THE GOLD STANDARD:
Project Design Document for Gold Standard Voluntary Offset projects

(GS-VER-PDD)

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ADES Solar and efficient stoves in Madagascar

VOLUNTARY OFFSET PROJECTS

PROJECT DESIGN DOCUMENT FORM (GS-VER-PDD)
Version 01 - in effect as of: January 2006)

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SECTION A. General description of project activity

A.1 Title of the project activity

Title: ADES Solar and efficient stoves in Madagascar (GS 464)
Version: 7.0 (2nd crediting period)
Date: 27.06.2014

A.2. Description of the project activity

Purpose of the project activity
The project is the construction and dissemination of solar and efficient cook stoves to households and commercial and institutional users in Madagascar. Improved cooking technologies can substantially reduce wood fuel and charcoal consumption thereby reducing GHG emissions from unsustainably harvest wood. In order to convince people in Madagascar of this new way of cooking, training programs, cooking demonstrations, and awareness creation activities (e.g. in schools) are conducted. The project is implemented by the Swiss-Madagascan NGO "ADES – Association pour le Développement de l'Energie Solaire" (http://www.adesolaire.org).

For centuries the population of Madagascar traditionally has been cooking their food on open fires consuming vast quantities of wood and charcoal contributing to deforestation in Madagascar, causing health problems from smoke emissions and consuming a considerable proportion of a household's time and financial budget. However Madagascar has ideal conditions for the use of solar energy, especially in the South and Southwest with around 330 sunny days per year, Thus, local production and dissemination of solar cook stoves is a solution to reduce fuel consumption and associated environmental and socio-economic impact in Madagascar. Solar stoves do not need any other source of energy than solar radiation and therefore are smoke-free and emission-free. Since solar stoves cannot be used at certain times, for example at night, ADES has also developed efficient cook stove models that can perfectly complement the use of solar stoves. Efficient stoves still burn firewood or charcoal, but have a cleaner and more efficient combustion thereby reducing fuel consumption by 45%-60%[1]. The combined application of solar and efficient stoves is the ideal solution for cooking in Madagascar.
The interest in solar cooking is huge, but it contrast to efficient cook stoves, the user of a solar stove has to accustom to a new way of cooking. It requires a lot of work to convince people to change their cooking habits and apply this new way of cooking like a daily routine. Therefore, awareness creation activities are essential to guarantee longterm adoption of the project stoves.

The application of solar and efficient cook stoves not only reduces fuel consumption, it also shows positive impact at the socio-economic and environmental levels: it reduces smoke emissions during cooking and thus improves health especially of women and children; it reduces the burden of collecting firewood and reduces financial expenditures for fuelwood and charcoal; and it contributes to reduce deforestation in Madagascar, which has again a positive impact on water cycle, soil condition and biodiversity.

The project stoves are locally produced and need to be subsidized to make them affordable to the population in Madagascar. Revenues from carbon credits are essential to cover these subsidies and enable expansion of the project activity.

Achievements in the first crediting period (2008-2014):
Since the start of the first crediting period in 2008 ADES has continuously increased its capacities and today operates 7 cook-stove production and distribution centres, produces 10 different models of efficient or solar cook

[1] See KT Reports and Customer Database from the first crediting period.

stoves for domestic, institutional and commercial clients, directly employs over 130 persons and has produced and sold over 40,000 improved cook stoves. By the end of the first crediting period the project will have reduced over 370,000 tCO_{2e} emissions. Further, over the course of the years ADES has visited several hundred schools thereby providing awareness creation for solar and efficient cooking to over 40,000 pupils and teachers.

Plans for the second crediting period:
The project aims at further expanding its activities in the second crediting period. It is planned to produce and sell around 200'000 solar and efficient stoves in the years 2015 – 2021.

Sustainable development matrix
The impact of the project is assessed using the Gold Standard's sustainable development matrix. It shows that the project has no negative impact. The measurable positive impact is attributed to the indicators air quality, livelihood of the poor, access to affordable and clean energy, human and institutional capacity, and qualitative employment and quantitative employment and income generation.

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 project developer	Negative impact: score '-' in case negative impact is not fully mitigated, score '0' in case impact is planned to be fully mitigated No change in impact: score '0' Positive impact: score '+'
Air quality	n.a.	MDG 5: Improve maternal health: MDG 4: Reduce child mortality: Application of solar and efficient stoves results in reduction of fuel consumption and leads to cleaner burning of fuels, which improves air quality during cooking. Emissions of airborne particles for combustion are a major cause for many deseases. WHO attributes 4.3 million deaths to household air pollution in 2012.[2]	Improvement of air quality: Number of positive comments from stove users on air quality improvement with project stove. This indicator will be monitored through monitoring surveys.	+

[2] http://www.who.int/phe/health_topics/outdoorair/databases/HAP_BoD_results_March2014.pdf?ua=1, Accessed 11 April 2014

Water quality and quantity	n.a.	MDG 7: Ensure environmental sustainability: Reducing the demand for wood fuel and charcoal decreases deforestation. This has positive effects on the water cycle (availability and quality): An intact vegetation cover preserves water resources in the ground and prevents soil erosion, which would lead to silting of water courses and bodies.[3]	Direct positive impact of the project activity on this indicator is difficult to attribute and measure. Therefor, this indicator is scored neutral.	0
Soil condition	n.a.	MDG 7: Ensure environmental sustainability: By the reduction of deforestation soil erosion and leaching is prevented.[4]	Direct positive impact of the project activity on this indicator is difficult to attribute and measure. Therefor, this indicator is scored neutral.	0
Other pollutants	n.a.	No other relevant pollutants are emitted by the project activity.	The project does not involve other pollutants	0
Biodiversity	n.a.	MDG 7: Ensure environmental sustainability: Lowering the demand of wood and charcoal for cooking reduces deforestation and helps to protect the highly valuable and biodiverse forests and vegetation in Madagascar.	Direct positive impact of the project activity on this indicator is difficult to attribute and measure. Therefor, this indicator is scored neutral.	0
Quality of employment	n.a.	MDG 1: Eradicate extreme poverty and hunger: ADES offers different positions to local employees at very good conditions: non-limited (permanent) contracts; cover of school fees for all children; and cover of health insurance for entire family.	Number of jobs offered to local employes at exceptional conditions: Non-limited (permanent) contracts; cover of school fees for all children; and cover of health insurance for entire family.	+

[3] http://rainforests.mongabay.com/0902.htm

[4] Thorkil Casse, Anders Milhøj , Socrate Ranaivoson , Jean Romuald Randriamanarivo. 2004. Causes of deforestation in southwestern Madagascar: what do we know? Forest Policy and Economics 6, 33–48. doi:10.1016/S1389-9341(02)00084-9

Livelihood of the poor	n.a.	MDG 1: Eradicate extreme poverty and hunger: Expenses for fuel purchase (charcoal/wood) and time needed for collecting firewood are both reduced by the project. This relieves households in terms of time and money available. Especially children and women benefit from reduced fuel acquisition.[5]	Time and monetary savings due to reduced fuel consumption: Time (hours) and money (Ariary) saved per household per year due to fuel savings achieved by project stoves.	+
Access to affordable and clean energy services	n.a.	MDG 7: Ensure environmental sustainability: The project provides access to solar and efficient cook stoves at affordable prices to users in Madagascar.	Number of persons that benefit from efficient and clean cooking technologies: This figure is calculated by multiplying the number of total project stoves (under consideration of usage rates) with average household size.	+
Human and institutional capacity	n.a.	MDG 3: Promote gender equality and empower women: The project includes awareness creation and eduction for solar and efficient cooking solutions through cooking demonstrations and school visits mostly focusing on women and children. The school visits contribute to awareness creation for solar energy and efficient cooking technologies targeting the next generation and thus contributing to the further social development in Madagascar.	Number of school visits conducted and number of people reached by awareness creation: Number of school visits and number of participants are recorded by ADES.	+
Quantitative employment and income generation	n.a.	MDG 1: Eradicate extreme poverty and hunger ADES has continuously increased the number of employees during the	Number of jobs offered by ADES to local employees: According to ADES employment records.	+

[5] http://www.cleancookstoves.org/resources/fact-sheets/igniting-change.pdf, page 12, accessed 05/05/2014

		last years and provides a range of different permanent job positions to local employees.		
Balance of payments and investment	n.a.	The project does not involve this indicator.	n.a.	0
Technology transfer and technological self-reliance	n.a.	MDG 3: Promote gender equality and empower women: The project stoves can be locally produced, assembled, repaired and distributed by trained local ADES staff. This builds up knowledge and capacity for new cooking technologies in Madagascar.	Promotion of knowhow about solar and efficient cooking technologies is already covered with the indicator "Human and instituioinal capacity" and "Quantitative employment and income generation". Therefore, this indicator is kept neutral.	0

A.3. Project participants:

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Madagascar (Host)	Private Entity - ADES – Association pour le Développement de l'Energie Solaire	No
Switzerland (Annex 1)	Private Entity - Foundation myclimate - the Climate Protection Partnership	No

A.4. Technical description of the project activity:

Baseline stoves

Baseline stoves in households:

Baseline Wood stove	**Baseline Charcoal stove**
Energy efficiency 10%[6] [7] [8]	Energy efficiency 10%[8]

Households in rural areas commonly cook on open 3-stone fires, whereas in urban areas households cook on a simple charcoal stove.

Baseline stove models of commercial and institutional users:

	
Baseline wood stove "Toko"	**Baseline charcoal stove**
Energy efficiency 10%	Energy efficiency 10%

Commercial and institutional users such as street kitchens or schools, when using firewood commonly cook on a "Toko" stove which is a type of a "3-stone fire", but with an iron frame instead of stones. When using charcoal they cook on conventional charcoal stove comparable to the one used in households.

Project stoves

Solar stove models:

		
Solar box stove	**Solar parabol stove**	**Large solar box stove**
Energy output: 0.2 kW	Energy output: 0.6 kW[9] [10]	Energy output: 0.6 kW[11]

[6] Carbones nouveaux de la région Sud-Ouest de Madagascar. Dr. Daniel Kotonirina RAMAMPIHERIKA

[7] UNDP, Kingdom of Morocco, GEF: "Clean Energy for Development and Economic Growth: Biomass and Other Renewable Energy Options to Meet Energy and Development Needs in Poor Nations Growth", http://www.undp.org/content/undp/en/home/librarypage/environment-energy/sustainable_energy/clean_energy_fordevelopmentandeconomicgrowth.html [accessed 05/05/2014]

[8] Baseline Guidelines, Global Alliance for clean cookstoves, Accessed 13/05/2014, http://carbonfinanceforcookstoves.org/implementation/certification-process/baseline-guidelines/

[9] FAO: "Wood Fuel Surveys", Annex III - (a) Measuring cooking fuel economy, 1. Introduction http://www.fao.org/docrep/q1085e/q1085e0b.htm#1.%20introduction

[10] GTZ: Moving Ahead with Solar Cookers - Acceptance and Introduction to the Market". Eschborn (1999): http://www2.gtz.de/dokumente/bib/00-0160.pdf, Accessed 05/05/2014

[11] Estimated based on size/volume compared to solar box for households.

Solar box stove:
The box type solar stove is an easily built, insulated box. Due to incident solar radiation temperatures up to 150° C can be generated in the box which is sufficient to cook almost all meals: rice, manioc, mais, potatoes, vegetables, meat and fish. Also, bread and cakes can be baked and medical tools or water can be sterilised. The box solar stove is produced in the ADES workshops in Madagascar. The solar box stove has a lifetime of around 7 years. ADES gives warranty for 5 years and provides free repair service during the warranty period.
In addition to the solar box stove for domestic application ADES developed a larger solar box to be used in school kitchens. The design principles are the same, but the stove is larger in size so that also the large pots No. 60 used in school kitchens can be used.

Parabolic solar stove:
The parabolic solar stove is using a parabolic mirror. In the focus point of the mirror there is a device where the cooking pot can be put. The parabolic mirror gathers the sun rays and this process leads to high temperatures at the focal point. These temperatures are high enough to cook, bake, grill and even fry. The cooker can also be used to sterilize medical tools. The parabolic mirror is made of weatherproof shining aluminium and the base frame is made of zinc coated steel (galvanised). The material for the mirror of parabolic solar cooker comes from Europe. The mirror parts and the frame of the stove are fabricated in Madagascar. ADES then assembles the parabolic solar stove in its workshops. The temperatures in the focus point of a parabolic-solar cooker are higher than the temperatures in the interior of the solar cooking box, which leads to a faster cooking process. The parabolic-solar cooker and the solar cooker box can be used in a complimentary manner. The parabolic solar stove has a lifetime of around 7 years. ADES gives warranty for 5 years and provides free repair service during the warranty period.

Efficient wood stove models:

		
OLI-b	**OLI-45b**	**OLI-60b**
Energy output: 1.5 kW[12]	Energy output: 3.7 kW[13]	Energy output: 12.1 kW[13]
Weight: 10 kg Height: 27.5 cm External diameter: 25 cm Circumference: 80 cm	Weight: 16 kg Height: 28 cm External diameter: 33.5 cm Circumference: 94 cm	Weight: 35 kg Height: 45 cm External diameter: 38.5 cm Circumference: 123 cm

[12] GTZ Mass dissemination of Rocket Lorena stoves in Uganda
http://www.betuco.be/stoves/Rocket%20Lorena%20stoves%20uganda.pdf, Accessed 05/05/2014

[13] Maximum energy output was estimated based on results from water boiling tests conducted with OLI-45b and OLI-60b stoves.

Efficient charcoal stove models:

		
OLI-c	**OLI-45c**	**OLI-60c**
Energy output: 1.5 kW[13]	Energy output: 3.7 kW[13]	Energy output: 12.1 kW[13]
Weight: 10 kg Height: 27.5 cm External diameter: 25 cm Circumference: 80 cm	Weight: 14.82kg Height: 28 cm External diameter: 33.5 cm Circumference: 94 cm	Weight: ca. 35 kg Height: 45 cm External diameter: 38.5 cm Circumference: 123 cm

Efficient wood-fired / charcoal-fired stove:
The efficient wood or charcoal fired rocket stove is a simple steel construction with a clay core inside as combustion chamber and for insulation This improves the energy efficiency of the cooking process and results in fuel savings of by 46-68% compared to the traditional cooking on the open fire or on the baseline stove. The stoves are locally produced by ADES. In 2007 ADES first introduced the efficient rocket stove called “Yoyo” of which only a small number was produced and sold until 2008. In 2010 ADES introduced new improved models for the efficient wood and charcoal stove called “OLI-b” for wood users and “OLI-c” for charcoal users. ADES produces the stoves locally at a private workshop and sells them preferably to be used in combination with the solar stoves. The efficient stoves have a lifetime of around 5 years. ADES gives warranty for 3 years and provides free repair service during the warranty period.
In order to motivate stove users of the efficient stove to surrender the old baseline stove, the project offers a price reduction of 20% for the efficient stove if the households hand in the old baseline stove in exchange for it. The collected baseline stoves will be destroyed and the materials recycled if ever possible.
Upon request from its customers ADES developed also larger models of the efficient wood and charcoal stove for domestic application in larger households and for commercial/institutional application in street kitchens and schools. These new models are identical to the existing efficient stove models OLI-b and OLI-c but larger in size (see picture below). The OLI-45b and OLI-45c stoves were especially designed to satisfy the requirements of the customers using the big cooking pots No. 45, such as larger households (with 8 or more persons) or street kitchens in rural and urban areas. Street kitchens are present in every quarter and are usually run families or households. The OLI-60b stove is specifically designed for the large cooking pot No. 60 (or larger) used e.g. in school kitchens. ADES also developed the pendant for charcoal users, the so-called OLI-60c.

