basis whether revenues from additional emission reductions in the GS methodology can cover the additional transaction costs. The number of stove projects using the GS methodology in the pipeline has grown significantly in 2009.

The small-scale CDM methodology AMS II.G, on the other hand, accounts for neither processes that precede cooking (i.e. fuel production) nor additional GHG emissions from methane and nitrous oxide. The CDM methodology's advantage lies in its applicability on both the compliance market and the voluntary market. Thus, in some cases, a project developer can move a project from the voluntary market to the CDM without having to change the outline of the project. Hence, the CDM methodology allows for more flexibility in that regard. There is still uncertainty regarding monitoring requirements. Until a clear interpretation has emerged, the detailed monitoring requirements of the GS methodology should be used as an orientation. Hence, whereas the Gold Standard methodology provides for flexibility by an all-inclusive approach that comes with a rather strict mandatory framework, the CDM methodology leaves room for individual project conceptualisation, but without offering support or guidelines to help with unanswered questions.

The Gold Standard methodology provides for flexibility by using an all-inclusive approach that comes with a rather strict mandatory framework; the CDM methodology leaves room for individual project conceptualisation, but does not offer detailed guidelines.

The small-scale CDM methodology AMS II.G is limited to issuing CERs equivalent to energy savings of 180,000MWh per year within one project. Higher amounts of CERs can only be credited by using the programmatic approach with several single small-scale projects (CPAs). The GS methodology is a large scale methodology without any reduction limits.

Regarding the crediting period, the Gold Standard offers the option to generate credits prior to registration and validation (up to two years) if it can be demonstrated that carbon revenues had been considered from the outset.

4. Implementing a Carbon-funded Cooking Stove Project

Basically, project developers will have to determine the organisational structure most suitable for each individual project depending on the project's specific characteristics. This chapter provides information and recommendations on the design of an appropriate organisational model for cooking stove projects on the carbon market (4.1 & 4.2). It does not, however, go into technical details of stove dissemination approaches. General information on the design of sustainable improved cooking stove projects can be found in GIZ's Cooking Energy Compendium.[32] Information on recommended use of carbon revenues as well as costs and revenues of carbon cooking stove projects are given in sections 4.3 Use of carbon revenues and 4.4 Costs and revenues of improved cooking stove projects

Project developers have to determine the structure most suitable for each individual project's specific characteristics.

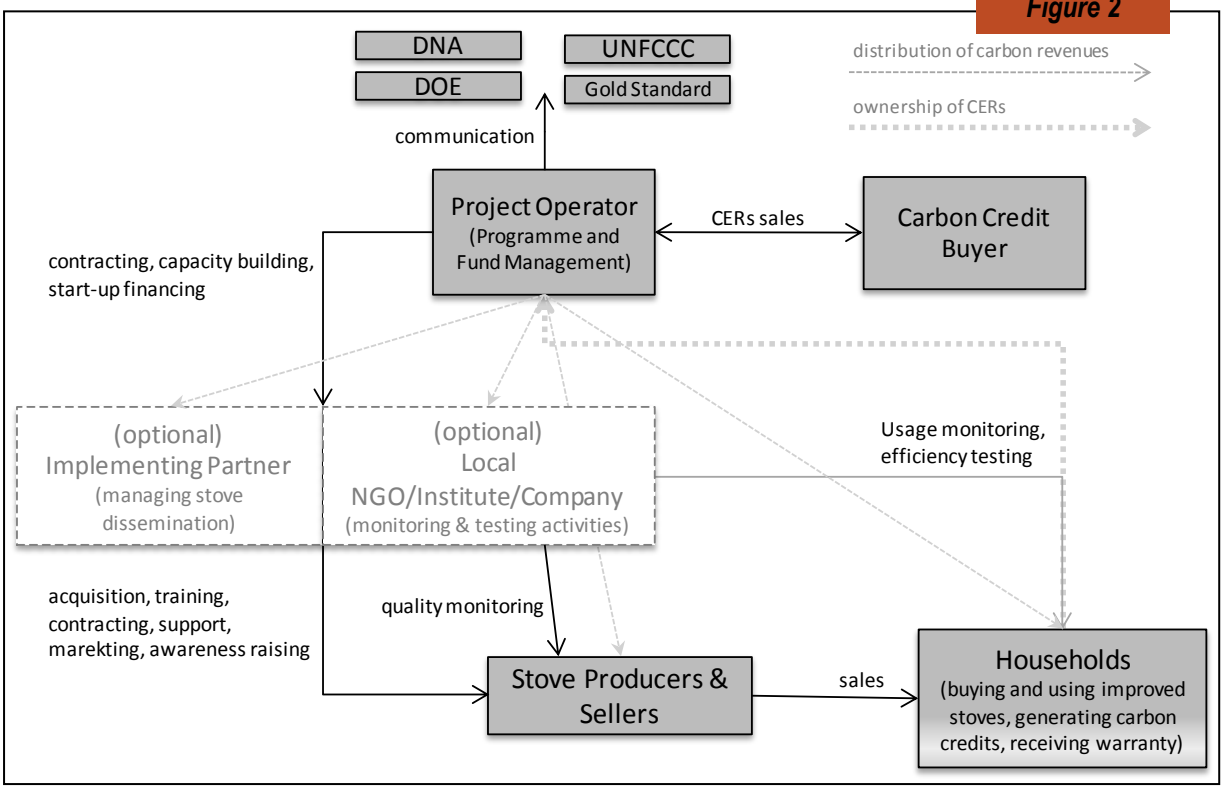
General information on the design of sustainable improved cooking stove projects can be found in GIZ's Cooking Energy Compendium.

