



**CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
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CONTENTS

- A. General description of the small scale project activity
- B. Application of a baseline and monitoring methodology
- C. Duration of the project activity / crediting period
- D. Environmental impacts
- E. Stakeholders' comments

Annexes

- Annex 1: Contact information on participants in the proposed small scale project activity
- Annex 2: Information regarding public funding
- Annex 3: Baseline information
- Annex 4: Monitoring Information

**SECTION A. General description of small-scale project activity****A.1 Title of the small-scale project activity:**

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Nanyang Danjiang River Solar Cooker Project Phase I

Version: 07

Date: 16/04/2012

A.2. Description of the small-scale project activity:

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Nanyang Danjiang River Solar Cooker Project Phase I project (hereinafter referred to as the “proposed project” or the “project”) located in the southwest of Henan Province, which is invested and implemented by Sirreon Technology and Development (Beijing) Co., Ltd. This region is an ideal area for solar energy utilization. The project involves the distribution and installation of 48,000 sets of solar cookers for rural households. The daylighting area of each solar cooker will be no less than 1.7 m² and the rated output is 773.5W_{th}. The rated and maximum total installed capacity of the project is 37.128MW_{th} and 42.073MW_{th} respectively. The beneficial population is anticipated to be 172,806¹ once the project is put into operation.

The existing scenario of the proposed project, i.e. the 48,000 households continues to cook and boil water with coal-fired stoves. The proposed project will enable the rural households to efficiently substitute solar energy for the fossil fuel (coal) used in daily cooking and water boiling, avoiding CO₂ emission that would be generated by fossil fuel consumption. It is estimated that 90,204 tCO₂e emission reductions will be produced annually.

The project activity will make much contribution to the local sustainable development in the following aspects:

1. Providing rural residents with a clean, practical and convenient way to meet the energy demand of their daily cooking;
2. Improving the indoor hygiene of rural residents;
3. Improving the living condition and quality of rural residents;
4. Creating employment opportunities for local people;
5. Mitigating GHG emission.

A.3. Project participants:

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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)
China (host country)	Sirreon Technology & Development (Beijing) Co., Ltd	No
The Netherlands	China Carbon N.V	No

A.4. Technical description of the small-scale project activity:

¹ Based on the Statistical data of Nanyang City

**A.4.1. Location of the small-scale project activity:**

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A.4.1.1. Host Party(ies):

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People's Republic of China

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

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Henan Province

A.4.1.3. City/Town/Community etc.:

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The rural area of 7 towns of Xichuan County, Henan Province.

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity(ies):

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The physical, geographical installation site of the 48,000 sets solar cookers that distributed in seven townships (Jingziguan, Siwan, Xihuang, Maotang, Dashiqiao, Shangji and Jinhe) of Xichuan County delineates the project boundary.

The distribution of 48,000 sets solar cookers is restricted to these seven townships only and the recipients should meet the following requirements:

- i) Utilizing coal as the main energy source for daily lives;
- ii) Family members should be more than 2;
- iii) Annual family income should be on a lower/middling level.

Each solar cooker has its unique serial number, and each serial number corresponding to one householder's information. In case one of these households stop to use the cooker halfway after all solar cooker have been distributed, the local coordinator will redistribute it to another household in the same village and re-register related information. The changes will be reported to the CDM monitoring team to update related information by the user information alternation form.

The location of the project site is presented in the maps below.

