CLEAN DEVELOPMENT MECHANISM
SIMPLIFIED PROJECT DESIGN DOCUMENT
FOR SMALL SCALE PROJECT ACTIVITIES (SSC-PDD)
VERSION 01 (21 JANUARY, 2003)

CDM Project Design Document (PDD):

CDM SOLAR COOKER PROJECT Aceh 1
INDONESIA

CONTENTS

Annexes

A. General description of project activity

A.1 Title of the project activity:

CDM SOLAR COOKER PROJECT Aceh 1

A.2 Description of the project activity:

The "CDM SOLAR COOKER PROJECT ACEH 1" aims for the district of
Sabang Islands/Aceh/Indonesia and Aceh Tenggara in the framework of a Small Scale CDM Project:

- help people depending on traditional fuel - which causes environmental destruction, diseases, forest fires, non-sustainable logging of trees and emission of smoke and greenhouse gases - by the introduction of newly developed solar cookers and containers for heat retaining for cooking as well as heating and sterilizing of water and for preserving food,
- train all steps of implementation of these technologies,
- collect all data needed for the CDM project,
- demonstrate chances of financing environmental projects by the help of CDM

by cooperation of

- Government of Aceh Province, Indonesia
- PT Petromat Agrotech, Jakarta, Indonesia
- Klimaschutz e.V., Bonn, Germany
- German experts on solar cookers, fuel saving devices and CDM.

The project strives to transfer and spread most advanced technologies of solar cookers and of heat retaining containers (to finish cooking by unattended simmering and to separate mealtime and cooking time).

The new technologies use renewable resources for cooking meals, heating and sterilising water and preserving food.

The transferred technology can be a source of additional income e.g. by preserving the quality of fish before further processing. The knowledge of advantages of applying renewable sources of energy and energy saving can be applied in various fields of production and daily life and results in household savings and environmental friendly behaviour. In this way, protecting the forest can be understood as protecting the resources for future generations.

One of the main reasons of deforestation in Indonesia is the use of firewood for cooking. The project aims to show that this can be changed without additional burdens to the country. As the people who depend on firewood have not got the means to purchase solar cookers, which leads them into a vicious circle of poverty and in consequence to environmental destruction what generates further poverty because of destroyed natural ressources. Therefore pre-financing the returns of CERs which enables Klimaschutz e.V. to purchase solar cookers is meant to assist people in need to escape from this vicious circle. In this way undesirable social developments can be prevented.

The solar cookers are delivered to Sabang City and City of Badar partially prefabricated. Assembling is labour intensive. Two persons will need approximately 4 hours to assemble one solar cooker. Therefore we intend to employ about 10 people who are trained and supervised by PT Petromat Agrotech to assemble the solar cookers. Although this project will produce direct employments by assembling and

monitoring, the greater impact to generating wealth for the beneficiary user is the application of the new devices for generating income and for saving expenses.

Monitoring of the project will be combined with an enduring educational program to ensure best use of the cooking devices. The educational program will contain also teaching of skills in building the cookers and other life skills.

Newest technology for solar cooking and heat retaining will be transferred from Germany and adopted to the local demands by intensive participation of the local company PT Petromat Agrotech.

Staff members of PT Petromat Agrotech have been already trained in assembling the solar cookers. Further staff is planned to be trained in the skills of assembling, use and monitoring at the project locations.

It is planned to cooperate intensively with local NGOs, especially for monitoring, training and environmental education. Readiness to cooperate has been signalised already by several local NGOs.

The project satisfies the eligibility criteria of CDM-projects:

1. Contribution to sustainable development
2. Environmental additionality
3. Financial additionality

The project is designed to contribute to sustainable development by protecting the environment and by improving the living conditions. This is achieved by saving non sustainably harvested fuel wood and by avoiding the emission of greenhouse gases and smoke from traditional cooking and from forest fires, and by improving the standard of households, promoting health and enabling income generation.

Additionality is described in chapter B3.

A.3 Project participants:

1. PT Petromat Agrotech

Person in Charge: Ir. Rudi Wahyudi

Core business: Renewable energy, especially solar drying, solar home systems and agricultural engineering; since more than 20 years in business.

Function in the project:
Monitoring and project administration; assembly, distribution and maintenance of the equipment.

PT Petromat Agrotech is responsible for the annual project review. PT Petromat Agrotech coordinates with Klimaschutz e.V. in case of one of the following changes are necessary:

a) providing additional equipment
b) adaptation of training methods
c) changes of beneficial users of equipment.

2. Klimaschutz e.V.

Project director: Klaus Trifellner

Function in the project: Investor and project supervision.

Klimaschutz e.V. receives 100% of the CERs resulting from the project activity. The revenues from the CERs are mainly used to cover the cost of equipment, its implementation and its improvement and maintenance.

The official contact for project activities is PT Petromat Agrotech.