For comparison of stove sizes: all three models of efficient wood stoves (starting from left): OLI-b, OLI-45b, OLI-60b. The same sizes apply to the different efficient charcoal stoves.

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

Republic of Madagascar

A.4.1.2. Region/State/Province etc.:

Entire country of Madagascar

The project area is the entire country of Madagascar

A.4.1.3. City/Town/Community etc:

The project covers the entire country of Madagascar. The current stove production and distribution centers are located in:
- Tuléar
- Ejeda
- Morondava
- Morombe
- Majunga
- Fianarantsoa
- Antananarivo

Additional production and distribution centers will be opened in other parts of Madagascar.

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

The geographical locations of the production and distribution centres are:

- Toliara: 23°21'S 43°40'E
- Ejeda: 24°21'S 44°31'E
- Morondava: 20°17'5"S, 44°19'3"E
- Morombe: 21°44'55.57''S, 43°21'47.12''E
- Majunga: 15°42'55.09"S, 46°19'8.42"E
- Fianarantsoa: 21°27'12.07''S, 47°05'08.42''E
- Antananarivo: 18°55'18.01''S, 47°31'05.58''E

A.4.2. Size of the project:

In accordance with the latest Gold Standard rules, this project is classified as a large-scale project. The project surpasses the threshold of energy savings of 180GWh$_{th}$ per year and thus classifies as a large-scale project. By the end of the year 2015 (the first year of the second crediting period) it is expected that 10,790 wood users, 45,350 charcoal users, 1732 solar+efficient wood stove users and 5,843 solar+efficient charcoal users have project stoves in operation that together lead to approximate total energy savings of 352 GWh$_{th}$. This clearly shows that the project has surpassed the threshold. Please note that stoves sold in the first crediting period may also be in operation in the second crediting period. For reference see excel file with ER forecast calculations.

The following stove sales are expected:

Stove Sales per Stove Type for 2015-2021

Year	Solar stoves	Efficient wood stoves	Efficient charcoal stoves	Total
2015	1900	3300	14800	20000
2016	2100	3300	14800	20200
2017	2100	3300	14800	20200
2018	2100	5400	27400	34900
2019	2100	5400	27400	34900
2020	2100	5400	27400	34900
2021	2100	5400	27400	34900
TOTAL	**14500**	**31500**	**154000**	**200000**

Comment: Solar stoves include box and parabolic; efficient wood stoves include Oli-b, Olli-45b, and Oli-60b; efficient charcoal stoves include Oli-c, Oli-45c, and Oli-60c.

Stove Sales per Scenarios for 2015-2021

Year	WOOD	CHARCOAL	Solar+Efficient Wood	Solar+Efficient Charcoal	Total
2015	3400	14200	600	1800	20000
2016	3434	14342	606	1818	20200
2017	3434	14342	606	1818	20200
2018	5933	24779	1047	3141	34900
2019	5933	24779	1047	3141	34900
2020	5933	24779	1047	3141	34900
2021	5933	24779	1047	3141	34900
TOTAL	**34000**	**142000**	**6000**	**18000**	**200000**

Comment: Stove sales forecast is estimated based on share of stoves pertaining to the different scenarios in the total sales record from the year 2013.

A.4.3. Category(ies) of project activity:

This project belongs to the category "End-use Energy Efficiency Improvement". In accordance with the thresholds and the project is specified as large-scale project (see Section A.4.2).

A.4.4. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed project activity, including why the emission reductions would not occur in the absence of the proposed project activity, taking into account national and/or sectoral policies and circumstances:

Without this project activity the thermal energy need for cooking applications in Madagascar would be filled by the use of wood-fuel or charcoal, most of which is non-renewable biomass from primary forests.
To calculate emission reduction of the whole project different customer groups have to be built, depending on the fuel they currently use and on the type of new stove they purchase. Since solar cookers do not emit any GHGs, the reduction for these buyers is equal to the emissions generated by the combustion of unsustainable biomass in absence of the project. For the group using efficient stoves the emission reductions are calculated from the reduced amount of unsustainable biomass needed through the new technology.

The project meets all basic requirements for Voluntary Gold Standard projects to be judged as additional;

- The emission reductions of the project are measurable by appliance of the “Gold Standard Methodology for Improved Cook-stoves and Kitchen Regimes V.01”, approved by the GS TAC
- The project entails an introduction of technological innovation in the host country by the dissemination of solar and efficient stoves not used before. The technology is transferred from its original center in Tuléar to new regions of Madagascar
- The project as described here has not been previously publicly announced to be implemented without carbon credit funding.

- The additionality can be clearly proved by the UNFCCC's "Tool for the demonstration and assessment of additionality", version 5 as is used in B.3.
- No ODA funds are used for purchasing VER credits. All VERs are bought by myclimate, a private actor funded by mainly private and small public (but non-ODA) funds. Myclimate's annual report shows that no ODA governmental agency is a client of myclimate..

A.4.4.1. Estimated amount of emission reductions over the crediting period:

The estimation of emission reductions for the years 2015 – 2021 is done based on latest measured fuel consumption and savings from the KPT 2014. ER per stove is multiplied with the planned number of stoves to be sold in a given year. This figure considers the savings of the different stove types as well as the continuous sale of stoves throughout a year. Further, an annual drop-off rate of 10% is considered in the ER forecast. For reference see excel file with ER forecast calculation. See table below.

Years	**Annual estimation of emission reductions in tonnes of CO_2 e**
2015	150'473
2016	182'550
2017	211'632
2018	256'576
2019	312'704
2020	363'220
2021	408'683
Total emission reductions (tonnes of CO_2 e)	**1'885'839**
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	**269'406**

SECTION B. Application of a baseline methodology

B.1. Title and reference of the approved baseline methodology applied to the project activity:

Gold Standard Methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption - 11/04/2011".
http://www.cdmgoldstandard.org/wp-content/uploads/2011/10/GS_110411_TPDDTEC_Methodology.pdf

B.1.1. Justification of the choice of the methodology and why it is applicable to the project activity:

The project is the production and dissemination of solar and energy efficient stoves to displace inefficient traditional cooking devices. By reducing the consumption of unsustainably harvested fuel wood and charcoal in households we are displacing decentralized thermal energy consumption and GHG emissions are reduced. Therefore the project qualifies as an End-use, non-industrial Energy Efficiency Improvement project that displaces decentralized thermal energy consumption and satisfy the requirement of the methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption - 11/04/2011".

More specific, the following conditions apply:

- *1. The project boundary can be clearly identified, and the technologies counted in the project are not included in another voluntary market or CDM project activity (i.e. no double counting takes place).* The project boundary includes the place of the kitchens where the project stoves are applied and the place of fuel collection, production, and transport in Madagascar. Households with project stoves are not part of another carbon reduction project. The project shall list other improved stove projects in the project area to establish if any of the stoves are also included in another project, and if so excluded from the project counting (see in section D.2.1. monitoring parameter "Similar new cook stove project activity in the project area").
- *2. The technologies each have continuous useful energy outputs of less than 150kW per unit (defined as total energy delivered usefully from start to end of operation of a unit divided by time of operation).* The useful energy output of the solar and efficient stoves is between 0.2 kW to 12.1 kW: The solar box stove has an energy output of 0.2 kW, the parabolic solar stove of 0.6 kW and the efficient rocket stove OLI-b and OLI-c of 1.5 kW. The larger models of efficient rocket stoves have a maximum energy output of 3.7 kW (OLI-45b and OLI-45c) and of 12.1 kW (OLI-60b and OLI-60c). This is far away less than 150KW thermal power output threshold for technologies under this methodology.
- *3. The use of the baseline technology as a backup or auxiliary technology in parallel with the improved technology introduced by the project activity is permitted as long as a mechanism is put into place to encourage the removal of the old technology (e.g discounted price for the improved technology) and the definitive discontinuity of its use.* Since solar stoves cannot be used at certain times, it is clear that household still have the traditional cook stove in place for occasional use. For households using an efficient stove continuous use of the traditional stove will be monitored through Monitoring Surveys. ADES has defined an incentive mechanism for efficient charcoal stove users: they receive a 20% discount in case they hand it their traditional charcoal stove. The discount mechanism is not applicable to firewood users using 3-stone fires in the baseline. Therefor, for firewood users ADES will compile a leaflet with instructions and information to encourage the use of efficient stoves and discourage the use of the 3-stone fires. It should be noted that as stated in the methodology page 4, footnote 5, "The removal and continued non-use of three stone fires and other easily constructed traditional devices is in many cases unlikely and impractical to monitor."
- *4. The project proponent must clearly communicate to all project participants the entity that is claiming ownership rights of and selling the emission reductions resulting from the project activity. This must be*

communicated to the technology producers and the retailers of the improved technology or the renewable fuel in use in the project situation by contract or clear written assertions in the transaction paperwork. ADES has communicated to all project participants and has the written assertion from all project participants that guarantee the transfer of ownership of emission reduction from the end user to ADES.

- *5. Project activities making use of a new biomass feedstock in the project situation (e.g. shift from non-renewable to green charcoal, plant oil or renewable biomass briquettes) must comply with relevant Gold Standard specific requirements for biomass related project activities, as defined in the latest version of the Gold Standard rule.* This project is not introducing any new biomass feedstock. The fuel type in the baseline is the same as the fuel type in the project scenario for efficient stoves. For solar stoves the baseline fuel is replaced by solar heat.

B.2. Description of how the methodology is applied in the context of the project activity:

Section II of the applied methodology, Technologies and Practices to Displace Decentralized Thermal Energy Consumption - 11/04/2011, outlines the Baseline Methodology including the following steps:

1. Project Boundary
See section B.4 of the PDD.

2. Selection of baseline scenarios and project scenarios

Baseline Scenarios:
A baseline scenario is defined by the typical baseline fuel consumption patterns in a population that is targeted for adaoption of the project technology. The PP may identify multiple baseline scenarios that are applicable in relation to the different project technologies in the project activity.
In project activities targeting non-industrial applications, the baseline is considered by default **fixed** in time during the considered crediting period. Since it is assumed that the conditions are unchanging during the crediting period, a fixed baseline is established as recommended in the methodology (page 6), for project activities targeting non-industrial applications.

Project Scenarios:
A project scenario is defined by the fuel consumption of end users within a target population that adopt a project technology. Emission reductions are credited by comparing fuel consumption in a project scenario to the applicable baseline scenario. The project proponent may identify multiple project scenarios given the different types of project technologies included in a project activity.

Additional Baseline and Project Scenarios
Additional baseline and project scenarios can still be added to a project activity at any time during the project crediting period upon approval of a request for design changes, as per Gold Standard rules.

3. Additionality
See section B.3 of the PDD.

4. and 5. Baseline Studies and Project Studies
As per applied methodology, the project proponent is required to carry out the following studies:
For the baseline:

- Baseline non-renewability of biomass assessment
- Baseline survey (BS) of target population

- Baseline performance field tests (BFT) of fuel consumption

For the project:

- Project non-renewability of biomass assessment
- Project survey (PS) of target population
- Project performance field tests (PFT) of fuel consumption

Since the methodology is applied to a project applying for the 2nd crediting period, there is a longterm track record of kitchen surveys and kitchen test results, which provide a broad database for the definitions of scenarios.

A. Baseline and Project non-renewable biomass (NRB) assessment

The CDM default value for NRB fraction for Madagascar is applied: **fNRB = 72%**

Source: http://cdm.unfccc.int/DNA/fNRB/index.html
This value was accepted by the DNA on 23 July 2012 and it is the latest available official value for fNRB.

B. Baseline and Project Surveys (BS and PS)

The baseline survey provides critical information on target population characteristics, baseline technology use, fuel consumption, leakage, and sustainable development indicators.

Survey Representativeness
The baseline survey requires in person interviews with a robust sample of end users without project technologies that are representative of end users targeted in the project activity.

Survey Sample Sizing
The baseline survey should be carried out for each baseline scenario using representative and random sampling, following these guidelines for minimum sample size:

- Group size <300: Minimum sample size 30 or population size, whichever is smaller
- Group size 300 to 1000: Minimum sample size 10% of group size
- Group size > 1000 Minimum sample size 100

Data Collected
The data collected was specific to the characteristics of the baseline scenario, and gathered information about each of the following:

1. User follow up
    a. Address or location
2. End user characteristics
    a. Number of people served by baseline and project technology
    b. Typical baseline technology usage patterns and tasks (commercial, institutional, domestic, etc.)
3. Baseline technology and fuels
    a. Types of baseline technologies used and estimated frequency
    b. Types of fuels used and estimated quantities
    c. Seasonal variations in technology and fuel use

d. Sources of fuels; (purchased or hand-collected, etc) and prices paid or effort made (e.g. walking distances, persons collecting, opportunity cost)

BS/PS conducted in 2014 as well as kitchen surveys and kitchen tests conducted during the first crediting period have revealed and confirmed the following baseline and project scenarios:

Baseline scenarios:
Four baseline scenarios have been defined for households using traditional cook stoves in Madagascar.

1. Baseline scenario: Wood
This scenario includes households using fuel wood on a traditional wood burning stove (3-stone fire or Toko stove, see A.4).

2. Baseline scenario: Charcoal
This scenario includes households using charcoal on a traditional charcoal stove (see A.4).

3. Baseline scenario: Solar+efficient wood stove
This scenario includes households using fuel wood on a traditional wood burning stove (3-stone fire or Toko stove, see A.4).

4. Baseline scenario: Solar+efficient charcoal stove
This scenario includes households using charcoal on a traditional charcoal stove (see A.4).

Further baseline scenarios for commercial or institutional users have not yet been defined. This will be done once a sufficient number of appliances have been sold to do representative surveys and tests.

Project scenarios:
Four project scenarios have been defined for households using solar and/or efficient cook stoves in Madagascar.

1. Project scenario: Wood
This scenario includes households that use fuel wood for cooking and apply any type of solar stove or any type of efficient wood stove.

2. Project scenario: Charcoal
This scenario includes households that use charcoal for cooking and apply any type of solar stove or any type of efficient charcoal stove.