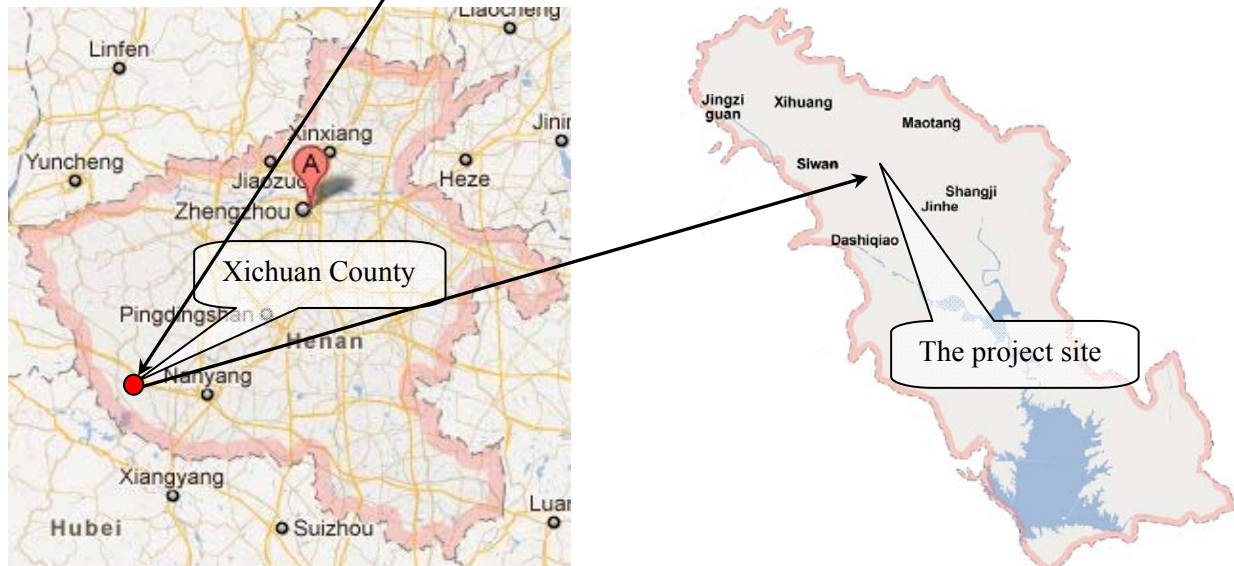
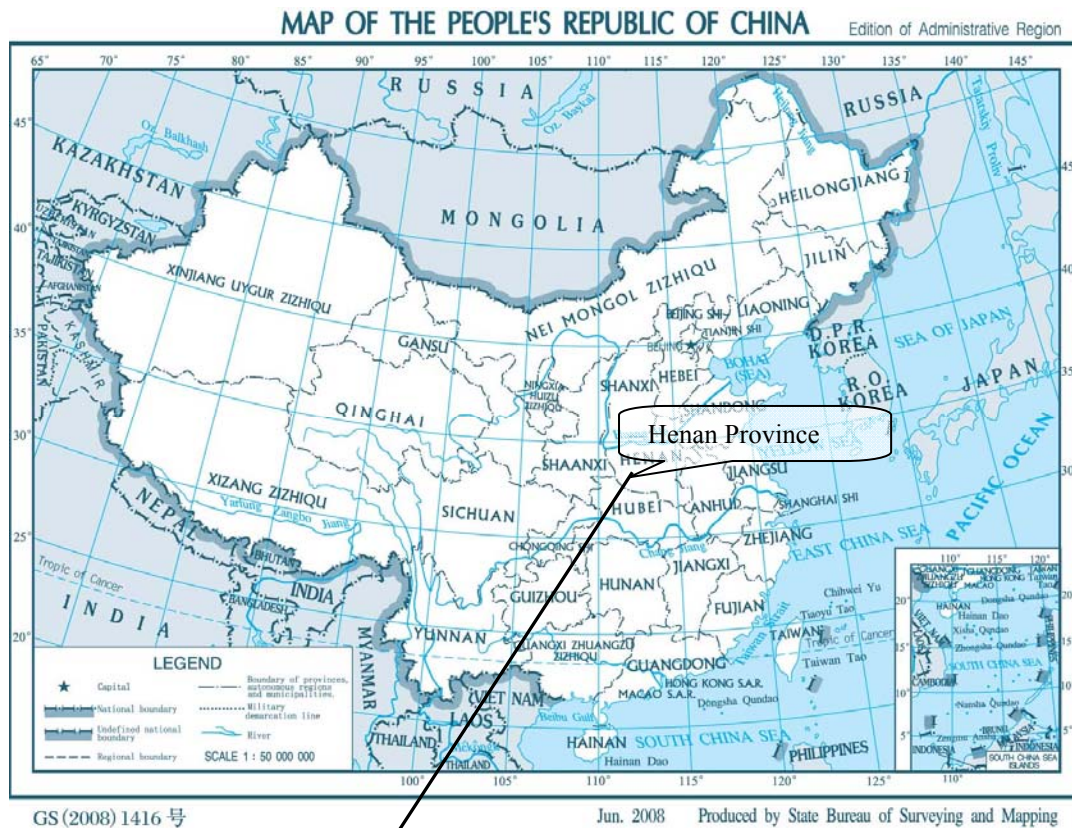


Figure A1 the Geographic Location of the proposed project in China and Henan Province

The geographic location of the proposed project is detailed in the following table.

Table A1. Geographic information of the seven townships



No.	Township	Number of solar cookers	Geographic coordinate		
				Longitude	Latitude
1	Jingziguan	6,000	Scope	110.9790°E~111.0316°E	33.2323°N~33.2513°N
			Center	111.0174°E	33.2467°N
2	Siwan	6,000	Scope	111.1273°E~111.1651°E	33.1588°N~33.1651°N
			Center	111.1486°E	33.1578°N
3	Xihuang	8,000	Scope	111.1390°E~111.1713°E	33.2393°N~33.2461°N
			Center	111.1615°E	33.2409°N
4	Maotang	8,000	Scope	111.2805°E~111.4480°E	33.1502°N~33.2697°N
			Center	111.3773°E	33.2184°N
5	Dashiqiao	7,000	Scope	111.2509°E~111.2592°E	33.0524°N~33.0575°N
			Center	111.2534°E	33.0567°N
6	Shangji	7,000	Scope	111.4803°E~111.4878°E	33.1289°N~33.1352°N
			Center	111.4825°E	33.1331°N
7	Jinhe	6,000	Scope	111.3979°E~111.4020°E	33.1024°N~33.1030°N
			Center	111.3986°E	33.1016°N
Total		48,000			