A.4 Technical description of the project activity:

A.4.1 Location of the project activity:

A.4.1.1 Host country Party(ies): INDONESIA
Home country of investor: GERMANY

A.4.1.2 Region/State/Province etc.: Sabang Islands/Aceh and Aceh Tenggara

A.4.1.3 City/Town/Community etc: Sabang Islands and Badar

A.4.1.4 Detailed description of the physical location, including information allowing the unique identification of this project activity:

The project is designed for households and small scale fishing industry of the districts in Sabang Islands in the north of Aceh and the City of Badar in Aceh Tenggara.

A.4.2 Type and category(ies) and technology of project activity

Type 1: Renewable Energy Projects
Category I.C: Thermal energy for the user

The project falls into this category as it uses renewable energy by introduction of solar cookers and heat retaining containers. The project avoids the use of non-sustainably harvested fuel wood.

A solar cooker of the type K14 (diameter of reflector parabola about 140 cm), which is used by the project, has the nominal power[1] P = 600 W. The project comprises up to 1000 device, thus the installed power adds up to maximum 600 kW, which is below the limit of 15 MW of Small Scale Projects (Appendix B, I.C., chapter 2.).

The cookers are used in households and small scale enterprises (e.g. fishery). The technology is transferred from Germany by providing the knowledge and prefabricated solar cooker kits and by propagation of technology for cooking by retained heat. The cookers are built locally under the supervision of the local specialists trained by German trainers.

In the past many attempts have been undertaken to spread solar cookers[2] with limited success and valuable experience. The project has a new concept using CDM as a means to making accessible devices of high quality and long durability to the people who most need to overcome the disadvantages of

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[1] The nominal power P is calculated by the formula $P = (T_2 - T_1) * c_p * m / t$.
Solar cooker K14 brings 6 litres of water (m = 6 kg) from temperature T_1 = 20 °C to a boil (i.e. $T_2 - T_1$ = 80 K) in a time t = 55 minutes with bright sunshine. P = 80 K * 4.18 kJ/kg/K * 6 kg / (55 * 60s) = 0.6 kW.

[2] E. g.: DME-GTZ-field test in South Africa, s. "Moving Ahead with Solar Cookers - Acceptance and Introduction to the Market", GTZ, Eschborn.
Also: Documentation provided by SCI, Solar Cookers International (www.solarcookers.org)

conventional cooking. A further difference of the project's concept is the use of prefabricated kits. This enables production with high capacity and high quality and assures a transparent process of the project.

The design of the solar cookers K14 is based on more than 20 years of experience with development and dissemination of parabolic solar cookers. Using effective containers for cooking with retained heat (simmering) in addition to the cooker is a highly recommended measure for saving energy, to separate cooking time from meal time, to conserve water at high temperature, to shorten the time when the pot is in the cooker, and to simplify the cooking process, because simmering takes place without the need of surveillance and intervention. The project will turn high attention to this technology.

Experiences with the existing parabolic solar cookers proved a life span of the reflector material of more than 7 years if used appropriately. For the corrosive atmosphere near to the coast a special protection coating of the reflector is applied to ensure the long lifetime. Defect components can be replaced easily.

A.4.3 Brief statement on how anthropogenic emissions of greenhouse gases (GHGs) by sources are to be reduced by the proposed CDM project activity:

Reduction of antropogenic GHG emission is achieved by using solar cookers and heat retaining containers to avoid the non sustainable use of fuel wood.

Assumed mean emission reduction (CO_2-equivalents) by a solar cooker K14 in combination with a heat retaining container by avoiding non sustainable use of fuel wood is m_{CO2} = 3.5 CO_2 eq tonnes/year. After installation of 1 000 equipments the total amount of emission reduction by about 1 000 households is assumed[3] to be about 3.5 CO_2 eq tonnes/year. As an education program and a maintenance service are incorporated into the project, it is assumed that the emission reduction is constant during the first crediting period. In the first year (2005) the devices are installed. It is assumed, that in this year the saving of CO_2 will be 1/4 of the estimated saving of a whole year.

CDM SOLAR COOKER PROJECT Aceh 1		
Year	**CO_2 eq tonnes abated**	**Cummulative (tonnes)**
2005	875	875
2006	3500	4375
2007	3500	7875
2008	3500	11375
2009	3500	14875
2010	3500	18375
2011	3500	21875
2012	2625	24500
Total	**24500**	

A.4.4 Public funding of the project activity:

There is no public development funding (ODA) going in this solar cooker project.

A.4.5 Confirmation that the small-scale project activity is not a debundled component of a larger project activity:

[3] Emission reduction is calculated by formula (5) in chapter E, derived in chapter B5.1. The amount m_{CO2} = 3.5 CO_2 eq tonnes/device/year is calculated by formula (7a) in chapter B5.1 with the stated assumptions.