4.1 Roles and responsibilities

Figure 2 provides an example of how a single CDM project for improved cooking stoves could be set up.[33]

Example: Project set-up for a single CDM project activity

Figure 2



[32] http://www.hedon.info/GTZCookingEnergyCompendium (URL as of December 2010).

[33] Depending on the situation, other project designs can also be conceivable and adequate.

Project management and operation

The key entity is the project operator/owner. This can be a local organisation or an international carbon asset developer.

The central actor in a carbon market project is the project operator[34]. There are two possible ways to identify a responsible body for the project. Either an international carbon asset developer or a local organisation can be appointed as project operator. A national project operator can be a governmental institution (e.g. Rural Energy Agency), NGO, private company, association of producers/distributors, financial institution or the like. The responsibilities of the project owner can vary depending on the general project structure, as well as on the organisation's capacity and interest. However, a certain institutional capacity and experience with carbon market regulations and procedures is an essential requirement. Previous experience with stove projects is a preferable asset; however, a lack of stove know-how can also be compensated by collaboration with experienced stakeholders such as NGOs or donor agencies (e.g. GIZ). In some countries, finding a local project operator may pose a considerable barrier for project implementation. Solutions include thorough capacity development activities for potential local project operators from the very beginning of the project planning phase; alternatively an international carbon asset developer might be willing to step in (for a price!).

When working with local organisations, capacity development is an essential component of the project planning phase.

The project operator is in charge of contracting, any required capacity building and start-up financing for all project partners (see below) involved in disseminating the stoves. The project operator organises monitoring of the stove dissemination process by managing a central monitoring database and is also called upon to define and monitor quality standards for the disseminated stoves. It is responsible for 'making the project work' and disseminating the CER revenues gained from the project among all project stakeholders (in the form of in-kind contributions or cash). The project operator is also responsible for all project-related communications with UNFCCC.

Managing stove dissemination

Depending on the project operator's technical experience and capacity, in addition to CDM-related project management it can also be responsible for the actual stove dissemination. In this case, no separate implementing partner (see Figure 2) is needed. In all other cases contracting of a separate implementing partner whose responsibility is "to get the stoves to the people" should be the preferred option. The implementing organisation is responsible for setting up the

Project operator and implementing organisation can be one entity or two partners working together.

[34] 'Coordinating Entity' in the case of a Programme of Activities (PoA); for details see 4.2

full stove value chain. Depending on the project context, producers, assemblers, wholesalers and retailers are identified and supported through extensive training with regard to production, quality standards, labelling, and after-sales services. Moreover, training in business skills such as marketing of products, developing business plans, and offering microcredits are offered. Training of new producers and sellers is needed from time to time to account for drop-outs among stove producers (due to moving, taking up new businesses, death etc.).

Setting up the stove value chain includes activities such as

- *identifying producers and sellers*
- *technical and business trainings for producers and sellers*
- *establishing quality criteria and labeling systems*

The implementing partner, with support from the project operator, will have to develop a marketing strategy and carry out effective marketing activities. Disseminating information among the target groups is the key to success. Awareness raising campaigns, focusing on local issues (wood scarcity, fuel wood prices, indoor air pollution, etc.) constitute an important factor in disseminating information. In countries where cook stove projects have been active for years, focus might have to be put on improved features (design, practicability, etc.). In areas where improved cooking stoves are relatively new, more basic educational activities such as demonstrations explaining the technologies and illustrating key advantages will be needed.

Awareness raising campaigns are important for creating significant demand.

Stove testing and monitoring

Specific activities which might not be realistically undertaken by the project operator, e.g. stove design, stove testing, and/or external monitoring, will most likely be outsourced to an independent third party that has more expertise in the relevant field or owns the required testing equipment (e.g. testing institute, university, private consultant etc.). However, the project operator or implementing partner might also take over these activities if adequate expertise and equipment is available. Stove testing is needed in the development phase of the project (baseline development) and for monitoring purposes throughout the project's entire lifetime. The monitoring tasks involve reliable data collection according to the methodology and the agreed monitoring intervals, data input and management.

Stove production and sales

Stoves can be either imported or produced locally. To support local value creation, GIZ-HERA highly recommends working with local stove artisans; however, the decision on whether or not include imported stoves will depend on a whole set of factors (price, quality of the imported product as well as local production capacities in particular) which cannot

be covered here. Depending on the stove type, producers will manufacture the stove directly in the customers' homes (fixed built-in type) or build portable stoves in semi-industrial production units (which could be built and expanded using carbon revenues). In the case of portable stoves, stove dissemination might involve additional stove sellers to retail the stoves produced. Training sessions conducted by the implementing organisation for producers and sellers should focus on quality as the crucial aspect. Producers and sellers are important links to the end user. They are in charge of delivering quality products which are designed in line with people's needs. After-sales services such as replacing or fixing broken stoves, which could be partly financed through carbon revenues, fall under their responsibility and are essential for customer satisfaction and hence generation of sufficient ER. When stoves are sold to the end user, the producer or seller is required to collect the installation data (e.g. stove reference number, name of user, address, location/village, date of purchase, mobile phone number) which is then regularly fed into a central monitoring database run by the project operator. Producers and sellers therefore need to cooperate closely with the entity in charge of monitoring.

Stove use

Upon stove purchase, users agree in the sales contract to waive their ER rights to the project operator.

In a sales contract stove purchasers will have to agree to waive their ER rights to the project operator. In exchange, they benefit directly or indirectly from additional services financed by carbon revenues (see 4.3.). The terms of the signed contract should be made easy for the customers to understand even though this can prove difficult among uneducated rural customers. Stove users should be trained in improved kitchen management techniques (using dry wood, cutting wood into small pieces, etc.) and proper stove handling to maximise efficiency and thus ER. Replacing broken stoves and avoiding the use of traditional stoves are ultimately responsibilities of the stove user. Awareness campaigns and incentives (e.g. discounts for returning old stoves) can facilitate proper user behaviour.