3. Project scenario: Solar+efficient wood stove
This scenario includes households that use fuel wood for cooking and apply a combination of solar stove and efficient wood stove. This includes any type of solar and any type of efficient wood stoves.

4. Project scenario: Solar+efficient charcoal stove
This scenario includes households that use charcoal for cooking and apply a combination of solar stove and efficient charcoal stove. This includes any type of solar and any type of efficient charcoal stoves.

Further project scenarios for commercial or institutional users have not yet been defined. This will be done once a sufficient number of applicances have been sold to do representative surveys and tests.

In 2014 combined baseline and project surveys for all scenario have been conducted (see BS/PS Report 2014). The following conclusions and recommendations were formulated:

- The existing two baseline scenarios and four project scenarios could be confirmed by the survey results. However, there might be a slight difference between scenario with one stove type and the corresponding scenario with combined application. Therefore it is recommended to conduct paired KPT for all four scenarios and decided based on the KPT results if additional baseline scenarios have to be defined.
- The survey results clearly show fuel savings in all four scenarios (between 42%-56%). Fuel savings are also visible through time and money savings households report due to project stove application.
- The estimations of project fuel consumption as reported in the survey are in line with previous results from the kitchen surveys conducted in the first crediting period.
- Seasonal and weekly variation in fuel consumption is occasionally reported, but insignificantly small. It is recommended to conduct KPT during weekdays and in the dry period, so that potential higher fuel consumption in the rainy season and on weekends can conservatively be left out. Where necessary an adjustment factor should be applied to account for lower fuel consumption in the rainy period.
- No leakage effect was identified.
- The coefficient of variation (COV) for baseline and project fuel consumption as well as for fuel savings in all scenarios is low (between 0.2-0.5). For low COV values the methodology recommends minimum sample size of 30 for KPT.

C. Baseline and Project Performance Field Test (BFT and PFT)

See "7. Performance Field Tests and Calculation of Emission Reductions" further below.

6. Leakage

The potential leakages as set out in the methodology (p. 11) are assessed in the table below;

Leakage form	*Estimate of risk*	*Justification*
a) The displaced baseline technologies are reused outside the project boundary in place of lower emitting technology or in a manner suggesting more usage than would have occurred in the absence of the project.	No risk	The displaced baseline technology is the least efficient and most common cooking method in the project area. It is highly unlikely that users outside the project boundary who cook on a more efficient, more convenient and less emitting technology (such as LPG, electricity,…) would switch back to open fires and traditional charcoal stove.
b) The non-renewable biomass or fossil fuels saved under the project activity are used by non-project users who previously used lower emitting energy sources.	No risk	The Kitchen Surveys conducted in the first crediting period show that 0% of stove users used the saved fuel for other purposes, which would include selling the fuel to non-project users. As already stated above, it is highly unlikely that non-project users who cook on a more efficient, more convenient and less emitting technology (such as LPG, electricity,…) would switch back to open fires and traditional charcoal stove.
c) The project significantly impacts the NRB fraction within an area where other CDM or VER project activities account for NRB fraction in their baseline scenario	No risk	There is no other CDM or VER project in Madagascar that accounts for NRB fraction in the baseline scenario. The NRB fraction is a default factor published by the CDM and approved by the DNA in Madagascar. In case a project would significantly impact the NRB fraction, a new default

		value would be published (http://cdm.unfccc.int/DNA/fNRB/index.html).
d) The project population compensates for loss of the space heating effect of inefficient technology by adopting some other form of heating or by retaining some use of inefficient technology	No risk	Baseline and project performance field tests subsume this potential for leakage in case of paired PFT (see methodology page 11, footnote 17). The project applies paired PFT and thus there is no risk for this form of leakage.
e) The project stipulates substitution within households who commonly used a technology with relatively lower emissions.	No risk	The project targets users that apply traditional open fires and inefficient charcoal stoves, which constitute the least efficient cooking technologies, which have higher emissions than the project stoves. Thus, there is no risk for this form of leakage.

Leakage risks are deemed very low thus negligible as the case above presents.
$\sum LE_{i,y} = 0$

7. Performance Field Tests and Calculation of Emission Reductions

Paired KPTs were conducted for all four baseline and project scenarios by visiting randomly selected stove users and carrying out quantitative fuel measurements at households level for a period of 3 days in May/June 2014 (see KPT report 2014: 140627_ADES_BFT_PFT_report_2014_V01.pdf). The KPTs followed the requirements of the methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption - 11/04/2011" Annex 4 page 44-48:

1) A sample of at least 40 households was randomly selected for a paired baseline and project performance field test applying a geographical cluster sampling approach. The project area is divided into different monitoring regions. Each monitoring region is further divided into monitoring sectors. For an identified monitoring sector the starting point for the test was randomly defined and stove users were visited starting from that point.
2) Choosing of an appropriate test period and an appropriate time of year for the KPT. • Seasonal and weekly variation in fuel consumption is occasionally reported, but insignificantly small. It is recommended to conduct KPT during weekdays and in the dry period, so that potential higher fuel consumption in the rainy season and on weekends can conservatively be left out. For this the KPT were conducted in May/June 2014.
3) Making sure that all households involved in the KPT understand they were expected to cook normally during the test so as to capture the normal cooking behaviour. Households were instructed to cook normally during the test period and fuel consumption was measured at kitchen level, which subsumes the potential use of additional stoves.
4) Stressing and emphasizing that families cook only on the fuel provide for the purpose of monitoring how much was used. A measured quantity of fuel was provided at the beginning of the test period and all household members were instructed to use only fuel from defined stockpile.
5) During the test period, the number of people living and eating in the household was recorded in the data sheet as required by the Gold Standard Methodology.
6) For the test period the project provided a pre-defined quantity of the typical fuel (charcoal or firewood) to the stove users.
7) Analysis of data was conducted as outlined in the excel file "140627_KPT_Analysis_2014_V01.xlsx". Mean fuel savings, standard deviation and standard error of the mean were calculated to check if the sampled data fulfils the 90/30 rule.

8) The households that participated in the KPT were not rewarded with a gift but thanks were expressed for their participation. The data showed good results with low variance, thus there was no need to extend the sample size.

Statistical estimate of fuel consumption and savings:
KPT results of all four scenarios showed good results with low variance, COV and standard errors so that data for fuel consumption and savings fulfilled the 90/30 rule. Therefore the mean value of fuel savings can be used for emission reduction calculations. See excel files "140627_KPT_Analysis_2014_V01.xlsx" and "140627_ADES_ER_forecast_calculation_2nd_CP_V01.xlsx".

Wood scenario			
Mean fuel savings (kg per year)	2033.35	**Sy**	379.50
Standard Deviation	379.50	**Sample size n**	40
COV	0.19	**√n**	6.32
90% Confidence	98.70	**Then SEy**	60.00
Precision attained	5%	**t-value** $_{(0.95, n-1)}$	1.68

Charcoal scenario			
Mean fuel savings (kg per year)	565.75	**Sy**	164.28
Standard Deviation	164.28	**Sample size n**	40
COV	0.29	**√n**	6.32
90% Confidence	42.72	**Then SEy**	25.97
Precision attained	8%	**t-value** $_{(0.95, n-1)}$	1.68

Solar+efficient wood stove scenario			
Mean fuel savings (kg per year)	2438.62	**Sy**	395.25
Standard Deviation	395.25	**Sample size n**	46
COV	0.16	**√n**	6.78
90% Confidence	95.86	**Then SEy**	58.28
Precision attained	4%	**t-value** $_{(0.95, n-1)}$	1.68

Solar+efficient charcoal scenario			
Mean fuel savings (kg per year)	599	**Sy**	172.37
Standard Deviation	172	**Sample size n**	40
COV	0.29	**√n**	6.32
90% Confidence	44.83	**Then SEy**	27.25
Precision attained	8%	**t-value** $_{(0.95, n-1)}$	1.68

Wood scenario

	fuel tons per year	**fuel tons per day**
Baseline scenario	3.95	0.0108
Project scenario	1.91	0.0052

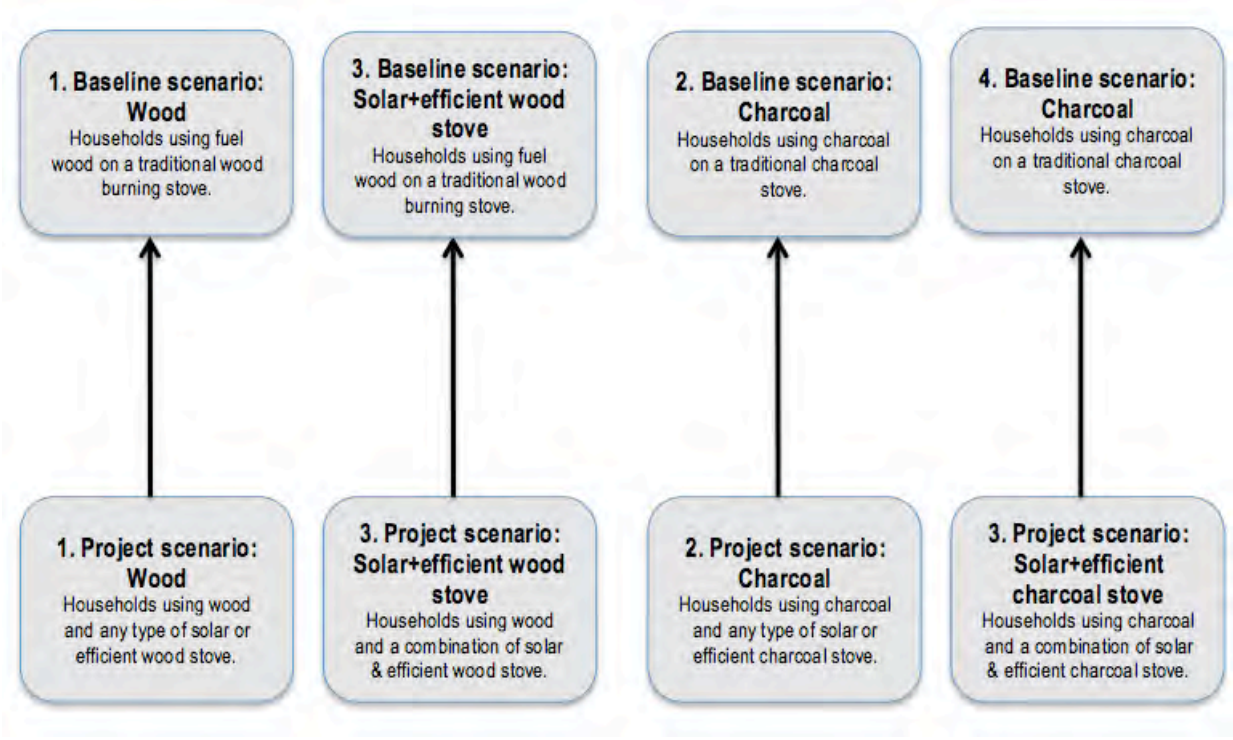
Fuel Savings	2.03	0.0056

Charcoal scenario		
	fuel tons per year	fuel tons per day
Baseline scenario	1.09	0.0030
Project scenario	0.52	0.0014
Fuel Savings	0.57	0.0016

Solar+efficient wood stove scenario (Oli-b)		
	fuel tons per year	fuel tons per day
Baseline scenario	4.23	0.0116
Project scenario	1.79	0.0049
Fuel Savings	2.44	0.0067

Solar+efficient charcoal stove scenario (Oli-c)		
	fuel tons per year	fuel tons per day
Baseline scenario	1.06	0.0029
Project scenario	0.46	0.0013
Fuel Savings	0.60	0.0016

Project scenario crediting in relation to the appropriate baseline scenario
Emission reductions are verified and credited by comparing the emissions for a given project scenario to the emissions for the applicable baseline scenario. The project scenarios are credited compared to the respective baseline scenario as shown in the figure below.



Adjustment factors (AF)
Adjustment factors can be applied during emission reduction calculation to allow for realistic comparison of project technologies to the baseline scenarios. Adjustment factors fine tune the baseline and project scenarios to account for variability in fuel savings due to differences in project technology type, size, usage pattern, and other pertinent variables, without requiring project proponents to independently monitor new baseline and project scenarios.

The kitchen surveys and kitchen test conducted during the first crediting period as well as the BS/PS 2014 and KPT 2014 conducted for the second crediting period allowed for defining several adjustment factors.

1. AF_{var} to account for seasonal and weekly variation of biomass fuel consumption
Annual Kitchen Surveys conducted with stove users reveal the latest figures for seasonal and weekly variation in fuel consumption. The AF_{var} obtained from the BS/PS 2014 is 0.999 for the wood users, 1.0 for solar+efficient wood stove users, 1.0 for charcoal users and 1.0 for solar+efficient charcoal stove users.

2. AF_{solar} to account for different stove application of solar stoves in the highlands:
Kitchen surveys (see KS Solar Tana Report 2013) conducted with solar stove users in the highlands revealed that due to different climatic conditions solar stove application is less frequent than in the existing project scenarios. The AF_{solar} currently applied is 0.593.

3. AF_{oli45b} for inclusion of larger efficient wood stove models in the exisiting project scenario:
Larger households prefer to cook with the larger model of the efficient wood stove (Oli-45b), which is designed for larger cooking pots. Stove performance test and kitchen surveys conducted in 2012 revealed that larger households have higher baseline fuel consumption, which leads to higher fuel savings when applying an efficient cook stove. The stove type Oli-45b is included in the existing project scenario wood without applying an adjustment factor. This is conservative. The AF_{oli45b} currently applied is 1. In the future a different adjustment factor may be applied.

4. AF_{oli45c} for inclusion of larger efficient charcoal stove models in the exisiting project scenario:
Larger households prefer to cook with the larger model of the efficient charcoal stove (Oli-45c), which is designed for larger cooking pots. Kitchen performance test conducted in 2012 revealed that larger households have higher baseline fuel consumption, which leads to higher fuel savings when applying an efficient cook stove. The stove type Oli-45c is included in the existing project scenario charcoal without applying an adjustment factor. This is conservative. The AF_{oli45c} currently applied is 1. In the future a different adjustment factor may be applied.

Baseline emissions
According to the applied methodology, in case the baseline fuel and the project fuel are the same and the baseline emission factor and project emission factor are considered the same, overall GHG reductions achieved by the project activity are calculated directly based on fuel savings (see methodology, page 14). Thus, see formula for emission reduction calculation further below.

Project emissions

According to the applied methodology, in case the baseline fuel and the project fuel are the same and the baseline emission factor and project emission factor are considered the same, overall GHG reductions achieved by the project activity are calculated directly based on fuel savings (see methodology, page 14). Thus, see formula for emission reduction calculation further below.