A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

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According to the Simplified modalities and procedures for small-scale clean development mechanism project activities (decision 4/CMP.1, Annex II) publicized by UNFCCC, the project type and category are defined as follows:

Type - I Renewable Energy Projects, and

Category I-C - Thermal energy production with or without electricity

Technology of the small-scale project activity

The proposed project is to install 48,000 parabolic type solar thermal cookers for rural households in Xichuan county, replacing the coal used previously for cooking and water boiling. This will lead to the reduction of coal consumption and consequently the reduction of CO₂ emission. According to the conservative principle, the calculated maximum power of single solar cooker is $876.512 W_{th}^2$. Therefore, the maximum total installed capacity of the project is no more than $42.073 MW_{th}$ ($876.512 \times 48,000 \times 10^{-6}$), below the $45 MW_{th}$ limit of small-scale CDM project.

The choice of solar cookers parameters is based on National Standard of P.R. China (GB) for solar cookers (NY/T219-2003), but the national standard only has the minimum requirements which cannot reflect the true

² $876.512 W_{th}$ is calculated based on Chinese National Standard (GB: NY/T219-2003) and the Testing Report (NO. NY2011J1685) issued by the Nanyang Quality and Technical Supervision, Inspection and Testing Center. The calculation is as below:

$R = 700 W_{th}/m^2$, $A = 1.82m^2$, $\eta = 68.8\%$ (Both the A and η is adopted the maximum value. For the justification of the values of R , A , and η , refer to section B6.2)

Rated power = $R \cdot A \cdot \eta = 876.512 W_{th}$.



performance of the solar cookers employed by the project activity. Therefore, the project owner entrusted a third-party authority (i.e. Nanyang Quality and Technical Supervision, Inspection and Testing Center) to carry out the solar cookers testing. The test results which sourced from the Testing Report (NO.NY2011J1685) thus can reflect the facts and will be used as the criteria for solar cookers inspection, delivery and justifying the applicability of the methodology.

The parameters of the solar cookers engaged in the proposed project and the test results are listed below:

Table A2. Equipments Employed by the Project Activity

Parameters	Unit	Requirements of National Standard	Test Results
Focus	mm	600~750	667 ~ 684
Aperture area	m ²	≥1.7	1.75 ~ 1.82
Rated Power	W _{th}	≥773.5	815.7 ~ 823.5
Thermal Efficiency	%	≥65%	66.5% ~ 68.8%
The area with temperature over 400°C	cm ²	50~200	73 ~ 105
Maximum operational height	m	≤1.25	1.13 ~ 1.19
Maximum operational distance	m	≤0.8	0.67 ~ 0.73
Technical life of equipment	year	No less than 10 years which is required by the project owner	

Test results source: solar cookers testing report (NO.NY2011J1685)

According to the conservative principle, the minimum value of 773.5W_{th} that required by national standard is adopted for the calculation of emission reduction. However, the maximum calculated value of 876.512W_{th} (700×1.82×68.8%) is adopted for justifying the applicability of the methodology AMS I.C.

All the equipment engaged in the proposed project is domestic, and no technology transfer is involved.

The baseline scenario of the proposed project is the 48,000 households continue to cook and boil water with coal-fired stoves.

A.4.3. Estimated amount of emission reductions over the chosen crediting period:

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A fixed crediting period of 10 years has been chosen for the proposed project, and the average annual emission reductions will be expected to be 90,204 tCO₂e, accumulating to a total emission reductions of 902,040 tCO₂e over the 10-year crediting period.

Table A2 the estimation of the emission reductions in the first crediting period

Year	Estimation of annual emission reductions in tonnes of CO ₂ e
2012(05.01~12.31)	64,911
2013	90,204



2014	90,204
2015	90,204
2016	90,204
2017	90,204
2018	90,204
2019	90,204
2020	90,204
2021	90,204
2022(01.01~04.30)	25,293
Total estimated reductions (tonnes of CO ₂ e)	902,040
Total number of crediting years	10
Annual average of the estimated reductions over the crediting period (tCO₂ e)	90,204

A.4.4. Public funding of the small-scale project activity:

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No public funding from parties included in Annex I is available to the project activity.

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

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According to Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM project activities, a proposed small-scale project activity shall be deemed to be a debundled component of a large scale project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

- ◆ With the same project participants;
- ◆ In the same project category and technology/measure;
- ◆ Registered within the previous 2 years; and
- ◆ Whose project boundary is within 1km of the project boundary of the proposed small-scale activity at the closest point?

