

## **MONITORING REPORT FORM (CDM-MR)\***

**Version 01 – in effect as of: 28/09/2010**

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\* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

**MONITORING REPORT**  
**Version: 1, 1 November 2011**

**Federal Intertrade Hong-Ru River Solar Cooker Project**  
**Reference number: 2311**  
**3rd Monitoring Period, 01/11/2010 - 31/10/2011, first and last days included**

**SECTION A. General description of the project activity****A.1. Brief description of the project activity:**

&gt;&gt;

The project installs 17,000 solar cookers for the poor rural residents in mountainous area in northwestern China. The rating power of each solar cooker is 773.5W and the total capacity of the project is 13.1 MW. The proposed project will enable the rural residents to efficiently substitute solar energy for the fossil fuel (coal) used in daily cooking and water boiling, avoiding CO<sub>2</sub> emission that would be generated by fossil fuel consumption.

The operation period for the project is 01/11/2010 - 31/10/2011 which is the current monitoring period. The total emission reductions achieved in this monitoring period is 38738 tCO<sub>2</sub>e.

**A.2. Project Participants**

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<b>Name of Party involved (*)</b> <b>((host) indicates a host Party)</b>	<b>Private and/or public entity(ies)</b> <b>project participants (*)</b> <b>(as applicable)</b>	<b>Kindly indicate if the Party</b> <b>involved wishes to be</b> <b>considered as project</b> <b>participant (Yes/No)</b>
People's Republic of China (Host)	Ningxia Federal Intertrade Co. (Project Owner)	No
Netherlands	Swiss Re Global Markets Limited (CER Purchaser)	No
Switzerland	Post 2012 Carbon Credit Fund C.V. (CER Purchaser)	No

**A.3. Location of the project activity:**

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The Project is located in five townships (Baiyang, Gucheng, Xinji, Chengyang, and Honghe) in southern rural area of Pengyang County, Ningxia Hui Autonomous Region, China. The location is approximately within east longitude 106°17'-106°54' and north latitude 35°40'-35°53'. The approximate locations of the centers of the townships in which the project is located are:



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<u>Township</u>	<b>Longitude(E)</b> Deg Min Sec	<b>Latitude(N)</b> Deg Min Sec	<b>Longitude(E)</b> Degree	<b>Latitude(N)</b> Degree
BAIYANG	106°39'17"E	35°49'59"N	106.6547	35.8331
GUCHENG	106°27'35"E	35°51'43"N	106.4597	35.8619
XINJI	106°28'2"E	35°46'0"N	106.4672	35.7667
CHENGYANG	106°47'1"E	35°48'59"N	106.7836	35.8164
HONGHE	106°41'59"E	35°46'0"N	106.6997	35.7667

Each of the 17,000 solar cookers was installed in the yard of its user's home in a location where it can be fully exposed to sunshine. The solar cooker's technical details are listed in the next section.

#### A.4. Technical description of the project

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The parameters of the solar cookers engaged in the proposed project are listed below. The choice of solar cookers parameters is based National Standard of P.R. China (GB) for solar cookers (GB No.: NY/T219-2003),

<b>Item</b>	<b>Value</b>	<b>Justifications</b>
Focus (mm)	600 ~ 750	National Standard of P.R. China (GB), GB No.: NY/T219-2003
Aperture (Light Collecting) Area (m <sup>2</sup> )	1.7	National Standard of P.R. China (GB), GB No.: NY/T219-2003
Rating Power (W)	773.5	National Standard of P.R. China (GB), GB No.: NY/T219-2003, calculation based on the footnote below
Thermal Efficiency (%)	At least 65%	National Standard of P.R. China (GB), GB No.: NY/T219-2003
Temperature in the focus area (°C) and the size of focus area (cm <sup>2</sup> )	The area with temperature beyond 400°C is between 50cm <sup>2</sup> and 200cm <sup>2</sup>	National Standard of P.R. China (GB), GB No.: NY/T219-2003
Maximum operational height (m)	1.25	National Standard of P.R. China (GB), GB No.: NY/T219-2003
Maximum operational distance (m)	0.8	National Standard of P.R. China (GB), GB No.: NY/T219-2003

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Weight (kg)	60	Required by the project owner
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**A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:**

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Small-scale CDM baseline methodology “AMS-I.C (Version 12, EB33), Thermal energy for the user with or without electricity”.