4.2 CDM Programme of Activities (PoA)[35]

An alternative to developing a single carbon market project activity is developing a so-called "Programme of Activities" (PoA). The programmatic CDM approach was introduced in 2007 to help overcome high transaction costs and complex organisational requirements for smaller projects, such as cooking stove activities, which are particularly relevant especially for Least Developed Countries. A PoA is a set of individual small projects (CDM Programme Activities - CPA), which are comparable to individual small-scale CDM projects. CPAs may be realised in different locations and/or timeframes within the geographical and temporal boundaries of the PoA. Adding up emission reductions from several CPAs, PoAs can achieve much larger total emission reduction amounts than an individual CDM small-scale project.

A CDM stove PoA has two levels: the programme level and the project activity (CPA) level. At the programme level, the PoA is the organisational and financial framework that provides structure to the underlying stove dissemination activities; it is managed by a coordinating entity. The coordinating entity's tasks are similar to the tasks of a project operator in an individual CDM stove project (see 4.1), but the management of a PoA with a whole bundle of CPAs run by different stakeholders makes this task more complex and therefore requires higher organisational capacities. The actual stove dissemination takes place on the activitiy (CPA) level. A CPA is rather similar to a standard small-scale CDM project as described in 4.1. One CPA implementer can be in charge of one or more CPAs at the same time. See figure 3 for an example of the design of a PoA for improved cooking stoves. Of course, other variations are also possible.

The coordinating entity is the key entity in a PoA.

The PoA project architecture is quite complex and requires high organizational capacities from the coordinating entity.

A PoA defines broad parameters for the individual CPAs in the PoA Design Document (PoA-DD). Once the PoA has been approved and registered by the CDM Executive Board, individual CPAs (each described in a CPA Design Document, CPA-DD) can be added without further approval by the CDM EB provided they meet the requirements laid out in the registered PoA.

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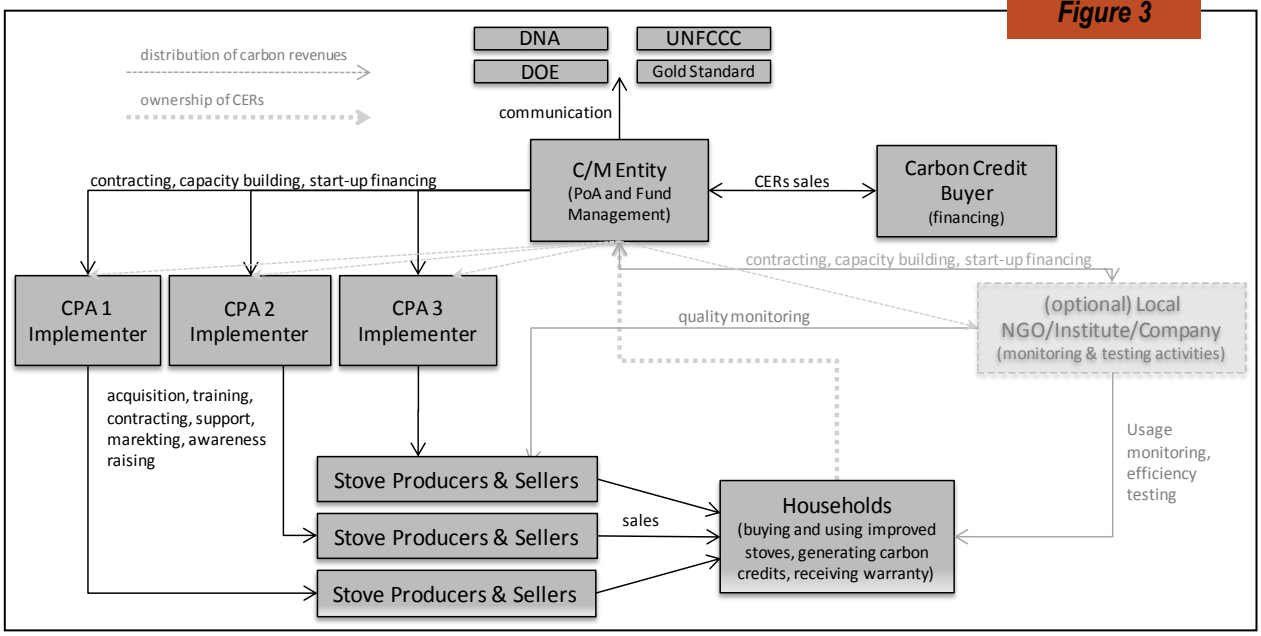
[35] For general information on PoA development please refer to the UNEP Primer on CDM Programme of Activities (November 2009), URL as of December 2010: http://www.cd4cdm.org/Publications/PrimerCMDPoA.pdf and The PoA Blueprint Guidebook for PoA Coordinators published by the PoA Support Centre at the German Kreditanstalt für Wiederaufbau (KfW) http://www.kfw.de/DE_Home/KfW-Klimaschutzfonds/PDF/PoA_BlueprintBook_2Edition_30Apr2010.pdf (URL as of December 2010).

Example: Project set-up for a CDM-PoA

Figure 3



Compared with a set of individual standard CDM projects, PoAs offer several advantages in terms of flexibility and scope, in addition to lowering transaction costs. Since the time up to registration and associated uncertainties are greatly reduced for CPAs as soon as the PoA is registered, investors will be more likely to provide pre-payments or other forms of securitisation for individual CPAs. The maximum lifetime of a PoA is 28 years (compared with 21 years for stand-alone small-scale projects under the CDM). The crediting period of a CPA is either a maximum of seven years which may be renewed at most twice, or a maximum of ten years with no option for renewal. For small-scale (SSC) programmatic CDM, only the individual CPA's emission reductions have to be below the SSC threshold, while the overall programme can go far beyond. This reduces relative transaction costs and generates significant economies of scale.