On the contrary, a proposed small-scale project activity shall not be deemed to be a debundled component of a large project activity if the project doesn't accord with one or more of them. The project boundary, as stated in Appendix B of the simplified modalities and procedures for small-scale CDM project activities, encompasses the physical, geographical site of the renewable generation source. Except the project, the project owner of the project has not developed other small scale projects whose project boundary is within 1km of the physical, geographical site of the specific project at the closest point.

Therefore, the project is not a debundled component of a large scale project activity.

SECTION B. Application of a baseline and monitoring methodology**B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:**

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The methodology AMS-I.C Thermal energy production with or without electricity” (Version 19, EB61) will be applied. For more information regarding the methodology, please refer to the website:



<http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html>

The project also refers to:

“Tool for the demonstration and assessment of additionality (version 06.0.0)”

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.0.0.pdf>

B.2 Justification of the choice of the project category:

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The methodology AMS-I.C. (Version 19, EB61) is fully applicable to the proposed project because:

The applicability of the methodology AMS I.C	The project activity
1. This methodology comprises renewable energy technologies that supply users with thermal energy that displaces fossil fuel use. These units include technologies such as solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass and other technologies that provide thermal energy that displaces fossil fuel.	The proposed project supplies individual households with solar cookers that allow the user to use renewable (solar) energy to displace coal used for cooking and water-boiling.
2. Biomass-based cogeneration systems are included in this category.	The proposed project supplies individual households with solar cookers and no biomass-based cogeneration system is involved.
3. Emission reductions from a biomass cogeneration system can accrue from one of the following activities: (a) Electricity supply to a grid; (b) Electricity and/or thermal energy (steam or heat) production for on-site consumption or for consumption by other facilities; (c) Combination of (a) and (b).	The proposed project only supplies individual households with solar cookers and no biomass-based cogeneration system is involved.
4. The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal.	According to the aforementioned, the maximum calculated power of single solar cooker is $876.512W_{th}$ and the maximum total installed capacity of the proposed project is $42.073MW_{th}$ ($876.512 \times 48,000 \times 10^{-6}$) which is still less than $45MW_{th}$.
5. For co-fired systems, the total installed thermal energy generation capacity of the project equipment, when using both fossil and renewable fuel, shall not exceed 45 MW thermal.	No co-fired system is involved in the proposed project activity.
6. The following capacity limits apply for biomass cogeneration units: (The items is omitted)	No biomass cogeneration system is involved.
7. The capacity limits specified in the above paragraphs apply to both new facilities and retrofit projects. In the case of project activities that involve the addition of renewable energy units at an existing renewable energy facility, the total capacity of the units added by the project should comply with capacity limits in paragraphs 4 to 6,	The proposed project is a new developed project and does not involve addition of renewable energy units at an existing renewable energy facility.



and should be physically distinct from the existing units.	
8. Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category.	The proposed project is a new developed project.
9. New Facilities (Greenfield projects) and project activities involving capacity additions compared to the baseline scenario are only eligible if they comply with the related and relevant requirements in the “General Guidelines to SSC CDM methodologies”.	The proposed project is a greenfield project and complies with the related and relevant requirements in the “General Guidelines to SSC CDM methodologies”.
10. If solid biomass fuel (e.g. briquette) is used, it shall be demonstrated that it has been produced using solely renewable biomass and all project or leakage emissions associated with its production shall be taken into account in the emissions reduction calculation.	The proposed project only supplies individual households with solar cookers and no solid biomass fuel is used.
11. Where the project participant is not the producer of the processed solid biomass fuel, the project participant and the producer are bound by a contract that shall enable the project participant to monitor the source of the renewable biomass to account for any emissions associated with solid biomass fuel production. Such a contract shall also ensure that there is no double-counting of emission reductions.	The proposed project only supplies individual households with solar cookers and no solid biomass fuel is used.
12. If electricity and/or steam/heat produced by the project activity is delivered to a third party i.e. another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered into that ensures there is no double-counting of emission reductions.	The heat produced by the project is captured and used by the solar cookers only, and it does not involve in delivery to another facilities within the boundary.
13. If the project activity recovers and utilizes biogas for power/heat production and applies this methodology on a stand alone basis i.e. without using a Type III component of a SSC methodology, any incremental emissions occurring due to the implementation of the project activity (e.g. physical leakage of the anaerobic digester, emissions due to inefficiency of the flaring), shall be taken into account either as project or leakage emissions.	There is no biogas recovery and utilization involved in the proposed project.
14. Charcoal based biomass energy generation project activities are eligible to apply the methodology only if the charcoal is produced from renewable biomass sources provided.	The proposed project only supplies individual households with solar cookers and no any biomass energy generation is involved.

B.3. Description of the project boundary:



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The physical and geographic boundary of the proposed project is delineated by the installation site of the 48,000 sets solar cookers that distributed in the 7 townships. Each solar cooker has its unique serial number, and each serial number corresponding to one householder's information. In case one of these households stop to use the cooker halfway after all solar cooker have been distributed, the local coordinator will redistribute it to another household in the same village and re-register related information. The changes will be reported to the CDM monitoring team to update related information by the user information alternation form.