**A.6. Registration date of the project activity:**

&gt;&gt;

31 May 2009

**A.7. Crediting period of the project activity and related information (start date and choice of crediting period):**

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According to the UNFCCC website, the crediting period of the project is:

31 May 2009 – 30 May 2019

**A.8. Name of responsible person(s)/entity(ies):**

&gt;&gt;

Ju Ning  
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43670 Lucketts Bridge Circle  
Ashburn, VA 20148  
USA

Phone: +1-703-598-8032

Email: ju.ning@cleanairtrade.com

**SECTION B. Implementation of the project activity****B.1. Implementation status of the project activity**

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The starting date of operation of the project activity was 2 June 2009. The current monitoring period is the third monitoring period. There is no event or situations that occurred during this monitoring period, which may impact the applicability of the methodology.

**B.2. Revision of the monitoring plan**

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None

**B.3. Request for deviation applied to this monitoring period**

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None

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**B.4. Notification or request of approval of changes**

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None.

**SECTION C. Description of the monitoring system**

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According to methodology AMS-I.C. (Version 12, EB33) and the registered PDD, the following two parameters were monitored:

- (a) the number of solar cookers in operation, and
- (b) the average operating time of each solar cooker.

<b>Monitoring Plan in PDD</b>	<b>Monitoring Process Implemented</b>
<b><u>For the number of solar cookers in operation:</u></b>  <b>B7.1 of PDD:</b> The initial value of this parameter will be determined by the sales contract of the solar cookers and then this parameter will be monitored, recorded, and archived annually.  <b>B7.2 of PDD:</b> The monitoring of total number of operating solar cookers will be conducted annually during the last quarter of each year. A checklist will be used for monitoring and recording this parameter.	<b><u>For the number of solar cookers in operation:</u></b>  The sales contract has been presented to the verification team during the first verification.  From September 25, 2011 to October 25, 2011, the monitoring team has visited once each of the users that received the solar cooker, and checked if the solar cookers received are in operation.  Please note that the PDD assumes that the monitoring periods are full calendar years. This is why it states that the monitoring of total number of operating solar cookers will be conducted annually during the last quarter of each year. In reality, because the monitoring period is a not a full calendar year, the monitoring of total numbers of operating cookers has been adjusted accordingly to be at the end of the actual monitoring period.
<b><u>For the average operating time of each solar</u></b>	<b><u>For the average operating time of each solar</u></b>

