

GOLD STANDARD MONITORING REPORT
Version 3, 07/12/2016

Fuel efficient stoves for Ethiopia Programme of Activities CPA 001
UNFCCC Ref. Nr. 10045-0001, GS Ref. 2722

Monitoring Period: 15/11/2014-14/11/2015 (both days included)

For CDM monitoring please refer to the CDM Monitoring Report. The CPA consists in the distribution of a combination of two improved cookstoves (ICS) to particularly rural households: Slim type of Mirt stoves for *injera* baking (further only referred to as "Mirt stove") and Tikikil rocket stoves for other cooking tasks.

Total emission reductions achieved in this monitoring period: 24,458 tCO₂
of which:

2014 vintage: 3,149 t of CO₂
2015 vintage: 21,309 t of CO₂

The Monitoring of Sustainable Development Indicators was conducted in accordance with the GS CPA passport (CPA-PP). According to requirements of the Gold Standard, the project activity must be assessed against a matrix of sustainable development indicators. Indicators that were not scored neutral must be monitored.

Date of Survey: 26/11/2015 – 03/12/2015

Interviewer: 1) Kindye Getu
2) Tagel Worku
3) Mulualem Alemu
4) Adino Ambelu
5) Koyachew Muluye
6) Yismaw Wyletaw

Interviewed persons: 30 stove user

End user Name	stove type		stove ID
	Mirt	Tkikil	
Negat Walle	√	√	AEA0116
Yenegese Alene	√	√	AEA0439
adane worku	√	√	AEBB034
Ebabu Gedamu	√	√	AEBD422
Neber Bzuye	√	√	AEBD651
Alemu Ngat	√	√	AEBG102
Adgo Mtku	√	√	AEBG263
Simir Abeje	√	√	AEBG 279
Fetanewe lewetu	√	√	AEBH117
Wubie azeze	√	√	AEBH206
Chalachew Tizazu	√	√	AEBK633
nega bitew	√	√	AEBZ176
Feseha Chane	√	√	AED0086
Woreku Gedamu	√	√	AED0615
Abebe Amare	√	√	AED0755
Teshome Meresha	√	√	AED0925
Mulugeta Neguse	√	√	AED1097

tamerat kasa	√	√	AEBK188
Moges lakew	√	√	AED1262
Maru Ashagere	√	√	AEJ0161
Debere Gobe	√	√	AEJ0588
Adebabaye Zewde	√	√	AEM0124
Semengeaw Fekadu	√	√	AEM0588
kendu melese	√	√	AEM0771
Anechenalu Meberat	√	√	AEZ0203
Kasaw Tebeje	√	√	AEZ0403
P\Semenge Adunga	√	√	AEZ0921
Shebeshe aemare	√	√	AEZ1207
Alebachew Tefera	√	√	AEZ3366

The SD Matrix as in the passport is as follows:

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Preliminary score
Gold Standard indicators of sustainable development	If relevant, copy mitigation measure from 'Do No Harm' assessment, and include mitigation measure used to neutralise a score of '-'	Check www.undp.org/mdg and www.mdgmonitor.org Describe how your indicator is related to local MDG goals	Defined by Coordinating and Managing Entity	<u>Negative impact:</u> score '-' <u>No change impact:</u> score '0' <u>Positive impact:</u> score '+'
Air quality	n.a	Ensure environmental sustainability	Parameter: Number of ICSs in use. Question to ICS users during monitoring if indoor air quality has improved. Explanation: The reduction of cooking smoke due to the usage of ICS will have a positive impact on the indoor air quality, since less harmful smoke and CO is produced while cooking.	+
Water quality and quantity	n.a	Ensure environmental sustainability	Parameter: (Decreased) Fuel wood consumption influencing water household of the soil and runoff. Explanation: No direct impact on water quality and quantity, thus the connection to the project activity is hard to determine.	0