The physical and geographic boundary of each solar cooker is the solar cooker itself.

Figure B1 shows the project boundary delineated by the 48,000 solar cooker installation sites.

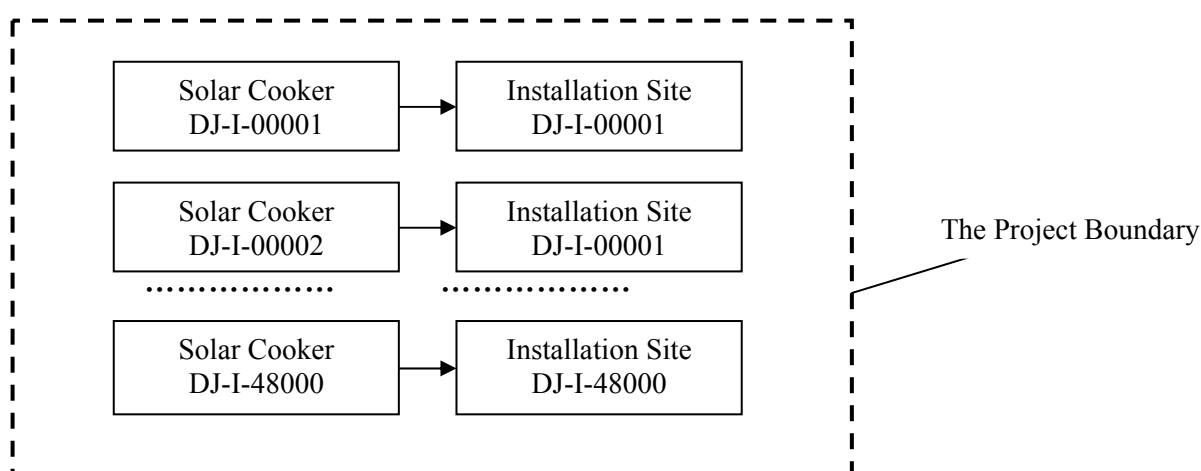


Figure B1: The project boundary

Only CO₂ emission from coal burning is included in calculating the project GHG emission reduction. Emission sources and gases included in the project boundary are listed in Table B1.

Table B1. Emission sources and gases included within the project boundary

	Source of Emission	Gas	Included/Excluded	Instruction
Baseline	Coal-fired cooking and water boiling	CO ₂	Included	Main emission source
		CH ₄	Excluded	Excluded for simplification. This is conservative.
		N ₂ O	Excluded	Excluded for simplification. This is conservative.
Project Activities	Project Activity Emission	CO ₂	Excluded	There is no CO ₂ emission
		CH ₄	Excluded	There is no CH ₄ emission
		N ₂ O	Excluded	There is no N ₂ O emission
Leakage	Project Leakage	CO ₂	Excluded	There is no CO ₂ leakage emission



		CH ₄	Excluded	There is no CH ₄ leakage emission
		N ₂ O	Excluded	There is no N ₂ O leakage emission

B.4. Description of baseline and its development:

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In accordance with the small scale methodology AMS-I.C “Thermal energy production with or without electricity” (Version 19, EB61), for renewable energy technologies that displace technologies using fossil fuels, the simplified baseline is the fuel consumption of the technologies that would have been used in the absence of the project activity times an emission factor for the fossil fuel displaced.

In the absence of the proposed project, the rural residents would continue to use the coal-fired stoves for their daily cooking and water-boiling as usual. According to a recent official document from local government, all the rural residents in the project site use coal for their daily cooking and water-boiling.

It's investigated that local households mainly relies on coal in their everyday lives. According to the statistics of the Xichuan Agricultural Bureau, 76.4% of the local households utilize the coal as the main energy source for the daily lives.

For the purpose of deforestation control and forests protection, the strict forest management regulations³ have been conducted in Nanyang city and Xichuan County. Furthermore, the Henan Danjiang Wetland National Nature Reserve is located in Xichuan County⁴. As a result, the firewood consumption is expressly prohibited in the area and it's unlikely for the local residents to use firewood as fuel for cooking and water boiling.

In order to protect local environment, work has simultaneously proceeded on tree planting, the safeguarding of forests and the prevention of forest fires. Hillsides have been closed off for forest conservation and the destructive lumbering of forests banned. As a result, the availability of straw is limited and all the straw there is used for feeding animals.