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<p><b><u>cooker:</u></b></p> <p><b>B7.2 of PDD:</b></p> <ul style="list-style-type: none"><li>● Sampling survey will be utilized in the monitoring. 309 sample users will be randomly selected from the seven townships within the project boundary.</li><li>● A number of CDM groups will be set up to conduct the daily monitoring of the operating hours of the sampled users. Each CDM group will consist of 1~5 people and each person will be responsible for the monitoring and recording of 5~20 sampled users. The monitoring forms will be filled out daily by the CDM group.</li><li>● At least once a month the monitoring form will be collected and the quality of data will be checked. At least once a month, the CDM group will choose one family and stay for an entire day in this family' home to monitor the detailed usage of the solar cooker.</li></ul>	<p><b><u>cooker:</u></b></p> <ul style="list-style-type: none"><li>● Sampling survey method was used and 309 samples were randomly selected using Excel in October 2010. The selected 309 samples and the selected process has been presented to DOE verification team</li><li>● There are 6 CDM groups (each consists of 1 person) directly monitoring and recording the operating hours of the 309 sample users. Please note that the number of users each monitoring person handled is more than 5~20 users as planned in PDD, because the ways of collecting data has been diversified – the monitoring personnel used phone call or SMS message, or visited the user face-to-face to get the data, which significantly improved the efficiency. In addition, there is another CDM group (consists of one person) that checked the quality of the data, converted the paper file into electronic form, and archived the data.</li><li>● At the end of each month during the monitoring period, the monitoring form was collected, the quality of data was checked, and the data on paper was converted to electric form.</li><li>● In each month of the monitoring period, the monitoring team chose one family and recorded the detailed usage of the solar cooker at this family throughout the day. The purpose of such visit is to double check if the usage time the users reported is within the reasonable range.</li></ul>
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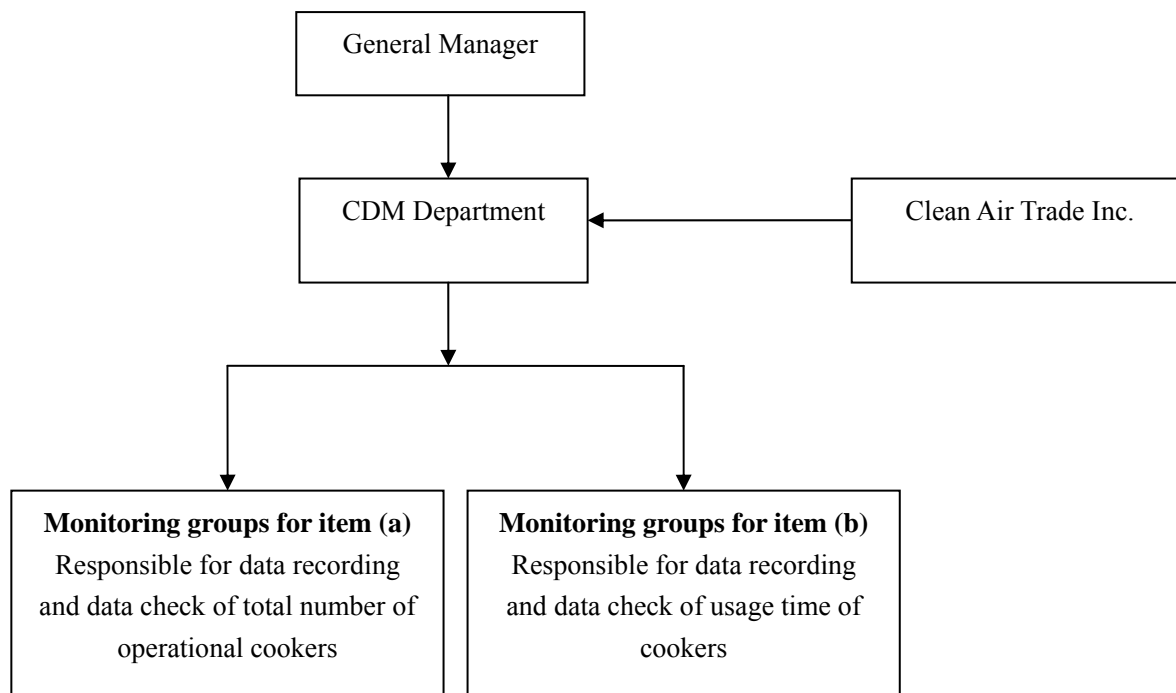
The project was implemented in the rural townships in Pengyang country. The situations of these townships are very similar to each other. Therefore, random selection of the samples within the project boundary can be used. According to statistical principles described in the PDD, 309 samples should be sufficient to represent the entire population. The daily usage times of the 309 sample users were added up

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to produce the total monthly usage time of all the 309 sample users. Then the total monthly usage time was divided by 309 to produce the average monthly usage time per user. Finally put the monthly usage time per user into equation in section E.1 to calculate the actual emission reductions.

The organization structure of the monitoring system is the following:

**Roles and Responsibilities:**

The General Manager is responsible for overall management of the entire monitoring process. Under the General Manager, there is a CDM Department which consists of groups for item (a) monitoring (total number of cookers in operation) and item (b) monitoring (cooker usage time). CDM Department is responsible for data recording, analyzing, checking, and archiving, Clean Air Trade Inc. is responsible for overseeing and advising the monitoring process as well as final data checking.

Due to the non-industrial nature of the project, emergency procedures are not applicable to the project. For QA/QC procedures, please refer to QA/QC procedures in section D.2.

**SECTION D. Data and parameters**

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**D.1. Data and parameters determined at registration and not monitored during the monitoring period,**



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including default values and factors	
<i>(Copy this table for each data and parameter. To report multiple values, a table may be used)</i>	
<b>Data / Parameter:</b>	1.EF CO <sub>2</sub>
Data unit:	tCO <sub>2</sub> /TJ
Description:	Baseline emission factor
Source of data used:	IPCC2006, page 2.22, Table2.5
Value(s)	94.6
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation
Additional comment:	

<b>Data / Parameter:</b>	2.R
Data unit:	W/m <sup>2</sup>
Description:	Standard solar irradiance rate used to calculate rating power of solar cooker
Source of data used:	National Standard of the People's Republic of China, GB No.: NY/T219-2003
Value(s)	700
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation
Additional comment:	