Emission reduction calculation

According to the applied methodology, in case the baseline fuel and the project fuel are the same and the baseline emission factor and project emission factor are considered the same, overall GHG reductions achieved by the project activity in year y are calculated as follows:

$$ER_y = \sum_{b,p} (N_{p,y} * U_{p,y} * P_{p,b,y} * NCV_{b,\,fuel} * (f_{NRB,b,y} * EF_{fuel,\,CO2} + EF_{fuel,\,nonCO2})) - \sum LE_{p,y} \quad (1)$$

$\Sigma_{b,p}$	Sum over all relevant (baseline b/project p) couples
$N_{p,y}$	Cumulative number of project technology-days included in the project database for project scenario p against baseline scenario b in year y
$U_{p,y}$	Cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate (fraction)
$P_{b,p,y,}$	Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/day, and as derived from the statistical analysis of the data collected from the field tests
$f_{NRB,b,y}$	Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass (drop this term from the equation when using a fossil fuel baseline scenario)
$NCV_{b,fuel}$	Net calorific value of the fuel that is substituted or reduced (IPCC default for wood fuel, 0.015 TJ/ton)
$EF_{fuel,CO2}$	CO2 emission factor of the fuel that is substituted or reduced. 112 tCO2/TJ for wood/wood waste.
$EF_{fuel,\,nonCO2}$	Non-CO2 emission factor of the fuel that is reduced
$LE_{p,y}$	Leakage for project scenario p in year y (tCO_2e/yr)

B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered VER project activity:

Generally spoken the project reduces greenhouse gas emissions emitted during production and combustion of fuel wood and charcoal[14]. This is because the new stoves introduced emit no emissions while in use (in case of the solar stoves) or fewer emissions than the traditional technology (in case of the efficient stoves) compared to the applied baseline technology.

Additionality

Apart from showing the reduction of greenhouse gas emissions, it is showed below that the project is additional to the baseline scenario. This is done by using the UNFCCC's "Tool for the demonstration and assessment of additionality". Version 5 is used.

Step 0 (required by Gold Standard): Previous Announcement Check

The project as described here has never been publicly announced to be implemented without carbon credits. Funding the project by carbon credits has been disccussed within ADES since 2005. In June 2007, the carbon credit buyer myclimate visited the project on-site and shortly later successful discussions and negotiations on carbon credit financing started, which concluded in an agreement.

[14] Part of the CO2 emissions are not net emissions as they come from renewable biomass. Only the reduction of CO2 emitted due to use of non-renewable emissions is accounted for as emission reduction.

Timeline of the project history:

Date	Decision	Source
22.05.2005	ADES discusses the possibility of financing solar and efficient stove project in Southwest Madagascar with the help of carbon credits.	Minutes of board meeting
25.05.2007	ADES meets representative of myclimate and discusses the development of a carbon offset project.	
June 2007	Representative of myclimate visits ADES project site in Toliara, Southwest Madagascar.	
12.07.2007	Myclimate decides to support the project	
09.08.2007	First PIN of the project activity is presented.	PIN
22.08.2007	ADES decides to purchase stove contruction machines and orders them on 27.08.2007 (point of no return)	Minutes Purchase contract

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a. Define alternatives to the project activity:

The output / service that the project activity is delivering is heat for cooking purposes. The same service with comparable quality, properties and application area can be met by the following alternatives in Madagascar;

- cooking with traditional, 3-stone or low-efficiency technology (current situation)
- cooking with fossil fuels (LPG, kerosene, coal)
- cooking with electricity
- project activity (solar stoves and efficient cook stoves) without carbon credit funding

Sub-step 1b. Consistency with mandatory laws and regulations:

All four alternatives comply with all mandatory applicable legislation and regulations.

Step 2. Investment analysis

Step 2. is left out as "Step 3. Barrier Analysis" is conducted.

Step 3. Barrier analysis

Sub-step 3a. Identify barriers that would prevent the implementation of the proposed project Activity :

Investment barrier:
The procurement/production costs for all ADES stoves is very high (see table below) compared to the per capita income in Madagascar of around 26 Euros per months (The World Bank gives figures for per capita yearly income in Madagascar 430 USD in 2012 - equaling around 310 Euros per year or 26 Euros per month[15]; The Economic

[15] http://data.worldbank.org/country/madagascar, Accessed 13/05/2014

Development Board of Madagascar indicates average monthly salary in 2012 between 40 USD and 90 USD – equaling between around 29 Euros and 65 Euros[16]; the Wage-Indicator for 2012 indicates an average hourly salary of 0.2 Euro[17]). Moreover, Madagascar is ranked 151st out of 187 countries classified according to the Human Development Index[18] and with more than 75% of the population living below the national poverty line[19]. This is especially true for rural areas, where around 80% of the population live and where living conditions have been steadily declining in recent years (in terms of transport, health, education and market access)[20]. To buy the new stoves for the price of the procurement/production costs equaling 3-4 monthly salaries in the case of the solar stoves is an unaffordable investment for families in urban and rural Madagascar. Moreover, it is not only a high and additional but also a rather risky investment as local people may perceive since they buy a completely new and to them unknown stove technology. Furthermore, also basic financing mechanisms to finance the stoves are not readily available to the people in the project area.

Therefore ADES sells the project stoves at subsidized and affordable prices to the population. The sale prices are determined based on the experiences ADES made during the last years concerning the local population's willingness and ability to pay.

The following table shows the procurement/production price of the stoves as well as the level at which the stoves would be bought (according to a multiyear experience by ADES).

	Procurement / production costs	Affordable price for average household
Solar Box stove	102.50 Euro	15.50 Euro
Parabolic stove	155.50 Euro	46.50 Euro
Oli-b	29.50 Euro	3 Euro
Oli-45b	39 Euro	9 Euro
Oli-60b	56 Euro	18.50 Euro
Oli-c	29.50 Euro	4.50 Euro
Oli-45c	39 Euro	12 Euro
Oli-60c	56 Euro	25 Euro

Production costs and sale prices according to ADES (April 2014).

ADES is reliant on additional funds, since the financial means from fundraising is by no means sufficient to offer the stoves at reduced prices to the local population. Therefore, revenues from carbon credits are essential to conduct the project activity.

Technological barrier:
There exists a technological barrier in many ways;

[16] http://www.edbm.gov.mg/Economic-data/Factor-costs, Accessed 13/05/2014

[17] Salaire à Madagascar - WageIndicator 2012, WageIndicator, Accessed 13/05/2014, http://www.wageindicator.org/documents/publicationslist/publications-2013/AIAS_WI_countryreports_f2f_report_Madagascar_final_French_20130218.pdf

[18] https://data.undp.org/dataset/Table-1-Human-Development-Index-and-its-components/wxub-qc5k, Accessed 05/05/2014

[19] http://data.worldbank.org/country/madagascar, Accessed 05/05/2014

[20] Rural Poverty Portal: http://www.ruralpovertyportal.org/country/home/tags/madagascar, accessed 19/05/2014

- Traditionally, no solar stoves and efficient stoves are produced and disseminated in Madagascar. Therefore, no local engineers and producers of solar and efficient stoves are available. The workers have to be trained on how to manufacture the solar stoves.
- Given the low production volumes, the needed economies of scale cannot be achieved, especially not for the efficient stoves.
- There is a lack of infrastructure in the region (few roads, in very bad shape), which leads to high transport costs (e.g. use of expensive 4x4 off-road cars for transporting material and bringing the stoves to the users, large transporting distances, slowness of transport)
- Some of the needed constructing material (e.g. high-quality glass and wood) and most of the manufacturing equipment (machines) is not available locally and must be brought from other regions of the country or even from other countries. Given the high transport costs in the country, this is a major hurdle.
- No facilities for repairing the stoves exist. Damaged stoves have to be returned to the centers for being repaired.
- As the technology is new the quality of the product has to be permanently checked.

Barrier due to prevailing practice:
Most families are used to cook with charcoal or wood fired stoves. The introduction of solar cookers has to be accompanied with a change in the habits regarding cooking time and periods as well as cooking methods. Therefore;

- cooking demonstration and training courses are needed to show that the technology works
- the technology has to be made known by the public through newspapers, the radio and well-known persons (marketing costs).
- The use of the stoves has to be checked from time to time and users have to be advised on how to handle the technology.

Sub-step 3 b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity)

The three barriers do not affect the alternative scenario of current situation continuation because;

- No investment barrier: the households already own inefficient stoves and the 3-stone-technology has no costs at all.
- No technological barrier: traditional stoves can easily be manufactured, since the know-how is lcoally available. The 3-stone method does not even need any manufacturing.
- No barrier due to prevailing practice: almost 100% of the population cooks with charcoal and fuel wood[21]. Traditional stoves therefore do not need to be made known and to be disseminated.

All barriers also prevent the use of electricity and fossil fuels for cooking purposes because those technologies are all very expensive, unknown, not easily available and not disseminated at all. Electricity or fossil fuels for cooking is only by very rich people and tourist facilities in Madagascar, which are both not the target population of the project activity. The rising oil prices will make it even more improbable that middle-income people switch to fossil fuel even if the fuel wood and charcoal prices rise. In the table below the latest prices for cooking fuels in Madagascar (in Ariary per kWh) is given;

[21] Global Alliance for clean Cookstoves, http://www.cleancookstoves.org/countries/africa/madagascar.html, Accessed 13/05/2014

Fuel	Fuel costs per kWh (in Ariary)	Year of the data
Bought fire wood	18[22]	2014
Charcoal	43[23]	2012
Ethanol	110[24] [25]	2011
Gasoil	178[26]	2012
Electricity	325[27]	2012
LPG (gas)	609[28] [29]	2014

As all other Alternatives face one or more barriers, the baseline of the project activity is Alternative 1 (cooking with traditional, 3-stove or low-efficiency technology (current situation))

Overview of the barriers faced by the different alternatives:

	Alternative 1: cooking with traditional, 3-stone or low-efficiency technology (current situation)	**Alternative 2:** cooking with fossil fuels (fuel oil, gasoil, gas)	**Alternative 3:** cooking with electricity	**Alternative 4:** project activity (solar stoves and efficient cook stoves) without carbon credit funding
Investment barrier	n/a	X	X	X
Technological barrier	n/a	X	X	X
Barrier of prevailing practice	n/a	X	X	X

[22] Baseline survey in Madagascar 2014, myclimate

[23] Diagnostic du secteur énergie à Madagascar, WWF, page 10, http://www.wwf.mg/ourwork/downloads/,Accessed 05/05/2014

[24] Ethanol as a Household Fuel in Madagascar : Health Benefits, Economic Assessment an Review of African Lessons for Scaling up, Practical Action Consulting, Page 92, http://www.cleancookstoves.org/resources_files/ethanol-assessment-madagascar-a.pdf

[25] Since 2014, the commercialisation of ethanol in Madagascar is allowed : http://www.hcc.gov.mg/decisions/d3/decision-n-02-hccd3-du-22-janvier-2014-concernant-la-loi-n2013-013-sur-la-production-et-la-commercialisation-de-lethanol/ , Accessed 16/05/2014

[26] Diagnostic du secteur énergie à Madagascar, WWF, page 92, http://www.wwf.mg/ourwork/downloads/,Accessed 05/05/2014

[27] Diagnostic du secteur énergie à Madagascar, WWF, page 93, http://www.wwf.mg/ourwork/downloads/,Accessed 05/05/2014

[28] Pénurie de gaz dans les stations, L'Express de Madagasacar, accessed 15/05/2014, http://www.lexpressmada.com/blog/actualites/economie/penurie-de-gaz-dans-les-stations-9732

[29] Vivre à Madagascar, EDBM, accessed 15/05/2014, http://www.edbm.gov.mg/fr/Informations-economiques/Vivre-a-Madagascar

4. Common practice analysis

Sub-step 4a: Analyze other activities similar to the proposed project activity:
Similar project activities were monitored during first crediting period. The monitoring reports show that in the last years there have been some project ideas for solar and efficient stove production in Madagascar, however none of them could successfully be implemented at a larger scale to date. There are some pilot activities with other efficient stoves, however with very limited scale and outreach. See monitoring reports from the first crediting period for further details.

Sub-step 4b: Discuss any similar Options that are occurring:
Sub-step 4a showed that no similar activities are occurring at a comparable scale in Madagascar.

Conclusions
The barriers explained above prevent the implementation of the project activity without carbon funds as well as the alternative scenarios. Therefore the baseline scenario is the continuation of the current situation (continued use of charcoal and fuel wood in inefficient stoves in the next 7 years).

Gold Standard registration will give the project activity the needed funding and will help the project to overcome barriers in the way such as:
- Revenues from carbon credits allow ADES to offer the locally produced stoves at subsized prices compatible with local population's ability and willingness to pay for such a device. Without the support from carbon credits the stoves would not be marketable. However, the prices are still at the upper end of the affordable price range, thus more stoves could be sold if it would be possible to further lower the prices.
- Revenues from carbon credits allow ADES to run their local stove workshops and carefully train stove users in the proper handling of the stoves. Moreover, ADES in this way can provide warranty and free repair service.. This is only possible when having additional funds to run the local workshops and train new staff that is able to manufacture and repair the stoves.

For the reasons mentioned above, the project activity could not be implemented without carbon funds. The project is therefore additional.

Assessing the validity of the original/current baseline at the renewal of the crediting period
The CDM tool “Assessment of the validity of the original/current baseline and to update the baseline at the renewal of a crediting period” (Version 03.0.1) is applied for assessing the validity of the original baseline.
http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf

Step 1: Assess the validity of the current baseline for the next crediting period
Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies
The current baseline (using traditional wood fires and inefficient charcoal stoves for cooking in the domestic, institutional and commercial sectors) complies with all relevant mandatory national and/or sectoral policies applicable at the time of requesting renewal of the crediting period.

Step 1.2: Assess the impact of circumstances
In the situation where the baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment, an assessment of the changes in the market characteristics is required for the renewal of the crediting period.

There are no changes in the market characteristics of the baseline scenario. The main fuels used for cooking in Madagascar are still wood and charcoal with 81.7% and 17.4%[30] respectively. Efficient cooking technologies are not yet largely disseminated in Madagascar[31].

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for the renewal is required

Assess wheter the remaining technical lifetime of the equipment that would have continued to be used in the absence of the project activity, exceeds the crediting period for which the renewal is requested. Take into consideration market penetration of different technologies. Evaluate the penetration rate of different technologies that are available in the market and evaluate how they could affect the baseline.

Over 98% of the population in Madagascar still cook using solid fuels[32]: The main fuels used for cooking are wood (81.7%) and charcoal (17.4%). The common baseline technologies are inefficient wood (3-stone-fires and Toko) and charcoal stoves, which have a lifetime of 6 months to two years until they need replacement. There are still few efficient cookstove technologies available in Madagscar, and they are still far from replacing the common technologies used. Besides the project activity only short-term projects or NGO investing in environmental protection promote efficient cookstoves[33].

Step 1.4: Assessment of the validity of the data and parameters

Assess wheter data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period are still valid or wheter they should be updated.

Some data and parameters determined at the start of the first crediting period need to be updated for the second crediting period. Please see Annex 2 for newest and updated baseline parameters used for the second crediting period.