Therefore, the baseline scenario of the proposed project is that the 48,000 households continue to cook and boil water with coal-fired stoves. The simplified baseline is the coal consumption of the existing stoves times the emission coefficient of coal.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

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It was put forwards in the project proposal that the project will be within the bounds of probability only when it could be registered as a CDM project. The proposed project was approved by Xichuan Development and Reform Commission on 22th Oct, 2010. The shareholders meeting about project investment was held on 13nd December 2010. Soon after this, on Dec 2010, the project own signed the ERPA with international CER buyer. As per the

³ <http://www.henan.gov.cn/jrhn/system/2011/05/24/010244763.shtml>

<http://www.nanyang.gov.cn/jsp/zwgk/browser/wcontent.jsp?id=14521&nodeid=ny00000460&siteid=ny%27>

<http://www.xichuan.gov.cn/news/zfb2011n11y/2011/11/11111797558638.html>

⁴ <http://baike.baidu.com/view/413177.htm>



definition of the start date of CDM project activity specified by the EB, the start date of the proposed project is defined to be 13/12/2010, i.e. the date on which the investment on the proposed project activity was approved in the shareholders' meeting. The main actions made for the proposed project implementation are generalized in the following table:

<i>Time</i>	<i>Milestone</i>
2010.08	<i>Completion of the project proposal</i>
2010.10.22	<i>Approved by local DRC</i>
2010.10.28	<i>Approved by local EPA</i>
2010.12.13	<i>Shareholder meeting minute about project investment</i>
2010.12	<i>Signed the ERPA with buyer</i>
2011.05	<i>Informed CDM EB on the prior consideration of CDM.</i>
2011.05	<i>Informed China DNA on the prior consideration of CDM.</i>

Based on the above analysis, as per Guidance on the demonstration and assessment of prior consideration of the CDM (version 03, EB49, 2009), it's concluded that the CDM has been seriously considered prior to the start of the proposed project and real and continuing actions have been taken to secure the CDM status of the project.

As per *Appendix B of the simplified modalities and procedures for small-scale CDM project activities*, Project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:

- (a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions;
- (b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;
- (c) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;
- (d) Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

The proposed project activity would not occur without the support from CDM revenue due to investment barrier the proposed project faces which is detailed as follows:

Investment Barriers:

Sub-step a. Determine appropriate analysis method

Three analysis methods are suggested in the "Guidelines on the Assessment of Investment Analysis" (Version 05). They are simple cost analysis (option I), investment comparison analysis (option II) and benchmark analysis (option III).

Since the proposed project will generate no financial and economic benefits other than CDM revenues, the simple cost analysis method (option I) is appropriate to apply for.

Sub-step b. Apply simple cost analysis



If the proposed project were carried out without CDM, the total upfront project investment by the project owner would be about 18.19 million RMB and after such investment the project would not generate any revenue to the project owner throughout the entire project lifetime. The projected financial statement of the proposed project without CDM is as below:

Parameters (without CDM):

Item	Value	Unit	Data Source
Project Lifetime ⁵	10	year	Project Proposal, page 14/21, Section 6
Equipment Costs ⁶	1536	10 ⁴ RMB	Project Proposal, page 20/21, Annex
Maintenance Costs	48	10 ⁴ RMB	Project Proposal, page 20/21, Annex
Project Development Cost ⁷	40	10 ⁴ RMB	Project Proposal, page 20/21, Annex
Initial Implementation Cost ⁸	60	10 ⁴ RMB	Project Proposal, page 20/21, Annex
Contingency	8	%	Project Proposal, page 20/21, Annex
Total Investment by the developer	1819	10 ⁴ RMB	Project Proposal, page 20/21, Annex
Corporate Income Tax Rate ⁹	25	%	Project Proposal, page 20/21, Annex
Discount rate ¹⁰	4.2	%	The latest Chinese Yuan (CNY) deposit rate for 5 years ¹¹ before the start date of the proposed project (13/12/2010)
Net Present Value of Project	-1819	10 ⁴ RMB	

As shown above, the Net Present Value (NPV) of the proposed project without CDM is -18.19 million RMB. In fact, the project does not generate any revenue other than CDM revenues, no matter how the variables (investment cost, maintenance cost, discount rate, etc.) fluctuate; the NPV will always be negative.

⁵ Based on the project monitoring plan and the solar cookers working life confirmation from equipment vendors.

⁶ The equipment cost includes transportation, installation.

⁷ Including feasibility study, coordinating with relevant parties, managing cooker manufacturing and distribution, and user training.

⁸ This is the cost of outsourcing the implementation of project to local agricultural bureau.

⁹ According to the corporate tax law of China

¹⁰ According to Annex 58 of EB 51, required/expected returns on equity can be used as benchmark for equity IRR. For the project owner, the capital cost of the investment on the project is the opportunity cost of depositing the same amount of fund to the bank.

¹¹ http://www.boc.cn/finadata/lilv/fd31/201010/t20101020_1170160.html



It is obvious that without CDM revenue the proposed project is financially unattractive at all. Therefore, the project faces obvious investment barrier.

In contrast, if the project is implemented as a CDM project, the CER revenue will make the project become financially attractive as shown below:

Parameters (with CDM):

Note: The explanations of the parameters below are the same as those in the previous section (without CDM) unless noted otherwise.