<b>Data / Parameter:</b>	3.R <sub>i</sub>																										
Data unit:	W/m <sup>2</sup>																										
Description:	Monthly solar irradiance rate in project region																										
Source of data used:	Ningxia Meteorological Archives																										
Value(s)	<table> <tr> <th><u>Month</u></th><th><u>Value</u></th></tr> <tr><td>1</td><td>397.6</td></tr> <tr><td>2</td><td>519.6</td></tr> <tr><td>3</td><td>521.8</td></tr> <tr><td>4</td><td>601.6</td></tr> <tr><td>5</td><td>689.5</td></tr> <tr><td>6</td><td>746.1</td></tr> <tr><td>7</td><td>666.1</td></tr> <tr><td>8</td><td>727.7</td></tr> <tr><td>9</td><td>656.7</td></tr> <tr><td>10</td><td>652.2</td></tr> <tr><td>11</td><td>402.6</td></tr> <tr><td>12</td><td>398.5</td></tr> </table>	<u>Month</u>	<u>Value</u>	1	397.6	2	519.6	3	521.8	4	601.6	5	689.5	6	746.1	7	666.1	8	727.7	9	656.7	10	652.2	11	402.6	12	398.5
<u>Month</u>	<u>Value</u>																										
1	397.6																										
2	519.6																										
3	521.8																										
4	601.6																										
5	689.5																										
6	746.1																										
7	666.1																										
8	727.7																										
9	656.7																										
10	652.2																										
11	402.6																										
12	398.5																										
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation																										



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Leakage emission calculations)	
Additional comment:	

<b>Data / Parameter:</b>	4.A
Data unit:	m <sup>2</sup>
Description:	Solar cooker's light-collecting area
Source of data used:	Project owner (technical specification of the solar cooker)
Value(s)	1.7
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation
Additional comment:	

<b>Data / Parameter:</b>	5. $\eta$
Data unit:	
Description:	Solar cooker's thermal efficiency
Source of data used:	Solar cooker testing report from Ningxia Department of Agriculture and Graze, Rural Energy Section
Value(s)	65%
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation
Additional comment:	

<b>Data / Parameter:</b>	6. $\eta_{th}$
Data unit:	
Description:	Thermal efficiency for the traditional coal furnace
Source of data used:	1) "Clean Energy for Development and Economic Growth: Biomass and Other Renewable Energy Options to Meet Energy and Development Needs in Poor Nations", United Nations Development Programme (UNDP), 2002 <a href="http://www.undp.org/energy/publications/2002/2002b.htm">http://www.undp.org/energy/publications/2002/2002b.htm</a>  2) The on-site measurement data of thermal efficiency of rural coal stoves in Ningxia by the Energy Saving Monitoring Technical Service Center of Ningxia Hui Autonomous Region, the provincial authority in charge of collecting and monitoring



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	energy usage data in Ningxia.
Value(s)	15%
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline calculation
Additional comment:	

**D.2. Data and parameters monitored**

*(Copy this table for each data and parameter. To report multiple values, a table may be used)*

<b>Data / Parameter:</b>	1. <i>n</i>												
Data unit:	Not applicable												
Description:	Number of solar cookers engaged in the proposed project												
Measured /Calculated /Default:	<p>Measured.</p> <p>The total number of operating solar cookers was counted by project team per monitoring period during the last 3 months of the monitoring period. (Note: Because normally the monitoring period is one year, for simplicity PDD just states that this parameter will be monitored annually during the last quarter of each year. What PDD actually meant is that the monitoring of this parameter will be conducted per monitoring period during the last three month of that monitoring period.)</p>												
Source of data:	Sales contract and invoice of the solar cookers. And the monitoring result.												
Value(s) of monitored parameter:	<p>17000</p> <p>The following table shows the number of cookers in operation in each township:</p> <table border="1"> <tr> <td>Baiyang</td><td>3533</td></tr> <tr> <td>Chengyang</td><td>3218</td></tr> <tr> <td>Gucheng</td><td>2865</td></tr> <tr> <td>Honghe</td><td>3129</td></tr> <tr> <td>Xinji</td><td>4255</td></tr> <tr> <td>Total</td><td>17000</td></tr> </table>	Baiyang	3533	Chengyang	3218	Gucheng	2865	Honghe	3129	Xinji	4255	Total	17000
Baiyang	3533												
Chengyang	3218												
Gucheng	2865												
Honghe	3129												
Xinji	4255												
Total	17000												
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation												
Monitoring equipment (type, accuracy class, serial	No monitoring equipment is used.												