Soil condition	n.a	Ensure environmental sustainability	Parameter: Soil erosion caused by deforestation. Parameter will not be monitored because scoring is zero. Explanation: No direct impact on soil condition thus the connection to the project activity is hard to determine.	0
Other pollutants	n.a	Ensure environmental sustainability	Parameter: Use of harmful chemicals, level of noise, light pollution. Parameter will not be monitored because scoring is zero. Explanation: No other pollutants issues will be involved in this project. The project does not involve any harmful chemicals. No light pollution during sleeping hours or high levels of noise are expected.	0
Biodiversity	n.a	Ensure environmental sustainability	Parameter: Number of affected and/or threatened plants or animals. Parameter will not be monitored because scoring is zero. Explanation: No direct impact on biodiversity, thus the connection to the project activity is hard to determine.	0
Quality of employment	n.a	Eradicate extreme poverty and hunger	Parameter: Trainings for stove producers. Explanation: Qualified jobs will be created for stove producers, they will receive trainings and supervision on stove production and possible safety measures during stove production.	+
Livelihood of the poor	n.a	Eradicate extreme poverty and hunger	Parameter: Money spent for fuel wood purchase or time spent to collect fuelwood. Parameter will not be monitored because scoring is zero.	0

			Explanation: The ICS will improve the livelihood of the poor because they will spend less time and money for firewood collection. Also people inside their houses will suffer less from smoke. But since these parameters are better attributable to other indicators the indicator is set neutral.	
Access to affordable and clean energy services	n.a	Ensure environmental sustainability	Parameter: Number of ICSs distributed Explanation: Access to efficient technology at a highly reduced price.	+
Human and institutional capacity	n.a	Promote gender equality	Parameter: Asset of free time for women for child care or income generation. Parameter will not be monitored because scoring is zero. Explanation: Reduction in time needed for fuelwood collection thus freeing up time for childcare or income-generating activities. Reducing or eliminating the need to gather wood empowers women. The time savings for fuelwood collection will be monitored for parameter "Quantitative employment and income generation". However, how time savings will affect childcare and women empowerment is difficult to quantify, therefore this parameter is scored zero.	0
Quantitative employment and income generation	n.a	Eradicate extreme poverty and Hunger	Parameter: Number of jobs created by the project activity. Qualitative question in the monitoring questionnaires on the savings for fuel wood for stove users (time and/or money). Explanation: The project will generate various employment opportunities for local stove producers.	+
Access to investment	n.a	Eradicate extreme poverty and hunger	Parameter: Amount of domestic and foreign direct investment	0

			Parameter will not be monitored because scoring is zero. Explanation: The fuel wood comes from local supply so the reduction of its use will have no effect on balance of payments and investment.	
Technology transfer and technological self-reliance	n.a	Eradicate extreme poverty and Hunger	Parameter: Development of a new technology. Parameter will not be monitored because scoring is zero. Explanation: A new technology introduced to the households and thus made available for the people. But uptake outside the project area difficult to determine.	0
Justification choices, data source and provision of references (A justification paragraph and reference source is required for each indicator, regardless of score)				
Air quality	Air quality will be improved since ICS burn wood more efficiently with less smoke generation. Unimproved stoves emit large amounts of smoke that is inhaled by cooks. Smoke is harmful and may cause health problems such as: coughing, eye irritation, asthma, headaches, lung problems, etc. The World Health Organization estimates that 4.3 million people a year die prematurely from illness attributable to the household air pollution caused by the inefficient use of solid fuels (2012 data)¹. The improved cook stoves emit fewer pollutants. The Mirt and the Tikikil Stove both have the advantage of low emissions. From the Memo Report provided by GIZ it can be seen that mirt has a potential to significantly reduce pollutant levels in the kitchen compared to three stone/open fire- around 90% and 30% respectively for CO and PM were recorded. ² Firewood savings are due to more efficient burning. Evidence of direct relationship between improved cook stoves and emissions of air pollutants include: R. Perez Padilla et al, 2010. 'Respiratory health effects of indoor air pollution' in International Journal of Tuberculosis and Lung Disease, vol. 14 no. 9, pp1079-1086. The text says that one half of the world's population is exposed to high concentrations of solid fuel smoke (biomass and coal) that are produced by inefficient open fires, mainly in the rural areas of developing countries. WHO, 2002. World Health Report: Reducing Risks, Promoting Healthy Life. World Health Organisation, Geneva. According to the report, studies have shown reasonably consistent and strong relationships between the indoor use of solid fuel and a number of diseases. These analyses estimate that indoor smoke from solid fuels causes about 35.7% of lower respiratory infections, 22.0% of chronic obstructive pulmonary disease and 1.5% of trachea, bronchus and lung cancer. Indoor air pollution may also be associated with tuberculosis, cataracts and asthma. Further the report states that: The most important interventions to reduce this impact are better ventilation, more efficient vented stoves, and cleaner fuels.			