Advantages of PoAs

- *Multiplicity of activities to reduce GHG distributed in time and space*
- *Lower transaction costs*
- *PoA maximum duration is seven years longer than for a standard CDM activity*
- *Size / scalability of activities*
- *Synergistic effects in monitoring and verification activities*
- *No extra registration of CPAs*

4.3 Use of carbon revenues

Depending on the business plan, the carbon revenues generated might be used for a multitude of purposes. To achieve sustainability, however, it is strongly recommended that market-oriented approaches be adopted, i.e. avoiding excessive product subsidies which are likely to distort existing local stove markets. Moderate subsidies can be used, although they are not recommended due to their market-disturbing effects. Before applying high subsidies, it should be considered whether any cheaper technological options are available that might not require direct subsidies. Past experiences of GTZ have shown that many locally manufactured stoves are marketable even without artificially lowering the sales price. There are many other areas where carbon funding can

Using carbon profits

- *Limited stove subsidies (avoiding disturbance of existing market structures)*
- *Setting up micro finance schemes*
- *Technical and business training*
- *Grants for setting up production facilities*
- *Quality control and standards*
- *Awareness raising*
- *Marketing campaigns*
- *Warranty and after-sales services*
- *Consumer incentives to take part in monitoring procedures*

contribute to reducing existing barriers for stove dissemination and where local stakeholders can still receive a share of the profits. For example, indirect financial subsidies could be provided by introducing innovative finance mechanisms, for stove purchasers. Other crucial activities that can be financed through carbon funding include: technical and business training for stove producers and distributors, grants for setting up and/or enlarging of production facilities, developing and ensuring quality standards, technical and socioeconomic monitoring, awareness raising and marketing campaigns, warranty and after-sales services, and incentives for customers to support the monitoring process (e.g. discounts for handing over their old stoves).

4.4 Costs and revenues of improved cooking stove projects

Improved cooking stove projects can be a very profitable field of investment when stove sales and related CO_2 savings are high enough and can be guaranteed over a continuous period of time. An important factor for the profitability of stove projects are the costs involved in project development and stove dissemination. To obtain an idea of the individual cost items of an improved cook stove CDM project, GIZ-HERA compiled a cost and revenue calculation sheet (see Annex V). This sheet is intended as a starting point for project developers. The structure might be used for a single project activity or as a starting point for a whole PoA with various CPAs.

Some cost items are more or less fixed, as they represent fixed CDM-related fees or consultancy costs (registration, validation, verification etc.). Others, such as monitoring costs or the development of a baseline, depend on project type, size, location etc. (see Table 4). To increase investment flows in LDCs, CDM-related fee reductions or exemptions are in place for project activities taking place in LDCs. Regarding the Gold Standard, a new “Share of Proceeds” model was implemented in 2009, with no costs arising for project application or fixed fees during the project cycle. Project costs are charged as a percentage of ER generated upon issuance.

Project Cost and Fees under CDM and GS

Table 3

Project Cycle	Description	Estimated Costs
Planning a Project and Preparing the PDD	Project participants employ a consultant for PDD writing, communication DNA, EB, etc.	Consultant 30-40 person-days, plus travel costs
DNA Approval	The written approval of the host country must include confirmation that the project activity assists in achieving sustainable development	Depends on DNA regulation
Validation	Validation by the DOE is the independent evaluation of a project activity against the requirement of the standard on the basis of the PDD. It is carried out by a Designated Operational Entity (DOE), a third party certified by the UNFCCC.	€ 20,000 – 45,000
Registration (No registration fee to be paid for proposed project activities hosted in LDCs)	The registration by the standard (e.g. CDM EB) is the formal acceptance of the validated project as a project activity. The registration fee is an advance payment of the share of proceeds, calculated from the yearly average of CER over the project duration. Maximum: € 350,000/year.	CDM single project[36]: < 15,000 tCO_2/year = no fee = 15,000 tCO_2/year = $0.10/CER > 15,000 tCO_2/year = $0.20/CER
Monitoring	Project participants collect all relevant data necessary for calculating emission reductions by the project activity.	€ 10,000 – 20,000/monitoring interval (excluding equipment)
Verification and Certification	Verification is a periodic independent review and *ex post* determination of the monitored emission reductions and results in certification of the emission reductions. It is carried out by a second DOE that is different from the one that validated the project.	€ 15,000 – 45,000/verification interval
Issuance of CERs	Certified emission reductions equal to the verified amount (minus the share of proceeds and adaptation fee, if applicable) will be issued. Depending on national regulation, other fees may accrue.	CDM EB: 2% of the CERs issued must be paid as adaptation fee. LDCs are exempted. Gold Standard: 1.5% of CERs or 2% of VERs[37]

[36] The registration fee for a PoA is based on the total amount of expected ER by the CPA(s) being submitted together with the request for registration of the PoA. The fee structure follows the existing rules for single project activities. No fees have to be paid for ER by CPAs which are added subsequently to validation: http://www.cdmrulebook.org/480 (URL as of December 2010)

[37] http://www.cdmgoldstandard.org/How-we-are-funded.67.0.html (URL as of Dec 2010)

Regarding potential revenues of a carbon project, the amount of achievable ERs as well as market prices are crucial. Depending on the methodology chosen, the efficiencies of the stoves in use, the fraction of NRB and the size of the project, ERs can vary greatly. Annex IV shows an example of the ER calculation for an imaginary PoA under AMS-II.G V.02, where improved fuel wood stoves are disseminated over a period of 21 years, with 25,000 units sold each year (stove lifetime 3 years). In this example, over 500,000 CERs are being generated.