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number, calibration frequency, date of last calibration, validity)	
Measuring/ Reading/ Recording frequency:	Once per monitoring period
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	<ul style="list-style-type: none"> <li>● The solar cookers used for the project were tested by authorities to ensure their specs and quality meet the requirements of the project.</li> <li>● There are maintenance and repair plan ready for the solar cookers. This plan will ensure the cookers in the project can remain in operational condition.</li> <li>● For missing or damaged data record, zero value is used for the missing or damaged data, which is the most conservative approach.</li> </ul>

<b>Data / Parameter:</b>	2. $t_i$																						
Data unit:	Hour																						
Description:	The monthly operating time of each solar cooker																						
Measured /Calculated /Default:	<p>Measured.</p> <p>According to statistical principles, 309 samples should be sufficient to represent the entire population of 17,000. Hence, 309 sample users were randomly selected from 17000 solar cookers. The project team measured the usage of time of these 309 sample users.</p>																						
Source of data:	Usage time measured by the project monitoring team																						
Value(s) of monitored parameter:	<table border="1"> <tbody> <tr><td>Nov-2010</td><td>154.70</td></tr> <tr><td>Dec-2010</td><td>154.98</td></tr> <tr><td>Jan-2011</td><td>135.91</td></tr> <tr><td>Feb-2011</td><td>108.95</td></tr> <tr><td>Mar-2011</td><td>133.87</td></tr> <tr><td>Apr-2011</td><td>140.59</td></tr> <tr><td>May-2011</td><td>131.02</td></tr> <tr><td>Jun-2011</td><td>119.07</td></tr> <tr><td>Jul-2011</td><td>136.21</td></tr> <tr><td>Aug-2011</td><td>135.65</td></tr> <tr><td>Sep-2011</td><td>95.58</td></tr> </tbody> </table>	Nov-2010	154.70	Dec-2010	154.98	Jan-2011	135.91	Feb-2011	108.95	Mar-2011	133.87	Apr-2011	140.59	May-2011	131.02	Jun-2011	119.07	Jul-2011	136.21	Aug-2011	135.65	Sep-2011	95.58
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Jul-2011	136.21																						
Aug-2011	135.65																						
Sep-2011	95.58																						



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	Oct-2011	134.64	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation		
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Clock or watch		
Measuring/ Reading/ Recording frequency:	<ul style="list-style-type: none"><li>● The usage time of cookers were measured and recorded daily</li><li>● At the end of each month, all the daily data of the past month were summarized to produce the monthly usage time.</li></ul>		
Calculation method (if applicable):	<ol style="list-style-type: none"><li>(1) For each of the 309 sample users, measure and record their daily usage time, then sum up all the daily usage time in a month to get the monthly usage time of each user;</li><li>(2) Sum up the monthly usage time of all the 309 users to get the total monthly usage time for the 309 users.</li><li>(3) Divide the number obtained in (2) by 309 to get the average monthly usage time per user.</li></ol>		
QA/QC procedures applied:	<p>Before implementing the project, Ningxia Federal Intertrade Co., Ltd. trained the personnel of monitoring teams on how to properly conduct the monitoring process.</p> <p>The following process was conducted for missing or damaged data record:</p> <ol style="list-style-type: none"><li>1. The general principle is that zero value is used for the missing or damaged data. This is most conservative approach. The monitoring personnel were trained before the starting of the project operation to ensure that each team member is fully aware of and able to strictly follow this conservative principle. During the monitoring process, the monitoring personnel were required to strictly abide by the above conservative principle in data recording, i.e.,</li></ol>		



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	<p>use zero values for all the missing or damaged data.</p> <p>2. If this is due to the working error of the monitoring personnel, further train the person until he or she can perform the job properly. And in the mean time, use zero value for the missing or damaged data;</p> <p>3. If this is due to the inability or attitude of a particular worker in monitoring team, dismiss such worker and re-hire those with proper ability and attitude. And in the mean time, use zero value for the missing or damaged data;</p> <p>4. If the monitoring team as a whole does not meet the job requirement of monitoring process, Ningxia Federal Intertrade Co., the project owner, has the right to require that RES create new monitoring team according to the requirement of Ningxia Federal Intertrade Co.</p> <p>5. If the data reported by the user significantly higher than the normal range, the monitoring personnel should ask for the reason. If the reason belongs to one of the following: 1) holidays celebration, 2) wedding or funeral, or 3) family/friends party, the reason is considered to be valid. Then the reason is recorded along with the data. Otherwise, zero value is used for that day's data.</p>
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## SECTION E. Emission reductions calculation