¹ <http://www.who.int/mediacentre/factsheets/fs292/en/#>

² GTZ SUN ENERGY (2011)_Memo, Result of stove testing:
https://energypedia.info/wiki/File:Memo,_Result_of_stove_testing,_Hiwote_Teshome,_Internal_report,_GTZ-SUN_Energy,_06.06.2007.pdf

	Cited in Eduardo Garcia-Frapolli et al, 2010. 'Beyond Fuelwood Savings: Valuing the economic benefits of introducing improved biomass cookstoves in the Purechepe region of Mexico' in Ecological Economics, vol. 69, pp2298-2605. The study recognizes that efficient cookstoves have been distributed in order to combat very significant health as well as climate change impacts from the use of biomass for cooking. Further it analyses the economic benefits of the use of ICS and reveals they stem from fuelwood savings and reductions in health impacts. Technical measurements of indoor air pollution are costly and sophisticated. Since evidence shows direct links between use of improved cook stoves and reduction in exposure to harmful smoke and particulate matter, this project will monitor this indicator based on wood consumed by households and also by asking households if they perceive an improvement of indoor air.
Water quality and quantity	There might be a slight indirect positive impact due to the prevention of soil erosion which typically leads to increased sedimentation when eroded soil material is washed into rivers (see e.g. www.un.org/esa/sustdev/csd/csd15/lc/GTZ_hem.pdf and Iowa State University 2009, Recourse Conservation Practices: Soils Erosion and Water Quality.³ However there is no direct impact on quality and quantity of water. There is no kind of release of pollutants into any kind of water linked to the implementation of the project. Therefore a neutral score was chosen.
Soil condition	By reducing fuelwood consumption and the pressure on the forest resources, the project can contribute to the preservation of the forest cover and hence protect against soil erosion (see e.g. www.un.org/esa/sustdev/csd/csd15/lc/GTZ_hem.pdf). But since this positive effect is only an indirect consequence of the project, a neutral scoring was chosen.
Other pollutants	There is no evidence to suggest that this type of projects relates to any other pollutants like increased noise level, noise frequency or light pollution.
Biodiversity	By reducing fuelwood consumption and the pressure on the forest resources, the project may contribute to the preservation of the forest cover and hence biodiversity (see e.g. www.un.org/esa/sustdev/csd/csd15/lc/GTZ_hem.pdf). But since this positive effect is only an indirect consequence of the project, a neutral scoring was chosen.
Quality of employment	Cook stove producers working for the project will receive trainings on stove construction, including safety measures. Additionally a handbook for cookstove construction will be provided. A list and agenda of the trainings will be provided during monitoring. Without the project, no safety training will be provided for the stove producers. The provision of first aid kits and training on how to act in cases of injuries will increase safety and wellbeing at work and thus increase quality of employment.
Livelihood of the poor	The project will improve livelihoods by fuelwood savings and time savings, as well as by the creation of new jobs in stove production. The Mirt and Tikikil stove save about 50% of the fuel compared to a three-stone stove. This is due to the closed burning chambers and the resulting higher efficiency of energy use for cooking. Due to the firewood savings, households need to collect less firewood and thus save time that, can be used for other activities. Evidence can be found on: http://www2.gtz.de/dokumente/bib-2010/gtz2010-0202en-stove-carbon-market.pdf, page 4. World Bank, 2011. 'Household Cookstoves, Environment, Health, and Climate Change: a New Look at an Old Problem' available at http://cleancookstoves.org/resources_files/household-cookstoves.pdf