The application of steps 1.1, 1.2, 1.3, and 1.4 confirmed that the current baseline is still valid for the second crediting period. However, the values of some data and parameters need to be updated for the second crediting period.

Step 2: Update the current baseline and the data and parameters

Step 2.1: Update the current baseline

Update the current baseline emissions for the second crediting period, without reassessing the baseline scenario, based on the latest approved version of the methodology applicable to the project activity.

The baseline fuel consumption for the defined scenarios has been reassessed with PFT according to the latest applicable methodology. See Annex 2 for updated data and parameters.

Step 2.1: Update the data and parameters

The default values, such as for GWP or emission factors, have been updated using latest available CDM default values. See Annex 2 for updated data and parameters.

[30] Global Alliance for clean Cookstoves, http://www.cleancookstoves.org/countries/africa/madagascar.html

[31] Diagnostic du secteur énergie à Madagascar, WWF, page 41 and 148, http://www.wwf.mg/ourwork/downloads/,Accessed 05/05/2014

[32] Global Alliance for clean Cookstoves, http://www.cleancookstoves.org/countries/africa/madagascar.html

[33] Diagnostic du secteur énergie à Madagascar, WWF, page 149, http://www.wwf.mg/ourwork/downloads/,Accessed 05/05/2014

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the project activity:

Project Boundary
As defined by the applied methodology (p. 5) three parameters have to be delinated: a) Project Boundary, b) Target Area, and c) Fuel Production and Collection Area.

a) Project Boundary:
The project boundary is the physical, geographical sites of the project technologies and pontentially of the baseline and project fuel collection and production. For this project the project boundary is;

- The place of the kitchens where the project stoves (solar and efficient) are applied.
- The place of fuel collection, production and transport, located in the fuel collection area.

b) Target Area:
The target area is defined as the entire country of Madagascar.

c) Fuel Production and Collection Area:
The fuel production and collection area is defined as the entire country of Madagascar.

Emission sources included in the project boundary
The following emission sources are included or excluded from the project boundary;

	Source	Gas	Included?	Justification / Explanation
Baseline	Cooking, production of fuel, and transport of fuel	CO_2	Yes	Important source of emissions
		CH_4	Yes	Important source of emissions
		N_2O	Yes	Can be significant in some fuels
Project Activity	Cooking, production of fuel, and transport of fuel	CO_2	Yes	Important source of emissions
		CH_4	Yes	Important source of emissions
		N_2O	Yes	Can be significant in some fuels

B.5. Details of baseline information, including the date of completion of the baseline study and the name of person (s)/entity (ies) determining the baseline:

Detailed baseline information can be found in Annex 2.

Date of completing the final draft of this baseline section:
26/06/2014

Name of person/entity determining the baseline:
Tobias Hoeck
myclimate - The Climate Protection Partnership
Listed in annex 1

SECTION C. Duration of the project activity / Crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

27/08/2007 (starting event of the project activity is the purchase of wood treatment machines for stove construction)

C.1.2. Expected operational lifetime of the project activity:

20y- 0m

C.2 Choice of the crediting period and related information:

The renewable crediting period is chosen.

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the second crediting period:

01/01/2015

C.2.1.2. Length of the second crediting period:

7y-0m

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

Not applied

C.2.2.2. Length:

SECTION D. Application of a monitoring methodology and plan

D.1. Name and reference of approved monitoring methodology applied to the project activity:

Section III of the methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption - 11/04/2011".

D.2. Justification of the choice of the methodology and why it is applicable to the project activity:

The applied methodology requests the following continuous and periodic monitoring activities.

The monitoring tasks undertaken continuously are:

A. Total Sales Record

The following data are recorded for all stoves;

- Date of Sale
- Geographic area of sale
- Model/type of project technology sold
- Quantity of project technology sold
- Name and telephone number (if available), and address:
    - Required for bulk purchasers, ie retailers and institutional users
    - All end users except in cases where this is justified as not feasible.
- Mode of use: domestic, commercial, other:
    - As many as commensurate with representative sampling

B. Project Database

The project database is derived from the total sales record (or dissemination record in case of non-commercial distribution) with project technologies differentiated by different project scenarios. The differentiation of the project database into sections is based on the results of the applicable monitoring studies for each project scenario, in order that ER calculations can be conducted appropriately section by section.

C. Ongoing Monitoring Studies

The following ongoing monitoring studies will be conducted for the project scenario following verification of the associated initial project studies. These monitoring studies will investigate and define parameters that could not be determined at the time of the initial project studies or that change with time.

a) Monitoring Survey – This shall be completed annually, beginning 1 year after project registration

The monitoring survey shall investigate changes over time in a project scenario by surveying end users with project technologies on an annual basis. It will provide critical information on year-to-year trends in end user characteristics such as technology use, fuel consumption and seasonal variations.

Monitoring Survey Representativeness:

End users from a given project scenario will be selected using representative sampling techniques to ensure adequate representation of users with technologies of different ages. Common sampling approaches such as clustered random sampling may be used. End users will be surveyed once a year with care taken to collect information pertaining to seasonal variations in technology and fuel use patterns.

As the project expands to other areas, monitoring surveys will guarantee that noticeable differences are detected and if needed new scenarios or appropriate adjustment factors will be defined.

Monitoring Survey sample sizing and data collection:
The monitoring survey has the same sample sizing and data collection guidelines as the baseline survey, but in this case, the monitoring survey will only be conducted with end users representative of the project scenario and who will be using the project technology at the time of the survey.

b) Usage Survey – completed annually
The usage survey provides a single usage parameter that is weighted based on drop off rates that are representative of the age distribution for project technologies in the total sales record. A usage parameter must be established to account for drop off rates as project technologies age and are replaced. Prior to a verification (also prior to first verification), a usage parameter is required that is weighted to be representative of the quantity of project technologies of each age being credited will be given project scenario. The number of days the stoves are in use will also be determined through usage surveys and considered for emission reduction calculation.

The minimum total sample size will be 100, with at least 30 samples for project technologies of each age being credited. The majority of interviews in a usage survey must be conducted in person and include expert observation by the interviewer within the kitchen in question. The usage survey will establish a useful lifetime for technologies after which they are removed from the project database and no longer credited

c) Project FT Update – completed every other year (every two years)
The PFT update is an extension of the project PFT and provides a fuel consumption assessment representative of project technologies currently in use every two years. Hence the PFT update shall account for changes in the project scenario over time as project technologies age and new customers are added, also as new models and designs are introduced. It is legitimate to apply an Age Test instead of a PFT, to project technologies which remain materially the same year after year.

d) Baseline FT Update
A fixed baseline is adopted in this project and FT Update is thus not required.

e) Leakage Assessment – Completed every other year, starting on time for the first verification.

f) Non-Renewable Biomass Assessment Update
The non-renewable biomass fraction is fixed based on the results of the NRB assessment.
In case of a renewal of the crediting period and as per Gold Standard rules, the NRB fraction will be reassessed as any other baseline parameters and updated in line with most recent data available.

D.2. 1. OPTION 1: Monitoring of the emissions in the project scenario and the baseline scenario

D.2.1.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

Data / Parameter:	$P_{p,y}$
Data unit:	t_biomass/unit-year and t_biomass/unit-day
Description:	Quantity of woody biomass consumed in the project scenario in year y and per day in year y.
Source of data to be	PFT, FT updates, and any applicable adjustment factors

used:	
Monitoring frequency	Updated every two years
QA/QC procedures to be applied:	Performance Field Tests conducted and analysed according to the requirements of the methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption - 11/04/2011"
Any comment:	A single project fuel consumption parameter is weighted to be representative of the quantity of project technologies of each age being credited in a given project scenario.

Data / Parameter:	$U_{p,y}$
Data unit:	Percentage
Description:	Usage rate in project scenario p during year y
Source of data to be used:	Annual usage survey
Monitoring frequency	Annual
QA/QC procedures to be applied:	Conducting surveys as required by the methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption - 11/04/2011"
Any comment:	A single usage parameter is weighted to be representative of the quantity of project technologies of each age being credited in a given project scenario

Data / Parameter:	$N_{p,y}$
Data unit:	Number of days
Description:	Cumulative number of technology days in the project database for project scenario y
Source of data to be used:	Total sales record/Project database
Monitoring frequency	Continuous
QA/QC procedures to be applied:	Transparent data analysis and reporting
Any comment:	

Data / Parameter:	Similar new project activity in the project area
Data unit:	Number of new project activities
Description:	List of similar cook stove projects and an assessment of how (e.g. target population, cook stove type, etc.) and to what degree overlap occurs
Source of data:	Various sources
Monitoring frequency	Every year
QA/QC procedures to be applied:	N.A.
Any comment:	

Data / Parameter:	Incentive scheme to surrender charcoal baseline stove
Data unit:	Number of stoves sold at discount
Description:	Number of efficient charcoal stoves sold at discount to households that hand in the baseline stove.
Source of data:	ADES financial records
Monitoring frequency	Every year
QA/QC procedures to be applied:	N.A.
Any comment:	

D.2.1.2. Data to be collected in order to monitor project performance on the most sensitive sustainable development indicators:

No sustainable development indicators were found critical during Stakeholder Consultation and Sustainable Development Assessment but the following are monitored for the need to assess bi-annually the social and environmental impact of the project.

No		1
Indicator		Air quality
Mitigation measure		N.A.
Repeat for each parameter		
Chosen parameter		Number of positive comments from stove users on air quality improvement with project stove
Current situation of parameter		Considerable exposure to smoke emission from cooking
Estimation of baseline situation of parameter		No air quality improvement
Future target for parameter		It is expected that close to all users will report improved air quality due to application of the project stove
Way of monitoring	How	Monitoring/Usage Surveys.
	When	Annually
	By who	ADES monitoring coordinator

No		2
Indicator		Qualitative Employment
Mitigation measure		N.A.
Repeat for each parameter		
Chosen parameter		Number of jobs offered to local employes at exceptional conditions: Non-limited (permanent) contracts; cover of school fees for all children; and cover of health insurance for entire family.
Current situation of parameter		In 2013 ADES offered employment to 132 persons
Estimation of baseline situation of parameter		In 2007 ADES provided employment to 22 persons
Future target for parameter		It is expected that ADES creates further jobs at exceptional conditions over the course of the second crediting period
Way of monitoring	How	ADES employment records
	When	Annually
	By who	ADES monitoring coordinator

No	3
Indicator	Livelihood of the poor
Mitigation measure	N.A.
Repeat for each parameter	
Chosen parameter	Time (hours) and money (Ariary) saved per household per year due to fuel savings achieved by project stoves
Current situation of parameter	N.A.
Estimation of baseline situation of	None

parameter		
Future target for parameter		It is expected that users save between 40-50% of time or money spent on fuel for cooking compared to the baseline.
Way of monitoring	How	Monitoring/Usage Surveys
	When	Annually
	By who	ADES monitoring coordinator

No		4
Indicator		Access to affordable and clean energy services
Mitigation measure		N.A.
Repeat for each parameter		
Chosen parameter		Number of persons that benefit from efficient and clean cooking technologies
Current situation of parameter		N.A.
Estimation of baseline situation of parameter		None
Future target for parameter		It is expected that over 200,000 persons benefit from efficient and clean cooking.
Way of monitoring	How	Total Sales record, usage rates and average number of household memebers
	When	Annually
	By who	ADES monitoring coordinator

No		5
Indicator		Human and institutional capacity
Mitigation measure		N.A.
Repeat for each parameter		
Chosen parameter		Number of school visits conducted and number of people reached by awareness creation:
Current situation of parameter		In 2013 ADES conducted 71 school visits thereby reaching 12,500 persons for awareness creation
Estimation of baseline situation of parameter		None
Future target for parameter		It is expected that ADES conducts several school visits and reaches several thousand persons per year.
Way of monitoring	How	ADES records
	When	Annually
	By who	ADES monitoring coordinator

No		6
Indicator		Quantitative Employment
Mitigation measure		N.A.
Repeat for each parameter		
Chosen parameter		Number of jobs offered by ADES to local employees
Current situation of parameter		In 2013 ADES offered employment to 132 persons
Estimation of baseline situation of parameter		In 2007 ADES provided employment to 22 persons

Future target for parameter		It is expected that ADES creates further jobs over the course of the second crediting period
Way of monitoring	How	ADES employment records
	When	Annually
	By who	ADES monitoring coordinator

D.2.1.3. Description of formulae used to estimate project emissions (for each gas, source, formulae/algorithm, emissions units of CO2 equ.)

According to the applied methodology, there is no need to calculate baseline emissions separately. When the baseline fuel and the project fuel are the same and the baseline emission factor and project emission factor are considered the same, overall GHG reductions achieved by the project activity are calculated as follows (see applied methodology, page 14):

$$ERy = \Sigma_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * NCV_{b,fuel} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel,\ nonCO2})) - LE_{p,y}$$

Where:
$\Sigma_{b,y}$ = sum over all relevant (b/project p) couples
$N_{p,y}$ = cumulative number of project technology days included in the project database for project scenario p against the baseline scenario b in year y.
$U_{p,y}$ = cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate revealed by usage surveys (fraction)
$P_{p,b,y}$ = Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/day, as derived from the statistical analysis of the data collected from field tests.
$NCV_{b,fuel}$ = Net calorific value of the fuel that is substituted or reduced (IPCC default for wood fuel, 0.015 TJ/ton)
$f_{NRB,b,y}$ = fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass
$EF_{fuel,CO2}$ = CO2 emission factor of the fuel that is substituted or reduced. 112 tCO2/TJ for wood/wood waste.
$EF_{fuel,\ nonCO2}$ = Non-CO2 emission factor of the fuel that is reduced
$LE_{p,y}$ = leakage for project scenario p in year y (tCO2eq/yr)

The parameters $NCV_{b,fuel}$ and $NCV_{p,fuel}$ are not applicable to this project since EF is in units of tCO2/t_fuel (see methodology page 21). Therefore the formula applied is:

$$ERy = \Sigma_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel,\ nonCO2})) - LE_{p,y}$$

D.2.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived:

N.A. since a fixed baseline is chosen.

D.2.1.4. Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO2 equ.)