Besides the amount of ERs generated, market prices for the generated credits are crucial for revenue generation. Depending on the type of CER, different market prices can be achieved for CERs, ranging (as of December 2010) from € 7 (high quality post-2012 vintages) to nearly € 12 (BlueNext spot prices). Credits from projects which have already been registered reach prices between € 10 and € 11.50.

Current market prices for GS VERs and CERs range between € 6 and € 12 (December 2010).

Gold Standard VERs from cooking stove project activities usually achieve prices which are significantly above market prices for VERs in general. However, the entire market for VERs has been suffering from the worldwide recession and the slow economic recovery. Gold Standard VERs are bid at € 6 and offered at € 8 for 2009/10 vintages. For forwards the price is up to € 2 lower.[38]

[38] As of November 2010: Carbon Positive: VER market flat, with forestry bright spots, 13 October 2010, URL as of December 2010: http://www.carbonpositive.net/viewarticle.aspx?articleID=2143

5. Frequently Asked Questions

How can improved cooking stoves generate carbon credits?

Improved wood-fuel cooking stoves save biomass by improving overall combustion efficiency. In case biomass from sustainably managed forests is used, CO_2 that is released due to the combustion of woody biomass is absorbed during the process of plant regrowth. However, increasing penetration of forest stocks in developing countries has led to a growing portion of non-renewable forestlands, meaning that the harvested wood stock is not replaced in an equivalent proportion. If the biomass combusted in cooking stoves originates from non-renewable stocks, CO_2 emissions cannot be absorbed by plant regrowth and hence remain in the atmosphere where they contribute to global warming. Improved cooking stoves can reduce emissions by reducing the amount of non-renewable biomass used for cooking.
Apart from CO_2 emissions due to non-renewable biomass, the improved combustion process of improved stoves generally leads to a decline in non- CO_2 emissions such as CH_4 and N_2O which have a much higher global warming potential than CO_2. Even in situations where the fraction of non-renewable biomass is low, the warming potential of non-CO_2 emissions cannot be compensated for by the equivalent CO_2 absorption. However, non-CO_2 emissions can so far only be accounted for when using the Gold Standard methodology.

How do I calculate emission reductions?

The project's emission reductions are calculated by subtracting all relevant project and leakage emissions from the baseline scenario. The baseline is the scenario that would exist if no project took place, i.e. "business as usual". Leakage emissions are those occurring due to an increase in non-renewable biomass consumption outside the project area as a result of the project intervention.

What is the timeframe of a project on the carbon market?

Project developers for carbon market activities can choose between a crediting period of either ten years or three seven-year periods. If a single ten-year crediting period is chosen, the project timeframe cannot be extended; a seven-year project can be extended twice for a total of 21 years.

Emission reductions from which stoves can be claimed in the current Carbon Markets?

For the methodologies presented in this guide, only stoves burning woody biomass or charcoal as their primary fuel are applicable. The assumption is that new stoves reduce the amount of non-renewable wood fuel used for combustion. However, other stove types, such as biogas or improved fossil fuel stoves are also eligible, applying different methodologies under the CDM or the GS. A range of various stoves can be used in project activities which aim to use methodologies for fuel switches from fossil fuels or non-renewable biomass to renewable energy sources in thermal applications (e.g. biogas stoves, solar cookers) and methodologies that increase end-user energy efficiencies of fossil fuel based stove technologies on household level.

Can stoves using agricultural residues and dung also generate emission reduction certificates with AMS II.G or the GS methodology?

No. Neither of the two methodologies presented can be applied to stoves that burn only dung and/or agricultural residues. AMS II.G Version 2 explicitly refers to woody biomass only, thus excluding fuels such as dung and agricultural residues. If dung or agricultural residues are part of the fuel mix, they must be deducted from the fuel savings that are taken into account for emission reductions.

Can a carbon market stove activity disseminate more than one type and size of stove within the project boundary and count all of them? Is it possible to introduce a new stove type in subsequent crediting periods?

Yes. Under the Gold Standard methodology it is possible to define stove usage clusters according to cooking habits and stove type and size. Each cluster must be monitored separately. Due to regular monitoring of stove efficiencies under the Gold Standard methodology as well as under the CDM methodology, new stoves can be introduced after a project has started. However, the more stove and fuel types are pooled into one activity, the more complex monitoring procedures become. Under a PoA, different stove types and sizes can be disseminated in the context of each CPA as long as the technologies applied meet the general conditions set forth in the PoA-DD.

How to deal with traditional stoves that might remain in use additionally to the improved stove?

A maximum amount of biomass savings and therefore emission reductions would only be achieved if the efficient system is being used exclusively. In order to guarantee that the improved stoves are not used in addition to the traditional ones certain project measures could be implemented. For example, a refund for traditional stoves could work as an incentive for customers to return their old stoves and at the same time facilitate the purchase of the new stoveIf it is likely that traditional stoves will remain in use in addition to the improved one, this can be dealt with by thoroughly monitoring biomass consumption of the traditional stove(s) and deducting it from the baseline biomass consumption.

Does every stove have to be numbered? How elaborate does the labelling system have to be?

Yes, every stove should have a number so that it can be clearly identified. The details of the labelling system are up to the project operator, but the more elaborate the labelling system, the easier the monitoring procedure becomes.

Is it permissible to disseminate non-certified stoves within the project boundary even if they are not counted for the carbon market activities?