	Both parameters are monitored under different indicators (access to affordable and clean energy services and quantity of employment and income generation). However, since the livelihood of the poor also strongly depends on factors such as education, access to health and sanitary services etc., which cannot be influenced by the project, the indicator is scored neutral.
Access to affordable and clean energy services	The project is designed to provide cleaner, safer, more affordable and more efficient cooking equipment than traditional stoves to poor household by means of carbon finance. The savings of non-renewable biomass due to the project will be also be measured as part of the monitoring of ER.
Human and institutional capacity	The use of ICS might have a slightly positive impact on gender equality by reducing time spent cooking and the time spent to collect wood (both task made mainly by women). http://www.appropedia.org/Improved_cook_stoves However, the project does not anticipate contributing to human and institutional capacity in such a way that it can be easily attributed to the project. Gender equality, education and empowerment are not directly addressed by the project activity. Since any such impact is difficult to demonstrate, a neutral score is given.
Quantitative employment and income generation	The project will lead to increased economic and employment opportunities. Jobs will be created particularly for stove producers, i.e. mainly stove construction workers and possibly also jobs in the management of new manufacturers. The number of jobs created will be monitored. Furthermore we will qualitatively monitor the income generation of stove uses through savings for fuel wood for stove users (time and/or money). Stakeholders discussed this parameter during the LSC together with the parameter of income generation of the stove producers and decided to monitor those parameters together under the “quantitative employment and income generation” indicator. For them it seemed the surplus of income which remains for the household due to lower fuelwood expenses is equivalent to income generation. Therefore the parameters are listed here together.
Access to investment	There will be no significant effect on the balance of payments since only fuel wood is replaced and no imported fuels. Firewood is the common fuel in rural Ethiopia (Environmental Protection Authority (2003): State of the Environment Ethiopia. Addis Ababa: Environmental Protection Authority, Annex 4).
Technology transfer and technological self-reliance	The project disseminates a new technology on a larger scale in selected areas. The technology was developed in Ethiopia, therefore the dissemination of stoves to households is not considered as technology transfer. It is not yet possible to assess a possible uptake of the technology outside the project area – therefore a neutral score is given.

ID 01: Air quality

Table as in the passport:

No	1	
Indicator	Air quality	
Mitigation measure	N/A	
Chosen parameter	Number of Improved cook stoves in use Results from question to ICS users during monitoring, if indoor air quality has improved.	
Current situation of parameter	11,084 pairs of ICSs distributed (11,084 Mirt and 11,084 Tikikil). Out of these 11,084 Mirt and 10,714 Tikikil stoves are in use. 100% of users with operational stoves confirm better air quality.	
Estimation of baseline situation of parameter	No dissemination of ICSs. No reduction of harming indoor air pollution.	
Future target for parameter	The objective of the CPA 001 is to distribute 18,000 pairs of fuel efficient cooking stoves to particularly rural households or institutions in Ethiopia.	
Way of monitoring	How	Sales records (Database) Sample survey will include question on improvement of air quality.
	When	Sales are recorded continuously. Reporting about ICS in use and sample survey with questionnaires was performed annually. Records will be maintained until the end of the crediting period.
	By who	Dedicated monitoring teams appointed and trained by the Project Proponent

Monitoring Results:

Air quality was hence monitored by

- 1.) Number of ICS in use, indicating the number of households benefiting from improved air quality.
- 2.) Results from interviewing a sample group of households (during CDM sample survey), to take into account the perception of improvements in air quality by households

Parameter 1.)

The number of ICS in use and hence the number of households benefitting from improved air quality can be seen from the table below.

Table 1: Number of ICS in use

Mirt stoves delivered to households in this CPA	11,084
Tikikil stoves delivered to households in this CPA	11,084
Mirt stoves operational (%)	100%
Tikikil stoves operational (%)	96,67%
Mirt stoves operational (number)	11,084
Tikikil stoves operational (number)	10,714
Households benefitting from improved air quality	11,084

Parameter 2.)

During the sample survey, the following question was asked to ICS users:

"Do you perceive better air quality with the new stoves?" All households who used the ICS are of the opinion that the ICS improves the air quality as can be seen from the table below.