The project is not a debundled component of a larger project activity.

B. Baseline methodology

B.1 Title and reference of the project category applicable to the project activity:

Title: CDM SOLAR COOKER PROJECT Aceh 1
Type: Renewable Energy Projects
Category I.C: Thermal energy for the user

B.2 Project category applicable to the project activity:

Renewable energy technologies that displace non-renewable sources of biomass.

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

Without the project there will be an emission of GHGs by the combustion of fuel wood which is non sustainably harvested and by emissions due to products of incomplete combustion (PICs) of the fuel wood.

The thermal capacity of the project is 600 kW (s. A4.2) which is below the limit of 15 MW, therefore a simplified methodology for small scale projects applies.

The logging for the purpose of firewood and the losses from forest fires is higher than national forestation (see e.g. Earth Trends, World Resources Institute: Country profile Indonesia). National policy is dedicated to avoid forest fires due to conventional burning of firewood. The population continuously depends on logging trees for firewood. If the devices are provided, illegal and legal non-sustainable logging will be avoided.

Sinks are not taken into account, until there it is a reliable base for calculation. But the intention of the project comprises the transition to sustainable firewood consumption. This enables trees to continue to grow and biomass is not exhausted, resulting in a durable stock of CO_2 which is removed from the atmosphere.

The project is additional, because the target group of users doesn't have the means to purchase the fuel wood saving devices. The average income in this area of the target group is about 30 Euro per month. It would mean a significant part of the income of the population. By the finance of an Investor, who actually pre-finances the returns of the CER's, it is possible to realize the project.

B.4 Description of the project boundary for the project activity:

The project boundaries are the Sabang Islands of Aceh and the city of Badar in Aceh Tenggara.
In both islands and in the city of Badar the firewood is logged locally. The firewood is not transported from other locations.

B.5 Details of the baseline and its development:

B.5.1 Specify the baseline for the proposed project activity using a methodology specified in the applicable project category for small-scale CDM project activities contained in appendix B of the

simplified M&P for small-scale CDM project activities:

Appendix B of the simplified M&P for small-scale CDM project activities, I.C. §19 states:
"For renewable energy technologies that displace non-renewable sources of biomass, the simplified baseline is the non-renewable sources of biomass consumption of the technologies times an emission coefficient for the non-renewable sources biomass displaced. IPCC default values for emission coefficient may be used."

The displacement of the non renewable harvested fuel wood by a device consisting of a solar cooker in combination with the heat retaining container can be calculated in several ways. A method is applied which gives conservative values and enables a simplified monitoring procedure:

With the known effective power P of one device[4] and its monitored operating time t we get the effective energy E_{eff} delivered by the device:

$$E_{eff} = P * t. \qquad (1)$$

The effective energy can be converted to the saved primary energy E by dividing E_{eff} by the mean efficiency η of the fuel wood use

$$E = E_{eff} / \eta. \qquad (2)$$

A mean value of efficiency η of traditional wood consumption (open fire) is 10%. Values of 5 to 15% for open fires - and higher values of laboratory studies with good wind protection - are reported. The Policy Discussion Paper for the Environmentally Sustainable Development Group (ESDG) of the United Nations Development Programme (UNDP) "Clean Energy for Development and Economic Growth: Biomass and Other Renewable Energy Options to Meet Energy and Development Needs in Poor Nations", published by UNDP, Kingdom of Morocco and GEF, resumes on page 8: "The most common method of cooking throughout rural areas of the developing world is the open hearth or three-stone fire, which typically transfers only 5 - 15 per cent of the fuel's energy into the cooking pot."

For the practical application a value η = 10% seems to be a very conservative approach. These results also from other data provided below, taking in consideration that there is a large consumption of fuel wood for simmering purposes which are not covered by the reported efficiency data.

To estimate the saved carbon emission m_C from the calculated saved energy E we can multiply E by the default value for the Carbon Emission Factor (*CEF*) for solid biomass, disclosed on page 1.6 of IPCC Workbook, chapter "Energy":

CEF = 29.9 t C/TJ [= 29.9 kg C/GJ = 0,0299 kg C/MJ]

$$\begin{aligned} m_C &= E * CEF \qquad (3)\\ &= E * 0.0299 \text{ kg C/MJ}\\ &= P * t / \eta * 0.0299 \text{ kg C/MJ}\\ &= P * t * 0.299 \text{ kg C/MJ} \end{aligned}$$

Conversion of the saved amount m_C of carbon to the saved amount m_{CO2} of CO_2 results from multiplication with the molecular weight ratio of CO_2 to C = 44/12 kg CO_2/kg C according step 6 of the Reference Manual, p. 1.10 and p. 1.30:

$$m_{CO2} = m_C * 44/12 \text{ kg } CO_2/\text{kg C} \qquad (4)$$

[4] device = a solar cooker K14 and a heat retaining container

$= P * t / \eta * CEF$ * 44/12 kg CO_2/kg C (5)
$= P * t$ * 1.096 kg CO_2/MJ (6)
$= E_{eff}$ * 1.096 kg CO_2/MJ. (7)