Parallel (carbon market and non-carbon market) stove activities of one operator in the same project region are difficult to justify in regard to additionality of the carbon market activity. In the case where more than one stove type is used in the project area (and hence disseminated as part of the project activity) the Gold Standard methodology allows for defining various clusters of use. Therefore, different stove types can be integrated into one carbon market project activity. Furthermore, if non-certified stoves are disseminated within the boundary of the carbon market project, the baseline scenario for the carbon market activities is evolving and cannot be assessed as a fixed reference prior to project activities. In consequence, the baseline would have to be monitored parallel to project activities.

How often do stove efficiencies have to be checked? Is a visual inspection sufficient?

Monitoring under the CDM methodology requires an annual check of a sample of new, used and broken stoves and their efficiencies. A visual inspection is not sufficient because biomass savings, and hence, emission reductions and corresponding certificates are calculated on the basis of stove efficiencies. Therefore these values must be reliable. In an official request for clarification the EB confirmed in April 2010 that project developers are free to decide on whether to use the Water Boiling or Controlled Cooking Test. Monitoring under the Gold Standard methodology requires a bi-annual efficiency test only, but here the tests are defined as “Kitchen Tests” suggesting that laboratory tests like the Water Boiling Test are not applicable.

Is it necessary to involve an approved institution to affirm stove tests?
No. The stove performance must be proven through e tests such as a Water Boiling Test or Controlled Cooking Test. Cooperating with an institution for efficiency tests is not mandatory, but can be helpful for monitoring, labelling and setting standards.

Does the carbon market stove project operator must know exactly – i.e. down to its GPS coordinates – where each purchased stove is situated? How can the project deal with mobile stove dealers or nomadic or moving customers?
The monitoring requirements necessitate a customer database which includes – if possible – the stove purchaser's address and telephone number. If no clear physical addresses exist or the customer is moving throughout the lifetime of his or her stove, the telephone number will enable the project operator to keep in contact with the customer for monitoring purposes.

What happens if a stove user moves outside the project boundary during the lifetime of his stove?
In principle, this beneficiary cannot be counted under the carbon market activities after his moving outside of the project boundary. The leakage assessment can account for these cases.

What happens if another carbon market stove activity starts disseminating stoves within "my" project boundary?
To justify stove activities in a project region where other carbon market players are already active is difficult in terms of additionality. If the activities are intended to be conducted under the CDM, the country's DNA should mention the existing carbon market stove activity and advise the second player to start its project in a different region. However, some DNAs might not keep track of all projects approved to date. If the scenario occurs, each project's monitoring will have to account for the development of the baseline scenario. Households that are already participating in a similar carbon market activity are not eligible for a second time.

Can additional financial resources of third parties be integrated into the project set-up?
The justification of the project's additionality becomes increasingly difficult as more donors become involved. Pre-financing of transaction costs through carbon brokers or CER/VER buyers is possible. However, the project operator should be careful. Institutions that offer financial support for the initial planning phase may request their share of carbon revenues during subsequent phases.

Can project operators claim higher emission reductions than those estimated in the preliminary project calculations? Can the DOE adjust emission reductions upwards?
Yes. The DOE can not only adjust projected emission reductions downwards during verification, but also adjust projected emission reductions upwards. However, continuous over-performance might raise questions as to whether the project was really additional.

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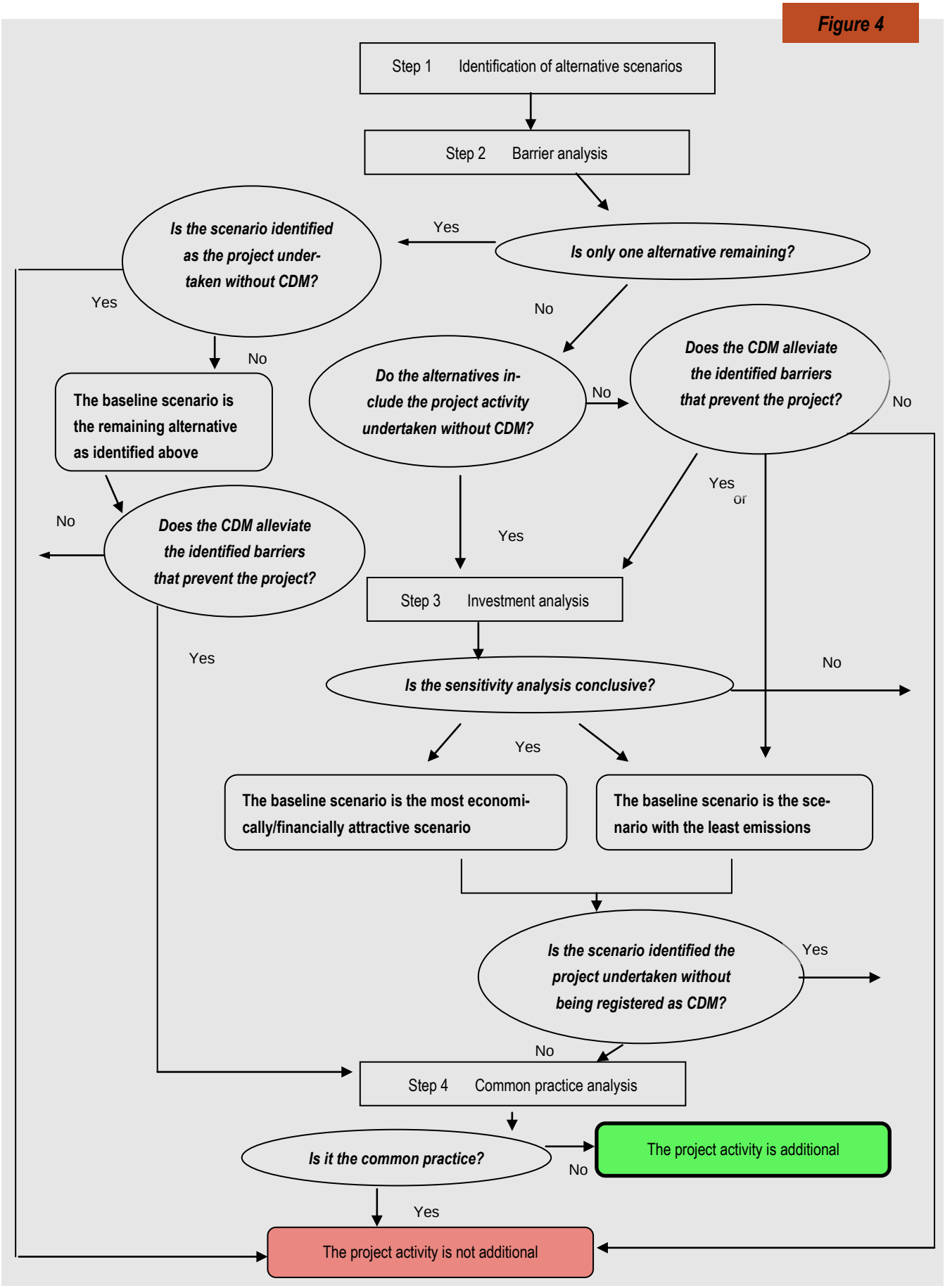
Annexes