Table 2: Perceived better air quality

Question	Yes	% of respondents	No	% of respondents	No Answer	Total
Do you perceive better air quality with the new stoves?	30	100	0	0	0	30

Evidence (submitted to DOE):

- ER_calculation_CPA1_WFP_Ethiopia_14.07.2016

ID 02: Quality of employment

Table as in the passport:

Table as in the passport.		
No		2
Indicator		Quality of employment
Mitigation measure		N/A
Repeat for each parameter		
Chosen parameter		Trainings for stove producers on stove production and possible safety measures during stove production.
Current situation of parameter		9 trainings
Estimation of baseline situation of parameter		Under the baseline situation there is no market for improved cook stoves. Therefore no special trainings for stove producers will take place.
Future target for parameter		Trainings for stove producers depend on the implementation schedule and are to be decided on a case by case basis, thus future target of parameter is unknown.
Way of monitoring	How	Number of internal and external trainings, description of training.
	When	Annual. Records will be maintained until the end of the crediting period.
	By who	Project proponent

Monitoring Results:

Quality of employment was monitored by recording the number of internal and external trainings including a description of training.

The table below lists the trainings and agenda of the trainings carried out so far.

Table 3: Number of internal and external trainings, description of training.

Training	Date	Nr of Participants	Short Agenda
On job training for liner producers (potters)	25.07.2014	59	• How to speed up liner mass production • How to maintain quality liner product • Timing of burning for quality liner product • Management of production process • Safety and security issues during and on the work places and the possible protection mechanisms
Quality control training	21.07.2014 - 22.07.2014	12	• Quality assurance of a product-GIZ guideline • Design procedure of Mirt stoves • Develop the Production Technologies and Techniques to Increase Productivity and Rate of Stove Production • Estimating production capacity (production /day) of Mirt stoves • Plan Production Capacity • Calculating production cost • Identify and Assign Values to Steps in Production • Production speed • The role of GIZ in Disseminating Tikikil and Mirt stoves(on WFP intervention Area) • How can the supply chain be efficiently made? • How can we integrate each other for mass and quality production of stoves?
Refreshment training for stove producers and energy experts	19.12.2013	18	• Design and manufacturing procedure of HRS/Tikikil stove • Estimating production capacity (production /day) of Tikikil manufacturers.

			• Calculating production cost • Quality assurance of a product-our guideline • The role of WFP in Disseminating Tikikil stove • How can the supply chain (liner-metal cladding to make final product) be efficiently made? • How can we integrate each other for mass production of Tikikil stove in response to WFP's demand? • Safety and protection
Mirt stove producer training in Ebinat	30.06.2014 11.07.2014 20.09.2014	99	• How to produce Mirt stove and for how many days drying of water
Mirt stove producer training in East Belessa	20.06.2014 25.06.2014 28.06.2014	60	• Production of Mirt cookstoves

Evidence (submitted to DOE):

- GS Reporting Form_ID02_Quality of employment

ID 03: Access to affordable and clean energy services

Table as in the passport:

Table as in the passport.		
No		3
Indicator		Access to affordable and clean energy services
Mitigation measure		N/A
Repeat for each parameter		
Chosen parameter		Number of Improved cook stoves in use.
Current situation of parameter		11,084 pairs of ICSs distributed. (11,084 Mirt and 11,084 Tikikil) 11,084 Mirt and 10,714 Tikikil stoves are in use.
Estimation of baseline situation of parameter		No dissemination of ICSs.
Future target for parameter		The objective of the CPA 001 is to distribute 18,000 pairs of fuel efficient cooking stoves to particularly rural households in Ethiopia.
Way of monitoring	How	Sales records (Database)
	When	Sales are recorded continuously. Reporting about ICS in use and sample survey with questionnaires was performed annually. Records will be maintained until the end of the crediting period.
	By who	Project proponent

Monitoring Results:

To monitor this indicator, the parameter: Number of Improved cook stoves in use was chosen. The parameter was monitored continuously through the sales database. The use of the ICS was determined during the sample survey

Table 4: Number of ICS in use

Mirt stoves delivered to households in this CPA*	11,084
Tikikil stoves delivered to households in this CPA*	11,084
Mirt stoves operational (%)	100%
Tikikil stoves operational (%)	96,67%
Mirt stoves operational (number)	11,084
Tikikil stoves operational (number)	10,714

That means 11,084 Mirt stoves and 10,714 Tikikil stoves are in use. The project gave access to affordable and clean energy services in form of 21,798 improved cook stoves.