Project Lifetime: 10 Years

Equipment Cost: 1536×10^4 RMB

Maintenance Costs: 48×10^4 RMB

Project Development Costs: 40×10^4 RMB

CDM Project Development Cost (Consultation, Validation etc.): 37×10^4 RMB

Initial Implementation Cost: 60×10^4 RMB

CDM Annual Operation Cost: 48×10^4 RMB

Contingency: 8%

Total Investment by the developer: 1910×10^4 RMB

Corporate Income Tax Rate: 25%

Crediting period: 10 Years

Expected CER Price: 8EUR

Project IRR: 16%

Conclusion

If the project can be successfully registered as a CDM project, then the CDM revenue will provide the only financial incentive to the project developers, transforming an otherwise financially unattractive project into an attractive one. As a matter of fact, the proposed project will not be started until it is successfully registered as a CDM project. Therefore, CDM revenue is absolutely crucial to the successful implementation of this project.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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Baseline Emissions

As per paragraph 13 of methodology AMS-I.C (version 19), For renewable energy technologies that displace technologies using fossil fuels, the simplified baseline is the fuel consumption of the technologies that would have been used in the absence of the project activity times an emission factor for the fossil fuel displaced.

For steam/heat produced using fossil fuels the baseline emissions are calculated as follows:

$$BE_{thermal, CO_2, y} = (EG_{thermal, y} / \eta_{BL, thermal}) * EF_{FF, CO_2} \quad (1)$$

Where:

$BE_{thermal, CO_2, y}$ the baseline emissions from heat (generated by burning coal) displaced by the project activity during year y in tCO₂e.



$EG_{thermal,y}$	the net quantity of heat supplied by the project activity during the year y in TJ.
EF_{FF,CO_2}	the CO ₂ emission factor of coal (tCO ₂ e/ TJ).
$\eta_{BL,thermal}$	the efficiency of the coal-fired stove that would have been used in the absence of the project activity

The annual net quantity of heat supplied by the project, $EG_{thermal,y}$, is the sum of 12 monthly net heat supplied, and consequently the annual baseline emission of the project, $BE_{thermal,CO_2,y}$, is the sum of 12 monthly baseline emission.

$$EG_{thermal,y} = \sum_{i=1}^{12} EG_{thermal,i} \quad (2)$$

$$BE_{thermal,CO_2,y} = \sum_{i=1}^{12} BE_{thermal,CO_2,i} \quad (3)$$

$$BE_{thermal,CO_2,i} = (EG_{thermal,i} / \eta_{BL,thermal}) * EF_{FF,CO_2} \quad (4)$$

where

$EG_{thermal,i}$	the net heat supplied in month i in TJ
$BE_{thermal,CO_2,i}$	the baseline emission in month i in tCO ₂ e

According to basic physics principle,

Heat = Power*Time

The monthly net heat supplied by the cooker is the product of its actual power in that month and its usage time in that month, i.e.:

$$EG_{thermal,i} = n * P_i * t_i * (3.6 \times 10^{-9}) \quad (5)$$

Where

n	the total number of solar cookers installed by the proposed project. The value adopted is 48,000;
P_i	the actual average power of the solar cooker in month i in W_{th}
t_i	the usage time of each solar cooker in month i in hours. The value adopted is 120 (4 hours per day for 30 days, see section B7.1 parameter #2 for details)
3.6×10^{-9}	the conversion factor between “ $W_{th} * h$ ” and “TJ”, i.e., $1 W_{th} * h = 3.6 \times 10^{-9} TJ$

Combine (4) and (5), we get

$$BE_{thermal,CO_2,i} = n * P_i * t_i * (3.6 \times 10^{-9}) * EF_{FF,CO_2} / \eta_{BL,thermal} \quad (i=1, 2, \dots, 12) \quad (6)$$

The actual power of the solar cooker P_i is proportional to the solar irradiance intensity under which the cooker is operated. The rated power $773.5 W_{th}$ is adopted which is calculated based on the “standard solar irradiance intensity” of $700 W_{th}/m^2$ according to Chinese national standard NY/T219-2003. Therefore, the actual power of the solar cooker is the rated power times the ratio of actual solar irradiance intensity and $700 W_{th}/m^2$:

$$P_i = 773.5 * (R_i / 700) \quad (7)$$



Where

R_i the actual solar irradiance intensity in month i in W_{th}/m^2 . The values adopted are in section B6.2 parameter #3;

Substitute (7) in (6), then substitute (6) in (3), we have

$$BE_{thermal, CO_2, y} = n * \sum [773.5 * (R_i / 700) * t_i * 3.6 \times 10^{-9}] * EF_{FF, CO_2} / \eta_{BL, thermal} \quad (i = 1, 2, \dots, 12) \quad (8)$$

Where:

R_i the actual solar irradiance intensity in month i in W_{th}/m^2 . The values adopted are in section B6.2 parameter #3;
 t_i the usage time of the solar cooker in month i in hours. The value adopted is 120 (4 hours per day for 30 days, refer to section B7.1 parameter #2 for details)
 n the total number of solar cookers installed by the proposed project. The value adopted is 48,000.
 EF_{FF, CO_2} the CO₂ emission factor of coal (tCO₂e/ TJ). IPCC default emission factor of 87.3tCO₂e/TJ will be adopted in the proposed project.
 $\eta_{BL, thermal}$ the efficiency of the coal-fired stove that would have been used in the absence of project activity. The value adopted is 15% (refer to section B6.2 parameter #6 for details).