Annex I - Additionality Assessment for CDM projects

Additionality Assessment according to the CDM EB

Figure 4



Source: UNFCCC (2006): p. 3

Step 1 *Identification of alternatives consistent with current laws and regulations:* In the first step the project operator lists all possible alternative activities that would lead to similar outcomes for the project participants in terms of scope, quality and area of application. This also includes the proposed project activity without being credited by the CDM. If the project activity comprises different technologies, services etc., alternatives must be defined for each of them individually, as well as, if possible, in a combination resembling the project activity. As with the project activity itself, the listed alternatives must be consistent with national legal regulations. If it can be shown that throughout the country the specific law that is not coherent with one of the alternative activities is not adhered to, then exceptions can be made. If it becomes clear in step 1 that the proposed project activity is the only alternative to the business as usual that adheres to national laws, then the project activity cannot be defined as additional.

Step 2 *Barrier analysis:* In the second step the project operator must define barriers that may prevent the alternative scenarios defined under Step 1 from occurring. Barriers must be described in terms of investment (lack of investment rather than investment risks as analysed in step 3), technology (lack of skilled labour, malfunctioning appliances, unavailability of proposed technology) and the prevailing practice (proposed activity is so far unknown in the region). In order to define the proposed carbon market activity as additional, it must be proven how registration under the CDM will overcome barriers that would otherwise prevent the project activity from taking place.

Box 23

Barriers that have proven to be consistent for additionality of stove projects:

- High upfront and initial costs
- Non-availability of the efficient stove because of lack of skilled producers
- Lack of confidence in /awareness of the new technology on the part of the beneficiaries
- Cultural and socio-historical barriers

Step 3 *Investment analysis:* This step serves to define the financially and economically most attractive alternative scenario (remaining on the list after step 2) on the basis of financial indicators, which is then considered the baseline scenario. The financial indicators for each of the remaining alternative scenarios are to be ranked and presented in the project's PDD. A sensitivity analysis tests how robust the financial indicators are to external changes. Depending on the results of the sensitivity analysis, either the alternative with the least emissions or the one that is most financially viable is taken as baseline scenario. Unless the chosen scenario is the proposed CDM project activity (in that case it would not be additional), the assessment proceeds with step 4.

Step 4 *Common practice test:* The last step guarantees that no activities are registered for the carbon market that are (in a similar way) already part of the project region's status quo. The proposed project activity can be considered additional under the CDM if no similar activity is observed in the region or if substantial distinctions between the proposed activity and similar ones are shown.

The described preliminary assessments and examinations should now merge into the Project Idea Note, which is to be presented to the Designated National Authority (DNA) in the host country for initial approval. If the DNA signals at that point that national regulations conflict with the proposed project activity, it can be adjusted at this early stage. Now the project operator must start assessing the proposed activity's sustainability issues and environmental impacts. Planning to create a Local Stakeholder Consultation should commence.

Annex II – Safeguarding Principles Developed by UNDP

Safeguarding Principles Developed by UNDP

Human Rights

The project respects internationally proclaimed human rights including dignity, cultural property and uniqueness of indigenous people. The project is not complicit in human rights abuses.

The project does not involve and is not complicit in involuntary resettlement.

The project does not involve and is not complicit in the alteration, damage or removal of any critical cultural heritage.

Labour Standards

The project respects employees' freedom of association and their right to collective bargaining and is not complicit in restrictions of these freedoms and rights.

The project does not involve and is not complicit in any form of forced or compulsory labour.

The project does not employ and is not complicit in any form of child labour.

The project does not involve and is not complicit in any form of discrimination based on gender, race, religion, sexual orientation or any other basis.

The project provides workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments.

Environmental Protection

The project takes a precautionary approach in regard to environmental challenges and is not involved in practices contrary to the precautionary principle. This principle can be defined as: "When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically."

The project does not involve and is not complicit in significant conversion or degradation of critical natural habitats, including those that are (a) legally protected, (b) officially proposed for protection, (c) identified by authoritative sources for their high conservation value or (d) recognised as protected by traditional local communities

Anti-Corruption

The project does not involve and is not complicit in corruption.