According to the applied methodology, there is no need to calculate baseline emissions separately. When the baseline fuel and the project fuel are the same and the baseline emission factor and project emission factor are considered the same, overall GHG reductions achieved by the project activity are calculated as follows (see applied methodology, page 14):

$ERy = \Sigma_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * NCV_{b,fuel} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel,\ nonCO2})) - LE_{p,y}$

Where:
$\Sigma_{b,y}$ = sum over all relevant (baseline b/project p) couples
$N_{p,y}$ = cumulative number of project technology days included in the project database for project scenario p against the baseline scenario b in year y.
$U_{p,y}$ = cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate revealed by usage surveys (fraction)
$P_{p,b,y}$ = Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/day, as derived from the statistical analysis of the data collected from field tests.
$NCV_{b,fuel}$ = Net calorific value of the fuel that is substituted or reduced ((IPCC default for wood fuel, 0.015 TJ/ton)
$f_{NRB,b,y}$ = fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass
$EF_{fuel,CO2}$ = CO2 emission factor of the fuel that is substituted or reduced. 112 tCO2/TJ for wood/wood waste.
$EF_{fuel,\ nonCO2}$ = Non-CO2 emission factor of the fuel that is reduced
$LE_{p,y}$ = leakage for project scenario p in year y (tCO2eq/yr)

The parameters $NCV_{b,fuel}$ and $NCV_{p,fuel}$ are not applicable to this project since EF is in units of tCO2/t_fuel (see methodology page 21). Therefore the formula applied is:

$ERy = \Sigma_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel,\ nonCO2})) - LE_{p,y}$

D. 2.2. OPTION 2: Direct monitoring of emission reductions from the project activity (values should be consistent with those in section E).

N.A.

D.2.2.1. Data to be collected in order to monitor emission reductions from the project activity, and how this data will be archived:

N.A.

D.2.2.2. Description of formulae used to calculate emission reductions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

N.A.

D.2.3. Treatment of leakage in the monitoring plan

As explained in B.2. there is no leakage expected from any potential source.

D.2.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project activity

Data / Parameter:	$LE_{p,y}$
Data unit:	t_CO2eq per year
Description:	Leakage in project scenario p during year y
Source of data:	Monitoring/Usage Survey
Monitoring frequency	Every two years (i.e. every other year)
QA/QC procedures to be applied:	Transparent data analysis and reporting
Any comment:	Aggregate leakage can be assessed for multiple project scenarios

D.2.3.2. Description of formulae used to estimate leakage (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

$LE_{p,y} = 0$

D.2.4. Description of formulae used to estimate emission reductions for the project activity (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

Overall GHG reductions achieved by the project activity are calculated as follows (see applied methodology, page 14):

$$ER_y = \Sigma_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * NCV_{b,fuel} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel,\ nonCO2})) - LE_{p,y}$$

Where:
$\Sigma_{b,y}$ = sum over all relevant (baseline b/project p) couples
$N_{p,y}$ = cumulative number of project technology days included in the project database for project scenario p against the baseline scenario b in year y.
$U_{p,y}$ = cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate revealed by usage surveys (fraction)
$P_{p,b,y}$ = Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/day, as derived from the statistical analysis of the data collected from field tests.
$NCV_{b,fuel}$ = Net calorific value of the fuel that is substituted or reduced ((IPCC default for wood fuel, 0.015 TJ/ton)
$f_{NRB,b,y}$ = fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass
$EF_{fuel,CO2}$ = CO2 emission factor of the fuel that is substituted or reduced. 112 tCO2/TJ for wood/wood waste.
$EF_{fuel,\ nonCO2}$ = Non-CO2 emission factor of the fuel that is reduced
$LE_{p,y}$ = leakage for project scenario p in year y (tCO2eq/yr)

The parameters $NCV_{b,fuel}$ and $NCV_{p,fuel}$ are not applicable to this project since EF is in units of tCO2/t_fuel (see methodology page 21). Therefore the formula applied is:

$$ER_y = \Sigma_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel,\ nonCO2})) - LE_{p,y}$$

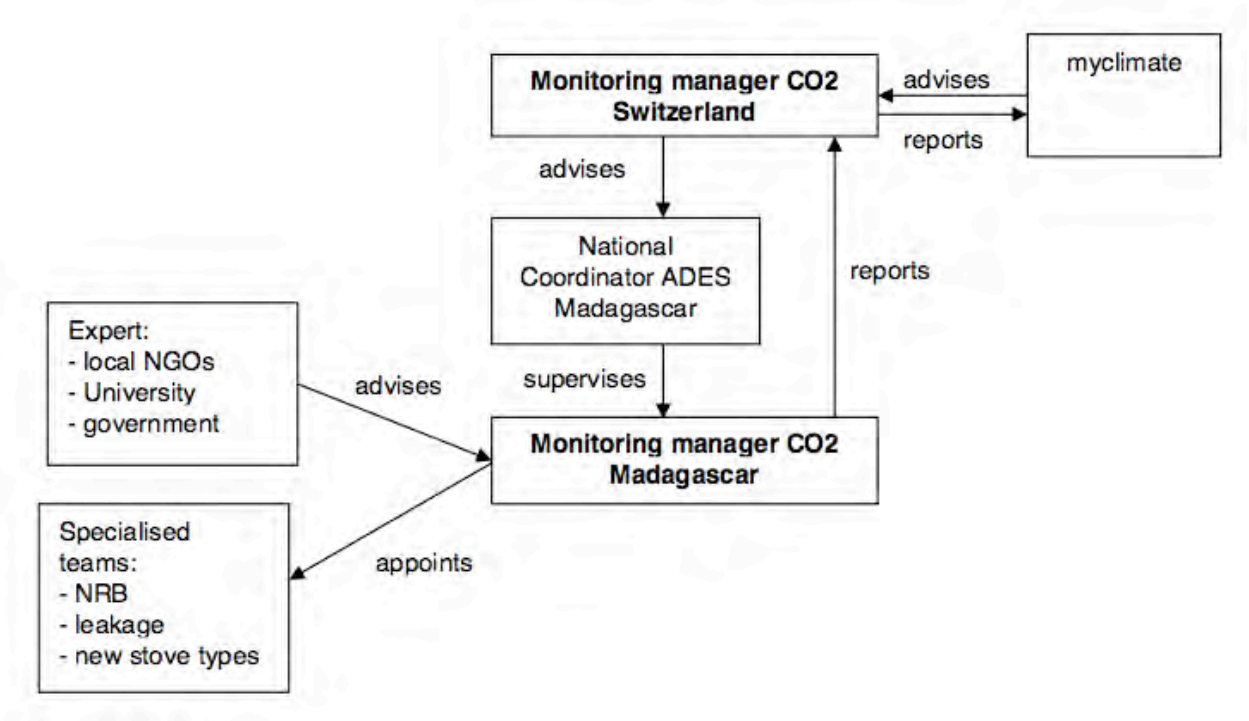
D.3. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored

Data	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
$P_{p,y}$	Low	PFT Update is conducted according to the requirements of the applied methodology. The monitoring coordinator with many years of experiences gained while conducting surveys and tests during the first crediting period takes care of the test.
$U_{p,y}$	Low	PFT Update is conducted according to the requirements of the applied methodology. The monitoring coordinator with many years of experiences gained while conducting surveys and tests during the first crediting period takes care of the survey.
$N_{p,y}$	Low	The project uses a sophisticated customer relation management system as sales record (SalesForce). Further, the sales figures are verified through an external financial audit.
Similar new project activity in the project	Low	Official public sources for carbon offset projects (CDM Pipeline, GS registry, …) as well as Information from the project owner's

area		network in Madagascar provide reliable data about similar initiatives.
Incentive scheme to surrender charcoal baseline stove	Low	Number of returned baseline stoves to get a 20% discount on the sales price is obtained from financial records of the project owner. Financial statements are externally verified at an annual basis.
SD1) Air quality	Low	The monitoring/usage surveys (including interviews with stove users) are conducted by the monitoring coordinator with many years of experiences gained while conducting surveys and tests during the first crediting period.
SD2) Qualitative employemement	Low	ADES's emplyoment records and contracts provide certainety about accurateness of reported figures.
SD3) Livelihood of the poor	Low	The monitoring/usage surveys (including interviews with stove users) are conducted by the monitoring coordinator with many years of experiences gained while conducting surveys and tests during the first crediting period.
SD4) Access to affordable and clean energy services	Low	The sales database is externally audited based on financial records. Usage rates are calculated based on applied methodology and data obtained from monitoring/usage survey with representative sample conducted by the monitoring coordinator with many years of experiences gained while conducting surveys and tests during the first crediting period. Average number of household members is obtained from monitoring/usage survey with representative sample.
SD5) Human and institutional capacity	Low	ADES keeps signed records of number of school visits conducted and number of people reached by awareness creation.
SD6) Quantitative employment	Low	ADES's emplyoment records provide certainety about accurateness of reported figures.

D.4. Please describe the operational and management structure that the project operator will implement in order to monitor emission reductions and any leakage effects, generated by the project activity

Monitoring set-up:



Monitoring Manager CO2 Switzerland:
Mr. Hans Peter Frei, Engineer HTL, Auditor: ISO 9001: 2008 & ISO 14000

Monitoring Manager CO2 Madagascar:
Mr. Andriamfidy Razafimanarantsoa („Fidy“)
University degree, long-term professional experience in surveys, interviews, data collection and analysis of results.

Deputy Monitoring Manager CO2 Madagascar:
Mr. Ramilson Faralahy:
Secondary degree, University degree, animation and surveys professional experiences

Responsibilities and quality assurance:
A monitoring manual has been compiled, where all necessary steps and procedures (organization, responsibilities, and tasks) are described in details for all monitoring activities. This manual is applied for all activities and allows for quality assurance at the different levels.
The ADES monitoring manager CO2 in Madagascar is responsible for all monitoring activities in the entire project area and is not involved in sales activities to guarantee an independent appraisal. For surveys and tests paper records are kept with the ADES monitoring manager CO2 in Tuléar, Madagascar. Surveys and tests are conducted by the monitoring manager CO2 in collaboration with a representative from the corresponding production center. The

monitoring manager CO2 conducts household visits, fills in the questionnaires and transforms paper data into electronic data. The electronic data from the monitoring activities is then submitted to the ADES monitoring manager CO2 in Switzerland, where it is checked on its accuracy and consistency. Final check and statistical analysis of the monitoring data is conducted by myclimate.
This organizational separation of data generation and data analysis combined with a two level data check guarantees for accurate and consistent results.
The monitoring manager CO2 Madagascar conducts plausibility checks during data generation and preparation. Results that cannot be reconstructed are not considered and if required additional surveys or tests are conducted. Moreover, the monitoring manager CO2 Madagascar crosschecks data (especially sales reports) with other data available at the different production and distribution centers during monitoring visits. Delivery and stock lists for materials used also help to verify sales figures.
Monitoring and sales data is transferred to the monitoring manager CO2 Switzerland, who is also the responsible person for logistics. He thus can compare figures of delivered materials with the number of stoves sold. Final plausibility check is conducted during data analysis by myclimate.

A detailed description of the monitoring system is available in the latest monitoring manual.

Moreover, an independent auditor verifies the sales record in combination with the financial audit of ADES Madagascar. This allows for crosschecking stove sales from a financial point of view.

D.5 Name of person/entity determining the monitoring methodology:

Name of person/entity determining the monitoring plan;
Tobias Hoeck
myclimate - The Climate Protection Partnership
Listed as project participant in annex 1

SECTION E. Estimation of GHG emissions by sources

E.1. Estimate of GHG emissions by sources:

According to the applied methodology, there is no need to calculate baseline emissions separately. When the baseline fuel and the project fuel are the same and the baseline emission factor and project emission factor are considered the same, overall GHG reductions achieved by the project activity are calculated directly as shown under E.5.

E.2. Estimated leakage:

Leakage is estimated to be negligible (see Section B), therefore;

$\sum LE_y = LE_{charcoal,y} + LE_{wood,y} = 0$

E.3. The sum of E.1 and E.2 representing the project activity emissions:

According to the applied methodology, there is no need to calculate baseline emissions separately. When the baseline fuel and the project fuel are the same and the baseline emission factor and project emission factor are considered the same, overall GHG reductions achieved by the project activity are calculated directly as shown under E.5.

E.4. Estimated anthropogenic emissions by sources of greenhouse gases of the baseline:

According to the applied methodology, there is no need to calculate baseline emissions separately. When the baseline fuel and the project fuel are the same and the baseline emission factor and project emission factor are considered the same, overall GHG reductions achieved by the project activity are calculated directly as shown under E.5.

E.5. Difference between E.4 and E.3 representing the emission reductions of the project activity:

According to the applied methodology, there is no need to calculate baseline emissions separately. When the baseline fuel and the project fuel are the same and the baseline emission factor and project emission factor are considered the same, overall GHG reductions achieved by the project activity are calculated as follows (see applied methodology, page 14):

$ER_y = \Sigma_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * NCV_{b,fuel} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel,\ nonCO2})) - LE_{p,y}$

Where:

$\Sigma_{b,y}$ = sum over all relevant (baseline b/project p) couples

$N_{p,y}$ = cumulative number of project technology days included in the project database for project scenario p against the baseline scenario b in year y.

$U_{p,y}$ = cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate revealed by usage surveys (fraction)

$P_{p,b,y}$ = Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/day, as derived from the statistical analysis of the data collected from field tests.

$NCV_{b,fuel}$ = Net calorific value of the fuel that is substituted or reduced ((IPCC default for wood fuel, 0.015 TJ/ton)
$f_{NRB,b,y}$ = fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass
$EF_{fuel,CO2}$ = CO2 emission factor of the fuel that is substituted or reduced. 112 tCO2/TJ for wood/wood waste.
$EF_{fuel,\ nonCO2}$ = Non-CO2 emission factor of the fuel that is reduced
$LE_{p,y}$ = leakage for project scenario p in year y (tCO2eq/yr)

The parameters $NCV_{b,fuel}$ and $NCV_{p,fuel}$ are not applicable to this project since EF is in units of tCO2/t_fuel (see methodology page 21). Therefore the formula applied is:

$$ER_y = \Sigma_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel,\ nonCO2})) - LE_{p,y}$$

The above formula is applied to the identified scenarios by including the adjustment factors applicable to the different scenarios to calculate emission reductions.

Scenario Wood:

$$ER_y = \Sigma_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * AF_{var} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel,\ nonCO2})) - LE_{p,y}$$

Where:
AF_{var} = Adjustment factor to account for seasonal and weekly variation of biomass fuel consumption.

The following ER are achieved for a stove being in use for one year:
ER_1 = 1 * 1 * 0.0056 * 0.999 * (0.72 * 1.7472 + 0.1356)) – 0
= 2.83 tCO2eq

Scenario Solar+Efficient Wood Stove:

$$ER_y = \Sigma_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * AF_{var} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel,\ nonCO2})) - LE_{p,y}$$

Where:
AF_{var} = Adjustment factor to account for seasonal and weekly variation of biomass fuel consumption.

The following ER are achieved for a stove being in use for one year:
ER_1 = 1 * 1 * 0.0067* 1.18 * 1.0 * (0.72 * 1.7472 + 0.1356)) – 0
= 3.40 tCO2eq

Scenario Charcoal:

$$ER_y = \Sigma_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * AF_{var} * f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel,\ nonCO2})) - LE_{p,y}$$

Where:
AF_{var} = Adjustment factor to account for seasonal and weekly variation of biomass fuel consumption.