For a solar cooker K14 with power P = 600 W/device and an assumed annual operating time t = 1500 h the effective energy E_{eff} is:

$E_{eff} = P * t$ = 0.6 kW * 1500 h/device/year * 3600 s/h
= 3 240 000 kWs/device/year
= 3240 MJ/device/year[5],

which corresponds to a CO_2-emission according formula (7)

$m_{CO2} = E_{eff}$ * 1.096 kg CO_2/MJ = 3551 kg CO_2/device/year, (7a)

i.e. about 3.5 tonnes CO_2/device/year.

Assumed 1500 h are about half of the sun hours at the location. In periods unfavourable for solar cooking other means for cooking are used. This is considered in the assumed operating hours.

For checking plausibility of the saving we can use a second way for the estimation of saved CO_2-emission, using data about the average energy consumption:

According Annex III §1 of FAO-paper "Wood Fuel Surveys", the energy consumed per capita for cooking in developing countries is about E_1 = 8.0 GJ/capita/year. Data about energy end-use for cooking and for water heating of low income households can be derived from the publication "The Challenge of Rural Energy Poverty in Developing Countries" of World Energy Council. Section 2.3.1 "Cooking" quotes the result of a research project: "… daily cooking energy consumption per capita varied from 11.5 to 49 MJ, based on field measurements. Despite a wide range of locations and conditions the range of consumption is quite small. In all the cases food was cooked predominantly on an open fire. However, the lower figures are those applying to efficient wood or charcoal stoves and modern energy sources." (http://www.worldenergy.org/wec-geis/publications/reports/rural/energy_use_in_rural_areas/2_3.asp.) The upper value of 49 MJ/capita/day corresponds to 17.8 GJ/capita/year. Thus E_1 = 10 GJ/capita/year for cooking, water heating and sterilizing and for preserving food is a quite conservative assumption for the mean energy consumption of the project's target groups.

The mean number N of the group members of the target groups (families) in Indonesia is about
N = 5.5 capita/group.

With these data the primary energy consumption of a group which will use a solar cooker is
$E = E_1 * N$ = 10 GJ/capita/year * 5.5 capita/group
= 55 GJ/group/year.[6]

The above mentioned Carbon Emission Factor (*CEF*) from IPCC Guidelines Workbook enables the conversion to the correspondent amount of C:
$m_C = E * CEF$ = 55 GJ/group/year * 29.9 kg/GJ (3a)
= 1644.5 kg C/group/year.

The annually consumption m_C of carbon leads to an annually CO_2-emission
$m_{CO2} = m_C$ * 44/12 kg CO_2/kg C

[6] "group" corresponds to "device" as it is assumed that one group (family) uses one solar cooking device.

= 1644.5 kg C/group/year * 44/12 kg CO_2/kg C = 6030 kg CO_2/group/year.

This calculated value m_{CO2} is higher than the amount calculated by equation (4a): (m_{CO2} = 3551 kg CO_2/device/year.) This reflects also the fact, that a solar cooker and the heat retaining container used by the group cannot substitute totally the fuel wood consumption.

Klimaschutz e.V. has made a preliminary survey about the fuel wood consumption in Indonesia. Results after questioning more than 20 potential user families have shown that an energy consumption E_1 = 10 GJ/capita/year is a conservative assumption. A typical amount of fuel wood consumption of a family is about 100 kg/week, i.e. 5200 kg/year. This may correspond to more than 4000 kg dry wood per year, corresponding to about 7300 kg CO_2 per year.

The annual saving of fuel wood can be higher by inserting the locally determined properties of the fuel wood instead of default values.

There are other methods for determining the saving of greenhouse gas emissions by the use of solar cookers and heat retaining containers, by comparing the amount of fuel wood consumption with and without the project implementation, but monitoring of this method is problematic.

In any case it has to be confirmed that there is a non-sustainable fuel wood logging.

To give a conservative estimation, the amount of non-CO_2 greenhouse gases produced by incomplete combustion, especially methane, is not included in the calculation. Sinks of greenhouse gases by the growing of otherwise - in absence of the project - logged trees also have not been considered yet.

B.5.2 Date of completing the final draft of this baseline section *(DD/MM/YYYY)*: 09/05/2005

B.5.3 Name of person/entity determining the baseline:

Dr.-Ing. Dieter Seifert
Senior Engineer
E-mail: bdiv.seifert@t-online.de
in co-operation with Klimaschutz e.V.
Klimaschutz e.V is listed in annex 1; Dr. Seifert is not separately listed in annex 1 of this document.