Evidence (submitted to DOE):

- ER_calculation_CPA1_WFP_Ethiopia_14.07.2016

ID 04: Quantitative employment and income generation

Table as in the passport:

No	4
Indicator	Quantitative employment and income generation
Mitigation measure	N/A
<i>Repeat for each parameter</i>	
Chosen parameter	Number of jobs created by the project activity Qualitative question in the monitoring questionnaire on the savings (time and/or money) of stove users due to reduced amount of fuel wood needed for cooking.
Current situation of parameter	382 jobs have been created so far.

		11,084 households confirm that they need less time and/or less money due to reduced amount of fuel wood needed for cooking (100% of users with operational stoves)
Estimation of baseline situation of parameter		Without implementation of the new stoves through this programme, there will not be additional jobs for stove producers. No increased income generation for households, since they will continue to use the traditional stoves and a lot of fire wood.
Future target for parameter		Since the CPA 001 aims to distribute 18,000 pairs of locally fabricated ICS all over Ethiopia, there will be jobs created in the stove producing sector. The number of stove producers depend on the implementation schedule and the production capacity of each stove producer. Therefore the future target of parameter is unknown. Since the ICS save fuelwood through higher efficiency, the ICS are expected to save about 2.34 tons of firewood per year per-household (see PoA DD part II section B2). It is thus expected that time needed for fuelwood collection/money spent for purchase of fuelwood will decrease.
Way of monitoring	How	There will be a reporting form to be used by the CME which will record the stove producers working for the PoA, the number of staff and staff positions. Since CPAs are divided by numbers of stoves, not by geographic borders, a clear assignment of staff to the CPAs is not possible. Sample survey will include qualitative question on the savings (time and/or money) due to reduced need of fuel wood for stove users.
	When	Annual or biennial. Records will be maintained until the end of the crediting period.
	By who	Dedicated monitoring teams appointed and trained by the Project Proponent

Monitoring Result:

The indicator “Quantitative employment and income generation” was monitored by

- 1) number of jobs created by the project activity
- 2) qualitative question in the monitoring questionnaire on the savings (time and/or money) of stove users due to reduced amount of fuel wood needed for cooking.

Parameter 1)

In total 382 Jobs were created in stove construction. 169 jobs for Tikikil production and 213 for Mirt stove production.

Parameter 2)

All users answered, that they do profit either from money or time savings, or both. The majority of users did only collect fuel wood and thus benefitted only from time savings. Only one user reported that they only purchase fuel wood and thus only reported money savings.

Table 5: Number of ICS users benefitting from time and/or money savings

Number of stove users profiting from time or money savings	100%
Number of stove users profiting only from time savings	96.7%
Number of stove users profiting only from money savings	3.3%
Number of stove users profiting both from time and money savings	16.6%

Evidence (submitted to DOE):

- GS Reporting Form ID 04_Quantitative employment and income generation
- ER_calculation_CPA1_WFP_Ethiopia_14.07.2016

Mitigation Measure for Safeguarding principle No. 8		
Safeguarding principle		The project provides workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments
Mitigation measure		Mitigation measures will include working safety equipment for stove producers (e.g. gloves, first aid kits) and safety instructions. Furthermore stove producers will receive training on stove production and possible safety measures during stove production (see ID 02).
Way of monitoring	How	During the monitoring survey (annual or biennial), the designated monitoring teams checks if mitigation measures are in place at the stove producers.
	When	Annual or biennial. Records will be maintained until the end of the crediting period.
	By who	Project Proponent

Mitigation Measure for Safeguarding principle No. 8:

Safety measures were taken from the beginning of the programme of activity. The measures were monitored by

Parameter1)

The compliance with safety measures was monitored at the stove producers' workshops. The pictures below were taken during the monitoring survey between 24.11.2015 and 30.11.2015. Safety measures were installed as shown e.g. by the pictures of first aid kits, which are available for the workers in the workshops (Picture 1-2) and by other safety measures like the provision of fire extinguishers and working gloves in the workshops (3-4).



Picture 1-2: First aid kits and gloves in stove producers' workshops



Picture 3-4: Availability of fire extinguisher and working gloves in stove producers' workshops

Parameter 2)

Furthermore the trainings for stove producers monitored for Indicator ID 02: Quality of employment included training on safety measures during stove production (see training agenda in section ID02).

Evidence (submitted to DOE):

- GS Reporting Form_ID02_Quality of employment