The following ER are achieved for a stove being in use for one year:
ER_1 = 1 * 1 * 0.0016 * 1.0 * (0.72 * 6.344 + 0.1563)) – 0
= 2.67 tCO2eq

Scenario Solar+Efficient Charcoal Stove:

$ER_y = \Sigma_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * AF_{var} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel,\ nonCO2})) - LE_{p,y}$

Where:

AF_{var} = Adjustment factor to account for seasonal and weekly variation of biomass fuel consumption.

The following ER are achieved for a stove being in use for one year:

ER_1 = 1 * 1 * 0.0016 * 1.18 * 1.0 * (0.72 * 6.344 + 0.1563)) – 0
= 2.83 tCO2eq

Further adjustment factors are applied at at stove types level and not at scenario level. The formula is not shown here for all the different types of combinations.

These are:

AF_{solar} = Adjustment factor to account for different stove application of solar stoves in the highlands.

AF_{oli45b} = Adjustment factor for inclusion of larger efficient wood stove models in the exisiting project scenario.

AF_{oli45c} = Adjustment factor for inclusion of larger efficient charcoal stove models in the exisiting project scenario.

E.6. Table providing values obtained when applying formulae above:

The table below summarizes ex-ante calculations of expected ER of a stove being in use for one year in a specific scenario:

Scenario	Estimation of baseline emissions (tonnes CO_2 e)	Estimation of project emissions (tonnes CO_2 e)	Estimation of leakage (tonnes CO_2 e)	Estimation of emission reductions (tonnes CO_2 e)
Wood	5.49	2.66	0	2.83
Charcoal	5.13	2.46	0	2.67
Solar+efficient wood stove	5.89	2.50	0	3.40
Solar+efficient charcoal stove	5.01	2.18	0	2.83

Ex-ante estimations of overall baseline and project emissions as well as emission reductions are estimated based on sales forecast of stoves in the different scenarios using ex-ante values for ER per stove per year and an assumed usage rate of 90%. Further, it is assumed that stove sales happen continuously throughout the year.

Year	Estimation of baseline emissions (tonnes CO_2 e)	Estimation of project emissions (tonnes CO_2 e)	Estimation of leakage (tonnes CO_2 e)	Estimation of emission reductions (tonnes CO_2 e)
2015	286'162	135'688	0	150'473
2016	347'175	164'625	0	182'550
2017	402'495	190'862	0	211'632
2018	487'875	231'299	0	256'576
2019	594'646	281'942	0	312'704
2020	690'740	327'521	0	363'220
2021	777'225	368'541	0	408'683
Total	**3'586'317**	**1'700'478**	**0**	**1'885'839**

SECTION F. Environmental impacts

F.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

According to the Gold Standard VER Manual an Environmental Impact Assessment (EIA) is necessary if required by appropriate host country law or if required by the Gold Standard. In order to decide if an EIA must be performed the results of the Sustainable Development Assessment Matrix and the stakeholder consultation are considered.

The Gold Standard EIA prescreeen checklist (see Annex 4) did not reveal any negative or critical impacts of the project. The sustainability matrix in Section A.2 does not contain any negative scores, every sub-total and total score is positive. As well there are no crucial indicators for an overall positive impact. Furthermore, the Stakeholder Consultation outlined in Section G shows that the stakeholders are very positive about the harmlessness of the project. No significant negative impacts have been identified. Therefore, the EIA has not to be performed as a result of GS requirements.

As well, there is no EIA required by the host country. In the respective legal decree "DECRET N° 99 -954 relatif à la mise en compatibilité des investissements avec l'environnement" from the 15 December 1999 the projects with mandatory EIA are stated in Annex I. For the energy sector, only large power plants and fossil fuel facilities need an EIA. Regarding, the production site, an EIA would only be required if the production site of the solar and efficient stoves would be classified as industrial plant, which is not the case. Since, the beginnings of ADES five years ago, there were many contacts with several governmental departments. Never any government representative mentioned that a EIA is required. As well the project site is not located in any of the ecologically sensible zones mentioned in the „Arrêté interministériel n°4355 /97" where the ecologically sensible zones are listed.

Even if no EIA is required, the Gold Standard requires a description of environmental impacts, which is given here;

The project is a renewable energy & energy efficiency project, which improves the environment resulting in less deforestation and less air pollution;

- Avoidance of deforestation. Thereby, reduced erosion, reduced loss of fertile soil and conservation of the biodiversity in the region.
- Reduction of airborne emissions due to indoor combustion of wood and charcoal.
- Reduction of water pollution caused by charcoal production.
- Reduction of CO2, airborne emissions and noise through reduced transportation of wood and charcoal

No essential negative aspects for the environment generated by this project could have been found. The material and energy use for the stove production is negligible compared to the energy and wood savings generated by the stoves in operation.

F.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

An Environmental Impact Assessment (EIA) is not needed (see F.1.) because it is neither required by the Gold Standard procedures nor by the host country (see F.1.).

SECTION G. Stakeholders' comments

G.1. Brief description how comments by local stakeholders have been invited and compiled:

Stakeholders were addressed in two phases;
1. Previous consultation activities
(prior to retroactive registration request to the Gold Standard)
2. Second round stakeholder consultation
(after feedback from the Gold Standard to the retroactive registration request)

1. Previous consultation activities

Since it beginnings in 2000 ADES has constantly been in contact with local stakeholders such as the government and NGOs. This helped to improve the technology and get a better understanding of the local Situation. From mid 2008 on, the stakeholders were consulted in a more formal way as follows;

Consultation meeting for local stakeholders
(part of the „Conference du 17 juin 2008 sur le CO_2")

Date: 17th June 2008
Place: ADES Conference room, Tuléar

Way of making the local meeting public:
The most important organizations and governmental institutions were invited per emails and letters. Additionally, leaflets on the meeting were placed at seeral locations of the city.
of Tuléar.
Independent person leading through the consultation: Mark Fenn, WWF Madagascar

Participants :

Name	Type of stakeholder	Organization / Company	Function
REJORAHARIMALALA Odette	Local government	Municipality of Tuléar	Deputy Mayor, Exponent of the community
Ranoandro Joëline	Local NGO	COS-DRV Toliara	Exponent of a woman's organization
Berthin-Poreaka	Local affected people	Exponent of the wood and charcoal business	Charcoal producer
Mark Fenn	Local representative of international NGO	WWF Madagascar	Technical assistant
Ralaimahandry Jean Bosco	Local NGO	ANGAP (Association National pour la Gestion des Aires Protégées)	General Secretary
Ramampiherika Daniel	Local university	University of Tuléar	Professor for Renewable energy
Rakotondrasoa Ananias	Local NGO	SAGE (Service d'Appui à la Gestion de l'Environnement)	Technical Coordinator
Hery Rosette	National Government	Ministry of population	Coordinator PC/EPT
Ramiandrisoa Richard	Local representative of	Regional Directorate of	Chef of service of

	national government	National Education (DREN) Antsimo Andrefana	alphabetisation
Jean Aimé Randrianandrasana	Local press	Radio le buffet Sakaraha	Reporter
Mananama	National Government	Ministry of mines	S/G Mines/DPMEM
Ismael Moussa Benali	Local university	University of Tuléar	Student
Retovo Latimer	Local press	Midi Madagascar	Reporter
Maherizo T. Geoline	Local NGO	SEESO	Chef of project "volet A"
Mananandro Julienne	Local representative of international NGO	Red cross	President of district CRM
Marcelin Jean	Local representative of governmental orgnanisation	Project FAP/RSO	
Francia	Local press	Radio of the university	Reporter
Otto Frei	Project proponent	ADES	Coordinator
Allain Chantal	Project proponent	ADES	Director of ADES Toliara
Rafelasoaritendry Jeanne Elise	Project proponent	ADES	Assistent of Coordinator of ADES

Personally invited but not participating persons:
- Chef de region (= Prime minister/president of the region of Tuléar)
- GTZ (Deutsche Gesellschaft für technische Zusammenarbeit) Tuléar

Language: Invitation for the meeting and meeting itself was conducted in French. A translation to the local language Malagasy was not made as all participants speak French.

Meeting procedure:
- Opening (5 min)
- Purpose of the consultation (5 min)
- Description of the project (15 min)
- Answering of questions (15 min)
- Answering to the checklists (15 min)
- General feedback (30 min)

Email consultation

In addition to the meeting for local stakeholders, Gold Standard supporting NGOs in Madagascar, international GS supporters as well as the Gold Standard itself were consulted through email.

NGOs consulted:

Contacts	Organisation	e-mail	Email sent	Feed-back
Meinrad Buerer	The Gold Standard	meinrad@ cdmgoldstandard.org	30/06/08	02/07/08
Voahirana Randriambola	WWF Madagascar	vrandriambola@wwf.mg	30/06/08	01/07/08
Fenosoa Andriamahenina	Tany Meva (Fondation malgache en environnement)	fenosoa.tanymeva@ wanadoo.mg	30/06/08	01/07/08
Amanda Luxande	REEEP, Regional Secretariat Southern African	amanda.luxande@ reeep.org	24/07/08	
Dorothy McIntosh	Mercy Corps UK	dmcIntosh@ uk.mercycorps.org	24/07/08	
Steve Sawyer	Greeenpeace international	Steve.Sawyer@ diala.greenpeace.org	24/07/08	

None of the consulted NGOs made any critical comments on the project.

Information to the DNA
On the 16th of January 2008 the Designated National Authority (DNA) of Madagascar (Monsieur Randriasandratana Germain, Ministére de l'Environnement, des Eaux et Forets, BP.571 Ampandrianomby, Antananarivo 101, Madagascar) was informed on the project. The DNA confirmed the receipt of the email on 19th January 2008.

Results announcement
The results of both the local meeting and the email consultation were made public from the 17th of July 2008 on the myclimate website.

Translation in French
The checklist for social and environmental impacts as well as a non-technical summary of the project were translated into French for purpose of the Stakeholder Consultation.

2. Second round stakeholder consultation
The second round of stakeholder consultation was initiated from the 25th of September 2008 and included;
- Making the PDD publicly available for at least 60 days on myclimate.org
- Inviting all GS supporter organizations and their local representatives to comment on the project
- Actively requesting a feedback from all stakeholders consulted in the previous periods (including several local NGOs) on the adapted version of the project.

After the 60 days have passed a stakeholder consultation report will be provided.

Stakeholder consultation for the second crediting period
The stakeholder consultation for the second crediting period is conducted as requested by the Gold Standard guidelines.

G.2. Summary of the comments received:

As part of the previous consultation activities (1) the following comments were received;

All stakeholders generally support the use of solar and energy efficient stoves in the region and also approve the ADES project. In specific, all stakeholders agree on the following positive impacts of the project;

- it is as an important contribution in the fight against deforestation in the South of Madagascar.
- CO2 emissions are reduced.
- The local population benefits by the lower need for buying charcoal and wood fuel. This can help the people to escape poverty.

The stakeholders think that ADES needs further help and funds to maintain and enlarge the activities in order to reach the final goals of poverty alleviation and the end of deforestation.

Mr. Mananama from the Ministry of Energy and Mines stated that the protection of the environnement must not be neglected and acknowledged that the ADES project contributes substantially to environmtal projection.

Several stakeholders mentioned that not only the production but also the promotion of the ADES cookers has to be expanded. Andrew, a student doing research at the University of Tuléar, asked ADES to train new people for cooking demonstration and the dissemination of the stoves. RAKOTONDRASOA Ananias, technical responsable at SAGE, thinks that the dissemination of the stoves is not over after the sale and that the stove users have to be trained in order to enhance the utilisation rate and to evaluate the products of ADES.

The national and international stakeholders did not provide any comments.

As part of the second round of stakeholder consultation (2) .the following comments were received:
During the second round four comments on the project activity were received from the contacted stakeholders.
Mr. MARCELLI, a local representative of governmental organization, points out the importance of combating global climate change und reducing CO2 emissions not only in the industrialized, but also in the developing countries. Therefore, he encourages ADES to continue the promotion of solar and efficient stoves in Madagascar as an important contribution to protect the environment. Further, Mr. MARCELLI recommends that ADES should enforce its marketing efforts for the promotion of solar stoves.
Narcisse ZAFIFAMENOSOA from SAGE (Servie d'Appui à la Gestion de l'Environnement) is convinced that the project activity will benefit the development of the region and kindly offers their support to the project if needed.
Solonarivo RAZAFIMANDIMBY, representative of a local commune, expresses its thanks to ADES for their efforts and emphasizes the importance of the project activity for the development of their commune.
Mr. MANANAMA from the Ministry of Energy and Mines supports the project activity as a contribution to the development of the region.
In general, all stakeholders support the project activity and emphasize its contribution to the development of the region. One stakeholder recommends intensifying the promotion of solar and efficient stoves in the region. No negative issues were mentioned.

Comments from the stakeholder consultation for the second crediting period:
Feedback will be inserted once the consultation has been conducted.

G.3. Report on how due account was taken of any comments received:

Generally, the project design does not have to be amended as no negative comments were received.

Regarding the call from several stakeholders for more promotion, training and dissemination measures ADES is aware that more can be done. However, the sources of ADES are at the moment limited. However, the income from carbon credits will not only help to enlarge the activities but also to do more for promotion of the technology and the training of resellers and cooking consultants.

As reaction to the call for more evaluation measures it is to be said that the monitoring for the carbon crediting gives the project the possibility to evaluate the usage rate and the aging of the stoves.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Association pour le Développement de l'Energie Solaire Suisse - Madagascar (ADES)
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Country:	MADAGASCAR
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FAX:	-
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URL:	www.adesolaire.org
Represented by:	
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Street/P.O.Box:	Sternenstrasse 12
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Annex 2

BASELINE INFORMATION

Data used to determine the baseline and project emissions:

A. Data that is not monitored:

Data / Parameter:	$EF_{b,co2}$
Data unit:	tCO2/t_fuel
Description:	CO2 emission factor arising from use of fuel in baseline scenario
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Tables 1.2/1.4
Value applied:	1.7472 tCO2/t wood (=112.0 tCO2/TJ * 0.0156 TJ/ t) 6.344 tCO2/t charcoal (=112.0 tCO2/TJ * 0.0295 TJ/ t + 3.04 tCO2/t)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default IPCC values for wood / wood waste are applied. Default IPCC values for charcoal are applied. Country-specific value for emission during production of the fuel: Girard, P., Rousset, P, Vergnet, A., Rasamindisa, A., 1998. Comparing forestry wood species for the charcoal supply of Antananarivo city, Madagascar. In: Boiling Point, Issue 40, Household energy and health. (http://www.hedon.info/View+Article&itemId=10457 -> Mean of mentioned emission factors)
Any comment:	If EF is in units of tCO2/t_fuel, remove NCV term from emission calculations. Term can include a combination of emission factors from fuel production, transport, and use. The EF for charcoal includes the emissions during production of the fuel.