C. Duration of the project activity and crediting period

C.1 Duration of the project activity:

C.1.1 Starting date of the project activity: 3rd October 2005

C.1.2 Expected operational lifetime of the project activity: minimum 15y-0m

C.2 Choice of the crediting period and related information: *(Please underline the selected option (C.2.1 or C.2.2) and provide the necessary information for that option.)*

(Note that the crediting period may only start after the date of registration of the proposed activity as a CDM project activity. In exceptional cases, the starting date of the crediting period can be prior to the date of registration of the project activity as provided for in paragraphs 12 and 13 of decision 17/CP.7 and in any guidance by the Executive Board, available on the UNFCCC CDM web site.)

C.2.1 Renewable crediting period *(at most seven (7) years per crediting period)*

C.2.1.1 Starting date of the first crediting period *(DD/MM/YYYY)*: 03/10/2005

C.2.1.2 Length of the first crediting period *(in years and months, e.g. two years and four months would be shown as: 2y-4m.)*: 7y-0m

C.2.2 Fixed crediting period *(at most ten (10) years)*:

C.2.2.1 Starting date *(DD/MM/YYYY*):

C.2.2.2 Length (max 10 years): *(in years and months, e.g. two years and four months would be shown as: 2y-4m.)*

D. Monitoring methodology and plan

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

Monitoring according to Appendix B/9 of the simplified modalities and procedures of small scale CDM project activity:
The emission reduction per system[7] is less than 5 tonnes of CO_2 a year. Thus monitoring according (c) is applicable, consisting in

(i) Recording annually the number of systems operating and
(ii) Estimating the annual hours of operation of an average system.

For the present pilot project additionally a more detailed monitoring is planned, and the monitoring is incorporated into an educational program. The responsibility of the monitoring in all phases has PT Petromat Agrotech.

It is intended to draft an detailed agreement between PT Petromat Agrotech and Klimaschutz e.V. outlining the responsibilities of each party. PT Petromat has the right to contract local partners for fulfilling parts of the monitoring activity.

Monitoring takes place by control cards submitted together with the solar cooker. Each solar cooker will only be given out upon signing of a user agreement for 7 years (with prolongation clause), which states, that in case of not using the solar cooker, PT Petromat Agrotech or its representatives are allowed to hand over the devices to another user. These cards are collected and re-emplaced regularly. The data of the users will be filed by PT Petromat Agrotech and evaluated electronically by PT Petromat Agrotech. The evaluation consists of adding up the operating hours and the results forwarded by e-mail to Klimaschutz e.V. for recording on a quarterly basis.

PT Petromat Agrotech cooperates with local NGOs, governmental institutions, religious institutions and re-known village leaders. If there are reports from one of the monitoring assistance that one or more users don't use the solar cooker, PT Petromat will instruct within a grace period of one month to hand over the devices to an interested user.

Verification of the credibility of the data takes place as following:
The central monitoring agency PT Petromat Agrotech files the weather data of the project location,

[7] system = device = a solar cooker K14 and a heat retaining container

especially the sunshine hours of each day. These data are compared with the operating hours to check plausibility. By counterchecking it can be found out if the user is actually using the equipment and if he is reliable in recording the data. Visits of the users and regular meetings in the communities will help to obtain additional feedback about the actual usage, cooperativeness and correct recording. The visits of the users and the discussions at the communities show especially, if a cooker is not applied appropriately and the respective reasons. In the meetings those problems are confronted by solving them or possibly handing over the equipment to another family.

The control card will be a form where the responsible user fills in the data of the usage. He has to fill in following data daily:

Date;
Duration t of usage (in hours per day during the period under report, e.g. during one month);
In case of certain times of not using the equipment, reason of not using has to be given;
Weather condition (recorded with help of symbols).

Each equipment has a monitoring card. The monitoring cards are used for recording the daily usage hours. The cards are collected on a regular basis and re-emplaced by new cards for the next period by the local monitoring entities. It is planned to organize regular meetings of the user community where the users discuss their experience and hand over the control card to the local representative of the project. Initially these meetings will take place quarterly, but the frequency can be adapted to the experience acquired.

The number of valid control cards must correlate to the number of solar cookers given out to the local government. The number of solar cookers supplied can be counterchecked with by the bill of lading from the shipment of the kits.

Coordination and responsibility of the monitoring has PT Petromat Agrotech (Director Ir. Rudi Wahyudi). Petromat is assisted by institutions like the NGO Yayasan Citra Aceh and by Educational Institutions.

If parts of the areas of implementation are too remote and too difficult to reach, the monitoring entities should mention the quantity of devices (households) they couldn't verify.

PT Petromat Agrotech transfers the data into a database. The control cards are kept by PT Petromat Agrotech. The database and following reports will be submitted quarterly to Klimaschutz e.V. for data back-up and verification.

PT Petromat Agrotech will prepare a semi-annual report. The control cards are prepared in Indonesian language to enable the user to report correctly. The reports are prepared in English language.