Cultural heritage

The project does not involve the alteration, damage or removal of any critical cultural heritage

Source: UNDP (2006): p. 1

Annex III – ER calculation for a fictive PoA-CPA under AMS-II.G (Version 2)

Basic Parameters			
Please fill in green cells!			
			unit
Starting year of project operation	2010	?	date
Expected project duration	21	?	years
Biomass-fuel type	fire-wood	?	
Estimated stove lifetime	3	?	years
Projected fossil fuel	LPG	?	
Quantity of biomass used per baseline appliance and day	2,5	?	kg/d
Stove Testing Method	WBT	?	
Efficiency old stove derived from a WBT	15	?	%
Efficiency new stove derived from a WBT	35	?	%
fNRB	70	?	%
Quantity of Biomass used per baseline appliance and year	0,91		t/a
Net Calorific Value Biomass	15,00		MJ/kg
Emission Factor projected Fossil Fuel	63		t Co2/TJ
Biomass savings per stove and year	0,52		t/a
Emission reductions per stove and year	0,34		**t Co2/a**

CDM-Small-Scale Limit for project scenario (max. energy savings 180.000 MWh/a)			
Net Calorific Value Biomass	4,17		MWh/t
Baseline Energy Generation per appliance	3,80		MWh/a
Energy-Savings (1-ηold/ηnew) in %	57		%
Energy Generation per appliance (new)	2,47		MWh/a
Energy Savings per appliance (new) and year	1,33		MWh/a
Small-Scale-Limit in No. Of stoves in Use per year	135.264		**stoves**
Small-Scale-Limit in emission reductions per year	46.656		**t CO2/a**

Summary Emission Reductions			
Average Emission Reductions per year	24.638		**t CO2/a**
Total after 10 years	232.824		**t CO2**
Total full project duration	517.388		**t CO2**

stove sales schedule	
Please fill in stove sales!	
year	stove sales
2010	25.000
2011	25.000
2012	25.000
2013	25.000
2014	25.000
2015	25.000
2016	25.000
2017	25.000
2018	25.000
2019	25.000
2020	25.000
2021	25.000
2022	25.000
2023	25.000
2024	25.000
2025	25.000
2026	25.000
2027	25.000
2028	25.000
2029	25.000
2030	25.000
total	525.000

stove usage schedule	
year	stoves in use
2010	25.000
2011	50.000
2012	75.000
2013	75.000
2014	75.000
2015	75.000
2016	75.000
2017	75.000
2018	75.000
2019	75.000
2020	75.000
2021	75.000
2022	75.000
2023	75.000
2024	75.000
2025	75.000
2026	75.000
2027	75.000
2028	75.000
2029	75.000
2030	75.000
2031	50.000
2032	25.000

estimation of ERs		
year	ERs in t CO2	accumulated
2010	8.623	8.623
2011	17.246	25.869
2012	25.869	51.739
2013	25.869	77.608
2014	25.869	103.478
2015	25.869	129.347
2016	25.869	155.216
2017	25.869	181.086
2018	25.869	206.955
2019	25.869	232.824
2020	25.869	258.694
2021	25.869	284.563
2022	25.869	310.433
2023	25.869	336.302
2024	25.869	362.171
2025	25.869	388.041
2026	25.869	413.910
2027	25.869	439.779
2028	25.869	465.649
2029	25.869	491.518
2030	25.869	517.388
total	517.388	

Source: GIZ-HERA Emission Reduction Calculation Tool (1.3) for AMS-II.G (Version 2) (2010)

Annex IV – Exemplary PoA Cost Calculation Structure

Cost Calculation Sheet									
Costs	**Responsibility**	**Pre Validation**	**Pre Registration**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year ...**	**TOTAL**
PoA level									
Implementation and operation of CME	NGO/Consultant								
Baseline Study	Consultant								
NRB Calculation	Consultant								
Stove Tests	NGO/Institute								
PDD	consultant								
CDM/PoA Trainings for Participants	Consultant								
Stakeholder Consultation	NGO/Consultant								
Contract Development	Legal Expert								
Acquisition of Partners	NGO								
Validation (DOE)	DOE								
Development of Training Material	NGO/Consultant								
Development of Marketing Material	NGO/Consultant								
Development of Monitoring Tool	Consultant								
Stove Testing Equipment	for NGO/Institute								
Development of a labelling System	for trainings								
Quality Guidelines	NGO								
Service Contracts:									
Monitoring Services (NGO/Institute)	NGO/Institute								
Management Services CPA Implementer	NGO/private comp.								
Fund Advisory Services	Carbon Developer								
Verification (DOE)	DOE								
Total Cost PoA level									
CPA level		**CPA 1**		**CPA 2**	**CPA 3**	**CPA 4**	**...**		
Acquisition of Partners	CPA Implementer								
Training Producers	CPA Impl/CME								
Training Sellers	CPA Impl./CME								
Contracting	CPA Impl/CME								
Baseline Study	Consultant/CME								
CPA-DD	Consultant/CME								
Investment Outlays for Production Facilities			**CPA 1**	**CPA 2**	**CPA 3**	**CPA 4**	**...**		
euqioment	(for machines)								
Construction materials	(for kiln)								
Labelling Equipments	1/producer								
Operation Cost Per CPA				**CPA 1**	**CPA 1-2**	**CPA 1-3**	**CPA 1-4**		
Administration	CPA Implementer								
Monitoring (User visits)	NGO								
Quality Control (with labelling system)	NGO								
Marketing	CPA Impl/CME								
Support	CME								
Refunds for Old Stoves	CME								
After Sales Services	CPA Impl./Sellers								
TOTAL Costs CPA Level									
TOTAL (PoA + CPA)									
Revenues - Generation of CERs									
CPA 1									
CPA 2									
CPA 3									
CPA 4									
...									
TOTAL no of CERs generated									
x estimated CER price									
Gross sales									
Net yield									
Accumulated									

Source: Own Illustration 2010

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