Data / Parameter:	$EF_{p,co2}$
Data unit:	tCO2/t_fuel
Description:	CO2 emission factor arising from use of fuel in project scenario
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Tables 1.2/1.4
Value applied:	1.7472 tCO2/t wood (=112.0 tCO2/TJ * 0.0156 TJ/ t) 6.344 tCO2/t charcoal(=112.0 tCO2/TJ * 0.0295 TJ/ t + 3.04 tCO2/t)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default IPCC values for wood / wood waste are applied Default IPCC values for charcoal are applied Country-specific value for emission during production of the fuel: Girard, P., Rousset, P, Vergnet, A., Rasamindisa, A., 1998. Comparing forestry wood species for the charcoal supply of Antananarivo city, Madagascar. In: Boiling Point, Issue 40, Household energy and health. (http://www.hedon.info/View+Article&itemId=10457 -> Mean of mentioned emission factors)
Any comment:	If EF is in units of tCO2/t_fuel, remove NCV term from emission calculations. Term can include a combination of emission factors from fuel production, transport, and use. The EF for charcoal includes the emissions during production of the fuel.

Data / Parameter:	$EF_{b,non-co2}$
Data unit:	tCO2/t_fuel
Description:	Non-CO2 emission factor arising from use of wood-fuel in baseline scenario

Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 2.5
Value applied:	0.1356 tCO2eq/t wood 0.1563 tCO2eq/t charcoal
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default IPCC values for CH4 and N20 emissions for wood / wood waste are applied Default IPCC values for CH4 and N20 emissions for charcoal are applied The following GWP100 are applied: 25 for CH4, 298 for N20
Any comment	These values were updated for the 2nd crediting period. GWP for second commitment period are applied.

Data / Parameter:	$EF_{p,non\text{-}co2}$
Data unit:	Data unit: tCO2/t_fuel
Description:	Description: Non-CO2 emission factor arising from use of wood-fuel in project scenario
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 2.5
Value applied:	0.1356 tCO2eq/t wood 0.1563 tCO2eq/t charcoal
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default IPCC values for CH4 and N20 emissions for wood / wood waste are applied Default IPCC values for CH4 and N20 emissions for charcoal are applied The following GWP100 are applied: 25 for CH4, 298 for N20
Any comment	These values were updated for the 2nd crediting period. GWP for second commitment period are applied.

Data / Parameter:	$P_{b,y}$
Data unit:	t_biomass/unit-year and t_biomass/unit-day
Description:	Quantity of woody biomass consumed in the baseline scenario in year y and per day in year y.
Source of data used:	
Value applied:	Wood scenario: 3.95 t wood/year and 0.0108 t wood/day Charcoal scenario: 1.09 charcoal/year and 0.0030 t charcoal/day Solar+efficient wood stove: 4.23 t wood/year and 0.0116 t wood/day Solar+efficient charcoal stove: 1.06 charcoal/year and 0.0029 t charcoal/day
Justification of the choice of data or description of measurement methods and procedures actually applied :	Results from KPT 2014. Data fulfills 90/30 rule, thus mean value is used.
Any comment:	These values were updated for the 2nd crediting period.

Data / Parameter:	$f_{NRB,i,y}$
Data unit:	Fractional non-renewability (%)
Description:	Non-renewability status of woody biomass fuel in scenario i during year y
Source of data used:	http://cdm.unfccc.int/DNA/fNRB/index.html
Value applied:	72%
Justification of the choice of data or description of	Official CDM default value is applied. This value was accepted by the DNA of Madagascar on 23 July 2012 and it is the latest

measurement methods and procedures actually applied :	available official value for fNRB.
Any comment:	This value is fixed for the duration of the crediting period. However, the PP can at any time chose to reassess and adjust the NRB value.

B. Data that is monitored:

Data / Parameter:	**$P_{p,y}$**
Data unit:	t_biomass/unit-year and t_biomass/unit-day
Description:	Quantity of woody biomass consumed in the project scenario in year y and per day in year y.
Source of data used:	
Value applied:	Wood scenario: 1.91 t wood/year and 0.0052 t wood/day Charcoal scenario: 0.52 charcoal/year and 0.0014 t charcoal/day Solar+efficient wood stove: 1.79 t wood/year and 0.0049 t wood/day Solar+efficient charcoal stove: 0.46 charcoal/year and 0.0013 t charcoal/day
Justification of the choice of data or description of measurement methods and procedures actually applied :	Results from KPT 2014. Data fulfills 90/30 rule, thus mean value is used.
Any comment:	

Data / Parameter:	**$U_{p,y}$**
Data unit:	Percentage
Description:	Usage rate in project scenario p during year y
Source of data used:	Annual usage survey
Value applied:	Usage parameters are applied per stove type: • Solar stoves (box and parabolic) • Oli-b • Oli-45b • Oli-c • Oli-45c
Justification of the choice of data or description of measurement methods and procedures actually applied :	Conducting surveys as required by the methodology “Technologies and Practices to Displace Decentralized Thermal Energy Consumption - 11/04/2011”
Any comment:	A single usage parameter is weighted to be representative of the quantity of project technologies of each age being credited in a given project scenario

C. Adjustment factors applied at scenario level:

Data / Parameter:	**AF_{var}**

Data unit:	ratio
Description:	AF_{var} is used to account for seasonal and weekly variation of biomass fuel consumption
Source of data used:	BS/PS 2014 and thereafter latest Monitoring/Usage surveys
Value applied:	Wood scenario: 0.999 Charcoal scenario: 1.0 Solar+efficient wood stove: 1.0 Solar+efficient charcoal stove: 1.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Adjustment factors fine tune the baseline and project scenarios to account for variability in fuel savings due to differences in project technology type, size, usage pattern, and other pertinent variables, without requiring project proponents to independently monitor new baseline and project scenarios.
Any comment:	Annual monitoring/usage surveys conducted with stove users reveal the latest figures for seasonal and weekly variation in fuel consumption.

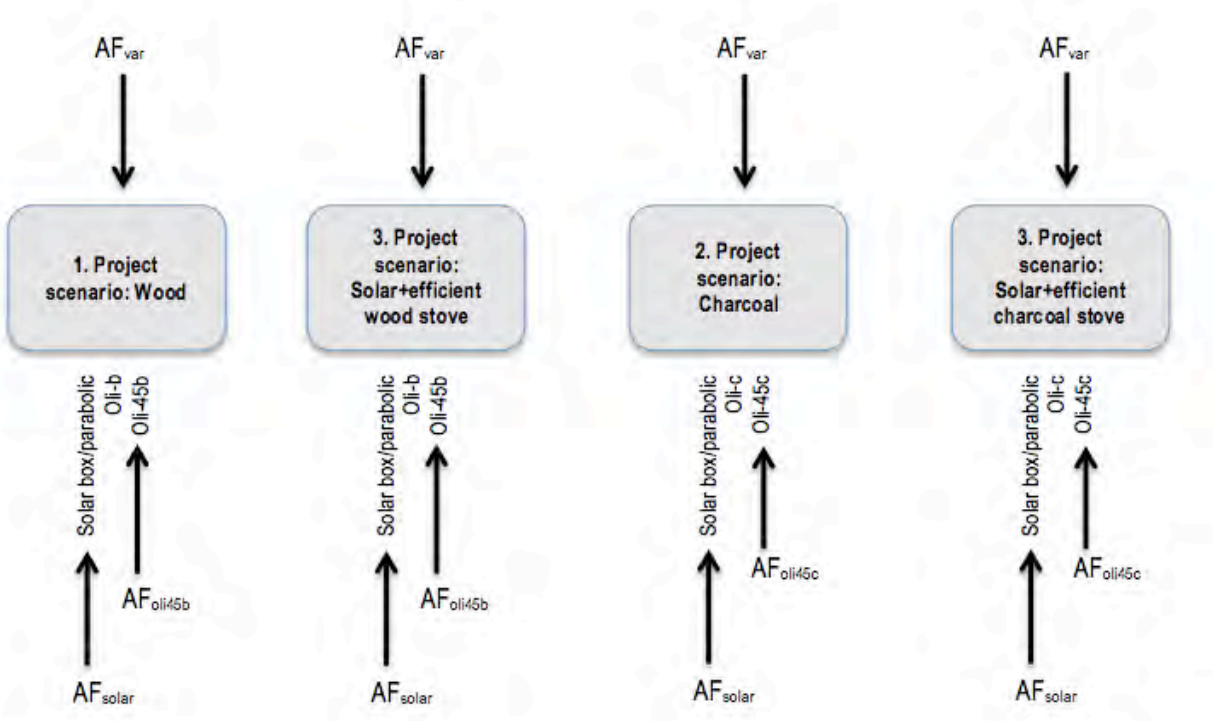
D. Adjustment factors applied at stove type level:

Data / Parameter:	**AF_{solar}**
Data unit:	ratio
Description:	AF_{solar} is used to account for different stove application of solar stoves in the highlands.
Source of data used:	Kitchen Survey 2013
Value applied:	0.593
Justification of the choice of data or description of measurement methods and procedures actually applied :	Adjustment factors fine tune the baseline and project scenarios to account for variability in fuel savings due to differences in project technology type, size, usage pattern, and other pertinent variables, without requiring project proponents to independently monitor new baseline and project scenarios.
Any comment:	Kitchen surveys (see KS Solar Tana Report 2013) conducted with solar stove users in the highlands revealed that due to different climatic conditions solar stove application is less frequent than in the existing project scenarios.

Data / Parameter:	**AF_{oli45b}**
Data unit:	ratio
Description:	AF_{oli45b} is used to account for different fuel savings of larger efficient stove model.
Source of data used:	KT 2012
Value applied:	1.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Adjustment factors fine tune the baseline and project scenarios to account for variability in fuel savings due to differences in project technology type, size, usage pattern, and other pertinent variables, without requiring project proponents to independently monitor new baseline and project scenarios.
Any comment:	Larger households prefer to cook with the larger model of the efficient wood stove (Oli-45b), which is designed for larger cooking pots. Stove performance test and kitchen surveys conducted in 2012 revealed that larger households have higher baseline fuel consumption, which leads to higher fuel savings when applying an efficient cook stove. The stove type Oli-45b is included in the existing project scenario: wood currently applying an adjustment factor of 1.0. This is conservative.

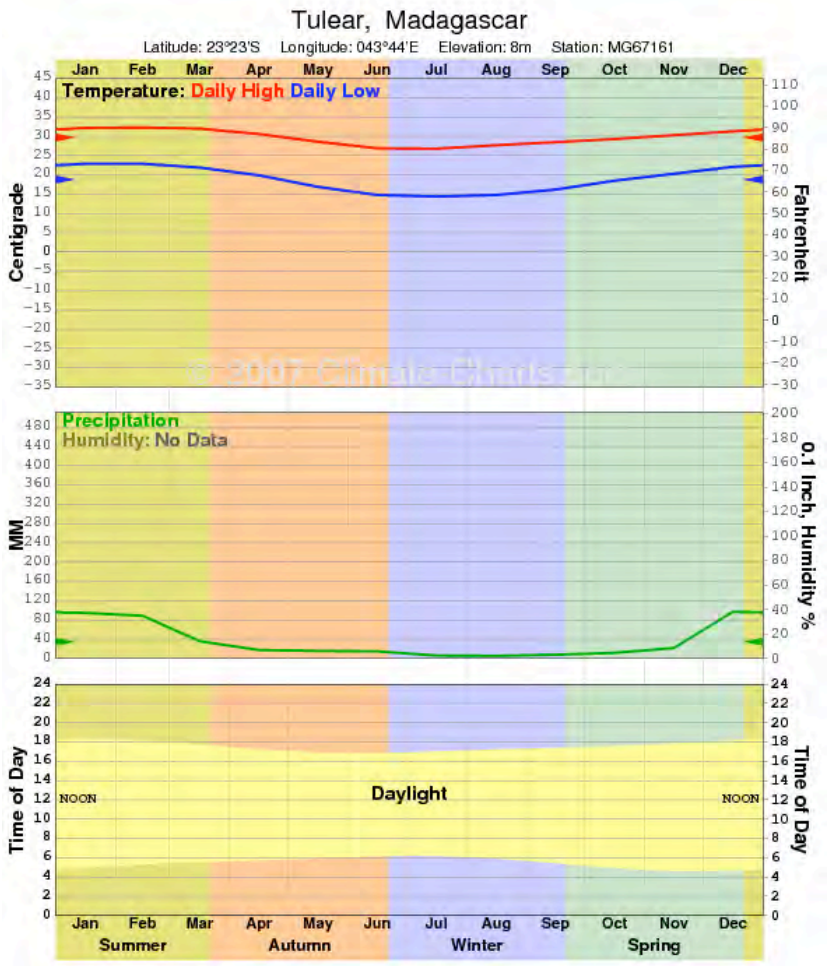
Data / Parameter:	**AF_{oli45c}**
Data unit:	ratio
Description:	AF_{oli45c} is used to account for different fuel savings of larger efficient stove model.
Source of data used:	KT 2012
Value applied:	1.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Adjustment factors fine tune the baseline and project scenarios to account for variability in fuel savings due to differences in project technology type, size, usage pattern, and other pertinent variables, without requiring project proponents to independently monitor new baseline and project scenarios.
Any comment:	Larger households prefer to cook with the larger model of the efficient charcoal stove (Oli-45c), which is designed for larger cooking pots. Kitchen performance test conducted in 2012 revealed that larger households have higher baseline fuel consumption, which leads to higher fuel savings when applying an efficient cook stove. The stove type Oli-45c is included in the existing project scenario: charcoal currently applying an adjustment factor of 1.0. This is conservative.

Overview of adjustment factors applied at scenario and stove level



Other baseline information:

Climate Chart for Tuléar



Source: http://www.climate-charts.com/Locations/m/MG67161.php, accessed on 28.04.2014

Annex 3

MONITORING PLAN

The monitoring plan is described in section D of this PDD. The latest monitoring manual is available as a separate document.

Annex 4

ENVIRONMENTAL ASESSMENT

EIA Pre-screen

1. Will there be a large change in environmental conditions?

No, the project is to small to have a large impact. However, the deforestation and the air pollution can be reduced

2. Will new features be out-of-scale with the existing environment?

No, the stoves can hardly be seen. The production facility is done in a existing building.

3. Will the effect be unusual in the area or particularly complex?

n/a

4. Will the effect extend over a large area?

n/a

5. Will there be any potential for transfrontier impact?

No, Madagascar is an island.

6. Will many people be affected?

Several thousands households benefit from affordable, ecologically sound cooking technology

7. Will many receptors of other types (fauna and flora, businesses, facilities) be affected?

No

8. Will valuable or scarce features or resources be affected?

No

9. Is there a risk that environmental standards will be breached?

No

10. Is there a risk that protected sites, areas, features will be affected?

No

11. Is there a high probability of the effect occurring?

n/a

12. Will the effect continue for a long time?

n/a

13. Will the effect be permanent rather than temporary?

n/a

14. Will the impact be continuous rather than intermittent?

n/a

15. If it is intermittent will it be frequent rather than rare?

n/a

16. Will the impact be irreversible?

n/a

17. Will it be difficult to avoid, or reduce or repair or compensate for the effect?

n/a