## E.1. Baseline emissions calculation

&gt;&gt;

According to the registered PDD, the emission reduction can be calculated in the following table using the parameters below:

$$BE_y = n \sum [773.5 \cdot (R_i / 700) \cdot t_i \cdot 3.6 \times 10^{-9}] \cdot EF_{CO_2} / \eta_{th} \quad (i = 1, 2, \dots, 12)$$

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Where:

$R_i$   $R_i$  is the actual solar irradiance rate in month  $i$  in  $W/m^2$ . The values adopted are parameter #3 in the data table D.1

$t_i$   $t_i$  is the usage time of the solar cooker in month  $i$  in hours. The value adopted are parameter #2 in table D.2

$n$  The total number of solar cookers installed by the proposed project. The value adopted is 17,000.

$EF_{CO_2}$  The  $CO_2$  emission factor of coal ( $tCO_2e/TJ$ ). IPCC default emission factor of  $94.6tCO_2e/TJ$  will be adopted in the proposed project.

$\eta_{th}$  The efficiency of the coal-fired stove that would have been used in the absence of project activity. The value adopted is 15%

The result is summarized in the table below:

	Time Interval	Solar irradiance rate	Actual Power of Solar Cooker	Monthly Usage Time	Net Heat Supplied Monthly	CER Generated Monthly
		$R_i$	$P_i$ = $773.5 \cdot (R_i/700)$ Equation (8) in PDD	$t_i$	$HG_i$ = $n \cdot [P_i \cdot t_i \cdot (3.6 \times 10^{-9})]$ Equation (6) in PDD	$BE_i$ = $HG_i \cdot EF_{CO_2} / \eta_{th}$ Equation (5) in PDD
Month		(W/m <sup>2</sup> )	(W)	(hour)	(TJ)	(tCO <sub>2</sub> e)
2010-11	01/11/2010 – 30/11/2010	402.6	444.9	154.70	4.21177	2656
2011-12	01/12/2010 – 31/12/2010	398.5	440.3	154.98	4.17651	2634
2011-01	01/01/2011 – 31/01/2011	397.6	439.3	135.91	3.65423	2305
2011-02	01/02/2011 – 28/02/2011	519.6	574.2	108.95	3.82836	2414

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2011-03	01/03/2011 – 31/03/2011	521.8	576.6	133.87	4.72373	2979
2011-04	01/04/2011 – 30/04/2011	601.6	664.8	140.59	5.71975	3607
2011-05	01/05/2011 – 31/05/2011	689.5	761.9	131.02	6.10926	3853
2011-06	01/06/2011 – 30/06/2011	746.1	824.4	119.07	6.00769	3789
2011-07	01/07/2011 – 31/07/2011	666.1	736.0	136.21	6.13578	3870
2011-08	01/08/2011 – 31/08/2011	727.7	804.1	135.65	6.67531	4210
2011-09	01/09/2011 – 30/09/2011	656.7	725.7	95.58	4.24449	2677
2011-10	01/10/2011 – 31/10/2011	652.2	720.7	134.64	5.93830	3745

Using Equation (4) in PDD, total CER in the monitoring period =  $\sum BE_i = 38738 \text{ tCO}_2\text{e}$

Therefore, the total CERs generated in the monitoring period is **38738 tCO<sub>2</sub>e**.

**E.2. Project emissions calculation**

&gt;&gt;

There is no project emission.

**E.3. Leakage calculation**

&gt;&gt;

There is no leakage.

**E.4. Emission reductions calculation / table**

&gt;&gt;

Total baseline emissions: 38738 tCO<sub>2</sub>e

Total project emissions: 0



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Total leakage: 0

Total emission reductions: **38738 tCO<sub>2</sub>e**

**E.5. Comparison of actual emission reductions with estimates in the CDM-PDD**

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Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO <sub>2</sub> e)	35723 <sup>1</sup>	38738

**E.6. Remarks on difference from estimated value in the PDD**

&gt;&gt;

The actual monitored emission reduction (ER) is 38738 tCO<sub>2</sub>e, which is higher than the estimated 35723 tCO<sub>2</sub>e in PDD. The higher actual ER is due to the fact that the actual usage time of the cookers is higher than the estimated value in PDD. The difference between the actual value and estimated value is within a reasonable range.

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<sup>1</sup> The annual ER value calculated in PDD was 35723.