The reports will cover following issues:

a. List of events
b. List of monitoring assistants
c. List of training activities
d. Number of active users of the equipment
e. Summarized usage hours
f. Reported problems
g. Proposed and implemented solutions
h. Individual reports

Based on the quarterly reports an annual report will be prepared by PT Petromat Agrotech. PT Petromat Agrotech is also responsible for calculating the emission reduction according to the given formulae and the collected data. The final report together with the calculated emission reduced will be submitted to TUEV Sued, the responsible DOE. TUEV Sued has the right to verify the bookkeeping of PT Petromat Agrotech.
The prompt reporting should avoid systematic erroneous trend.

The monitoring is not a singular control process. It is accompanied by continuous education how to apply solar cookers and heat retaining containers for one's benefit. Educational institutions are supporting the spreading of the technology by providing lectures in the framework of teaching life skills to the rural population. The continuous teaching effort during the duration of the project will provide sufficient feed back, which tends to make controlling more automated, because the population will be included in a process that makes the use of the new devices a habit. Through education people can understand the impact of changing their cooking habits in a world wide context. In this way everybody can personally take part in improving actual living conditions and safeguarding the environment for future generations. This will lead to a durable use of this new technology and to the participation in the necessary monitoring activity.

Regular control by the monitoring entities will verify if the user applies the new technology. If the family doesn't use the new technology it will be marked on the control card and the monitoring entity has the right to transfer the equipment to another family. This will be formulated in the contract between the responsible user and the monitoring entity when the equipment is handed over.

The project is included in a life skill program. It is intended to include the religious leaders, village chiefs, governmental institutions (especially ministry of social affairs) and local NGO's, who are already present at the project location. The local entities are meant to report continuously about the usage of the solar cookers and eventual problems in the applications. In case of problems PT Petromat Agrotech in cooperation with the local entity will decide which steps are to be taken for solving possible problems in the acceptance. Those local entities are continuously supported by regular demonstrations by representatives of PT Petromat Agrotech.

There are no approved methodologies yet to give the monitoring methodology for this project activity a specific name.

Project risks may arise from natural disasters or lack of acceptance by the population.

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

The methodology is considered, because education ensures the sustained use of solar cookers. The use of questionnaires in conjunction with continuous training was already successfully tested in a pilot project in Ghana.

D.3 Data to be monitored:

ID Number	Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data to be kept?	Comment
1	number of solar cookers	n_1	-	m	daily	100%	paper and electronic	9 years	Data measured daily and verified quarterly
2	mean operation time of solar cooker	t_1	hours per period	m and e	daily	10%	paper and electronic	9 years	Data measured daily and verified quarterly

Description of formulae when not provided in appendix B:

Saved fuel wood consumption is calculated from the energy provided by the solar cooker and by converting this energy into amount of biomass with the same effective energy. The effective energy provided by the solar cooker is calculated by multiplication of its nominal power P and the effective time t of use. To calculate the energy of biomass equivalent to this effective energy E_{eff}, the efficiency η of a traditional fireplace (including simmering processes) is used. Thus the corresponding energy of saved biomass per solar cooker is $E = t * P / \eta$. As the saving takes place in a region of non sustainable fuel wood logging the saving can be converted into a saving of C-emission by using the default value of Carbon Emission Factor CEF. CO_2-emission is calculated from C-emission by multiplication of the saved carbon emission with the quotient of molecular weight of CO_2 (44 kg/kmol) and atomic weight of carbon (12 kg/kmol).

Saved CO_2-emission m_{CO2} by using solar cookers during period

$$m_{CO2}(t_1, n_1) = CEF * 44/12 \text{ kg } CO_2/\text{kg C} * (n_1 * t_1 * P) / \eta \qquad (5)$$

with:
CEF = Carbon Emission Factor for solid biomass;
default value disclosed on page 1.6 of IPCC Workbook, chapter "Energy":
CEF = 29.9 t C/TJ
n_1 = number of installed solar cookers K14
t_1 = mean operating time (hours per period) of solar cookers K14
P = nominal effective power of solar cooker K14. P = 600 W.
η = efficiency of traditional cooking method (open fire, including simmering). η = 10%

The mean operating time t_1 during the period considered is calculated by summation the recorded duration t of equipment use and dividing the sum by the number n of equipments which are applied for the summation:

$$t_1 = 1/n * \Sigma t.$$

D.4 Name of person/entity determining the monitoring methodology:

Dr.-Ing. Dieter Seifert
Senior Engineer
E-mail: bdiv.seifert@t-online.de
in co-operation with Klimaschutz e.V.
Klimaschutz e.V is listed in annex 1; Dr. Seifert is not separately listed in annex 1 of this document.

E. Calculation of GHG emission reductions by sources

E.1 Formulae used:

E.1.1 Selected formulae as provided in appendix B:

According to the baseline methodology contained in appendix B, emission reductions are those that result from application of the formulae in section B.5.1 and therefore, project GHG emissions are zero.

E.1.2 Description of formulae when not provided in appendix B:

E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary: *(for each gas, source, formulae/algorithm, emissions in units of CO_2 equivalent)*

Not applicable. GHG emissions by sources are zero since solar energy is a clean energy.

E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities *(for each gas, source, formulae/algorithm, emissions in units of CO_2 equivalent)*

Leakage due to the project activity is negligible.

E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the project activity emissions:

Emissions are negligible.

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHG's in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities: *(for each gas, source, formulea/algorithm, emissions in units of CO_2 equivalent):* Formula (7a), described in section B.5.1.

E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period: See Section B.5.1.

E.2 Table providing values obtained when applying formulae above: See table in Section A.4.3.

F. Environmental impacts

F.1 If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

The DNA from Indonesia informed us, that there is no environmental impact assessment necessary in case of this type and size of project.

It is characteristic to the project that there are no emissions, no forest consumption and no wastes. The solar cookers have a long life time, defect parts will be replaced, and all parts are totally recyclable.

G. Stakeholders comments

G.1 Brief description of the process by which comments by local stakeholders have been invited and compiled:

The information that the solar cooker project is planned in Aceh Province was published in the newspaper of Banda Aceh on the 18th December 2004 (see Annex 4).

According to the Designated National Authority there is no format for stakeholder comments.

It is intended to make demonstrations of solar cooking in public and invite local media like radio and newspapers for reporting about details of the project.

G.2 Summary of the comments received:

Project is recommended by the Government of Aceh (see Annex 3) and by local NGOs.

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

Until now there have not been negative comments to the project. Received advices and recommendations regarding the implementation have been considered in the PDD.

Annex 1

CONTACT INFORMATION FOR PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	PT Petromat Agrotech
Street/P.O.Box:	Taman Bougenville Estate Blok A, No. 44, Kali Malang Jati Bening Gede
Building:	
City:	Raya Bekasi Jakarta
State/Region:	Jakarta
Postcode/ZIP:	17412
Country:	Indonesia
Telephone:	+62 21 8647766
FAX:	+62 21 8647422
E-Mail:	petromat@bit.net.id
URL:	
Represented by:	
Title:	Ir.
Salutation:	
Last Name:	Wahyudi
Middle Name:	
First Name:	Rudi
Department:	Director
Mobile:	+62 816 826818
Direct FAX:	+62 21 8647766
Direct tel:	+62 21 8647422
Personal E-Mail:	petromat@bit.net.id

Organization:	Klimaschutz e.V.
Street/P.O.Box:	Im Tulpenfeld 7/111
Building:	
City:	Bonn
State/Region:	Nordrhein-Westfalen
Postcode/ZIP:	53113
Country:	Germany
Telephone:	+49 228 2439185
FAX:	+49 228 2439188
E-Mail:	solargie@yahoo.com
URL:	
Represented by:	
Title:	
Salutation:	
Last Name:	Trifellner
Middle Name:	
First Name:	Klaus
Department:	CDM, Finance
Mobile:	+49 174 1910940
Direct FAX:	+49 8671 92 75 83
Direct tel:	+49 174 191 0940; +62 8131 49 39 547
Personal E-Mail:	ktrifellner@yahoo.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding for the project

Annex 3 (page 18)

Statement of Government of Aceh

Annex 4 (page 19)

Report about implementation of solar cookers in Indonesia
Serambi Indonesia
18th December 2004, p.11
PT Banda Aceh Press JI, Indonesia

Annex 5 (page 20)

Cost Calculation for duration of 7 years

GUBERNUR PROVINSI NANGGROE ACEH DARUSSALAM

Jln. T. Nyak Arief No. 219 Telp. 51377
BANDA ACEH – 23114

Statement of Governmet of Aceh

Banda Aceh 14th December 2004

Statement

As a vice governor of the Aceh province I am convinced that the solar cooker and the energy saving oven will be accepted by the local population. We will assist in the socialisation of this technology in order to make this project successful and in this way we will provide a real alternative to the conventional cooking habits by nonsustainable logging of trees in our province.

We see this project a workable way to stop the logging of trees and therefore we support this project.

We also support the educational activity together with the project to help people to achieve additional live skills.

This confirms

Vice Governor of Aceh

AZWAR ABUBAKAR

Annex 4

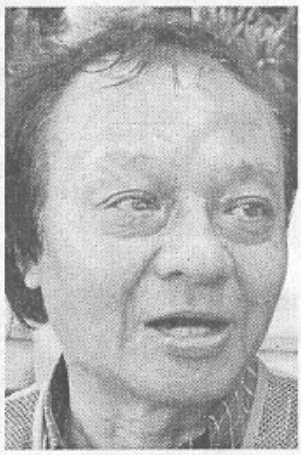
SOLAR COOKER - Utusan pemerintah Jerman, Klaus Trifellner sedang mendemonstrasikan cara penggunaan kompor tenaga surya (solar cooker) di halaman belakang Kantor Gubernur, Kamis (16/12) siang.
■ SERAMBI/HILMI HASBALLAH

2005, Jerman Hibah 25 Ribu 'Solar Cooker'

BANDA ACEH - Pemerintah Jerman direncanakan akan menghibahkan 25 ribu kompor tenaga surya (solar cooker) kepada masyarakat Aceh yang tinggal di kawasan hutan dan pesisir di seluruh kabupaten/kota pada 2005 mendatang. Program ini sudah masuk dalam agenda PBB sejak beberapa tahun lalu, kata Direktur PT Petromat Agrotech Jakarta, Ir Rudi Wahyudi MM di Banda Aceh, Kamis (16/12).

Untuk mewujudkan hal ini, sehari sebelumnya, Klaus Trifellner utusan pemerintah Jerman untuk Indonesia menemui Wagub NAD, Ir H Azwar Abubakar didampingi Ketua Fraksi PAN DPRD NAD, Ir T Rivolsa Ismail di Banda Aceh. Dalam pertemuan tersebut, Azwar telah menyetujui untuk menandatangani surat permohonan ke PBB melalui pemerintah Indonesia, dalam hal ini Menteri Lingkungan Hidup dan diteruskan ke Menteri Linkungan Hidup Jerman.

Rudi menambahkan, pihaknya hanya sebagai perakit solar cooker di Indonesia sebelum distribusikan ke daerah-daerah di Indonesia. Karena, seluruh komponen dan alatnya diambil dari Jerman. Program



■ Rudi Wahyudi

ini ditujukan kepada daerah-daerah yang memiliki kawasan hutan lebat dan masyarakat pesisir yang menggunakan kayu bakar untuk memasak, katanya.

"Tujuan utama hibah ini untuk mengurangi penebangan pohon sebagai kayu bakar untuk memasak," jelas Rudi. Negara-negara maju menyadari, telah terjadi pemanasan global akibat industri-industri raksasa yang mengeluarkan asap (CO_2) dan berkurangnya kawasan hutan di dunia.

Provinsi NAD, jelasnya, telah dianggap sebagai salah satu kawasan paru-paru dunia untuk menyelamatkan dunia dari pemanasan global. Makanya, pemerintah Jerman yang memiliki kepedulian terhadap lingkungan hidup telah menerapkan aturan kepada perusahaan industri Jerman untuk membayar denda. "Dari dana inilah, digunakan untuk membuat solar cooker," katanya.

Sementara, dalam pertemuan Wagub yang didampingi sejumlah Kadis seperti Kadisbun, Kepala BKP, Asisten II, Kepala Biro Ekonomi dan lainnya dengan Klaus saat mendemonstrasikan alat tersebut berupa parabola di halaman belakang Kantor Gubernur NAD, Wagub mengatakan Pemda tidak membuat perjanjian tapi hanya sebatas permohonan.

Selain itu, Wagub juga mengharapkan kepada Klaus agar dapat membawa sejumlah investor dari Jerman untuk menanamkan modalnya di Aceh. Apalagi, Klaus telah mengunjungi Kota Sabang untuk melihat potensi daerah tersebut. Menanggapi hal tersebut, Klaus mengatakan akan mengupayakannya.**(muh)**

Annex 5 to PDD Aceh 1

Cost calculation for duration of 7 years

Cost for implementation:

Description	Quantity	Unit price Euro	Total Euro
Cost of prefabricated solar cooker:	1.000	115	115.000
Cost of heat retention containers	1.000	12	12.000
Transportation sea freight to Medan	1	2.500	2.500
Land freight to Sabang and Batar	1	1.500	1.500
Clearing	1	800	800
Assemblance	1.000	5	5.000
Project preparation cost	1	15.000	15.000
Validation fee	1	12.000	12.000
Registration fee	1	1.000	1.000
Total cost for investment			**164.800**
Yearly costs:			
Monitoring costs:			
Supervision	1	5.000	5.000
Travel expenses	12	300	3.600
Administration fee	1	2.500	2.500
Total yearly costs			11.100
Total cost for 7 years:			**77.700**
Total cost			**242.500**

Total returns from CER's: (24500 tons)

In case of 4 Euro per ton: 98.000,- Euro	24.500	4	**98.000**
In case of 7 Euro per ton: 171.500,- Euro	24.500	7	**171.500**
In case of 10 Euro per ton: 245.000 Euro	24.500	10	**245.000**
In case of 15 Euro per ton: 367.000 Euro	24.500	15	**367.500**
In case of 20 Euro per ton: 490.000 Euro	24.500	20	**490.000**