Project Emissions

The implementation of the proposed project will not produce any GHG emission, i.e. $PE_y=0$.

Leakage

The solar cookers to be used in the proposed project will be directly purchased from the manufacturers. The project participants will not transfer the solar cookers out of the proposed project activity during the entire project life. The project implementation and monitoring plan will ensure that:

- 1) Only the households that currently do not have solar cooker will receive the new solar cookers, and
- 2) If the recipient no longer wants to use the cooker, he/she must immediately return the cooker back to the project owner, and the project owner will immediately give this returned cooker to other household who does not have a cooker.

Therefore, according to AMS-I.C., the energy generating equipment (solar cookers) is neither transferred from another activity, nor transferred to another activity. As a result, it is not necessary to consider the leakage in the proposed project, i.e. $LE_y=0$

Emission Reduction

The emission reduction ER_y during a given year y is calculated as follow:

$$ER_y = BE_y - PE_y - LE_y \quad (9)$$

Where:

ER_y the emission reductions produced by the proposed project.
 BE_y the baseline emissions from heat displaced by the project activity during the year y in tCO₂e.
 PE_y the emissions produced by the proposed project.



LE_y the leakage produced by the proposed project.

B.6.2. Data and parameters that are available at validation:

>>

Data / Parameter:	R
Data unit:	W_{th}/m^2
Description:	Standard solar irradiance intensity used to calculate rated power of solar cooker
Source of data used:	National Standard of the People's Republic of China, NY/T219-2003
Value applied:	700
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to National Standard of P.R. China (GB), NY/T219-2003, for calculating the rated power of solar cookers, $700 W_{th}/m^2$ should be used as the standard value of solar irradiance intensity.
Any comment:	

Data / Parameter:	A
Data unit:	m^2
Description:	Solar cooker's light-collecting area
Source of data used:	Manufacturer
Value applied:	1.7
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the technical specification of the solar cooker
Any comment:	

Data / Parameter:	H
Data unit:	%
Description:	Solar cooker's thermal efficiency
Source of data used:	Solar cooker testing report from Rural Energy Bureau of Nanyang city
Value applied:	65%
Justification of the choice of data or description of measurement methods and procedures actually applied :	This is the requirement of National Standard of P.R. China (GB) <i>Concentrating Solar Cooker</i> , NY/T219-2003. The project owner will also require in the technical specification that the solar cookers to be manufactured for this project have an efficiency of more than 65%.
Any comment:	

Data / Parameter:	$\eta_{BL,thermal}$
Data unit:	%
Description:	Thermal efficiency for the traditional coal furnace
Source of data used:	"Clean Energy for Development and Economic Growth: Biomass and Other Renewable Energy Options to Meet Energy and Development Needs in Poor



	Nations” , UNDP, 2002 http://www.undp.org/energy/publications/2002/2002b.htm http://content.undp.org/go/cms-service/download/publication/?version=live&id=2102581
Value applied:	15%
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to paragraph 31 of methodology AMS-I.C.(version 19), the efficiency of the baseline units shall be determined by adopting one of the following criteria: (a) Highest measured operational efficiency over the full range of operating conditions of a representative sample of units with similar specifications, using baseline fuel. The efficiency tests shall be conducted following the guidance provided in relevant national/international standards; (b) Highest of the efficiency values provided by two or more manufacturers for units with similar specifications using the baseline fuel; (c) Highest efficiency from referenced literature values or default efficiency of 100%. The method (c) is adopted by the proposed project. According to paragraph 3 in page 8 of the referenced literature: 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. Following conservative principle, the value of 15% is taken because it will lead to the least emission reduction.
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

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According to B.6.1, the emission reduction (ER_y) of the project activity in a given year y is the difference between the baseline emission and the sum of project emission (PE_y) and emission from leakage (L_y). The calculation formula is as following:

$$ER_y = BE_y - PE_y - L_y$$

Since both of the project emission and leakage within the boundary are zero, the emission reduction of the proposed project is equal to the baseline emission, i.e.:

$$ER_y = BE_y$$

where BE_y is the CO₂ emission from the continued usage of coal-fired stoves in the absence of the proposed activity and its value is equal to the emission reduction.

According to the formulas (2), (4), (5), and (7) in B6.1, the calculation result is tabulated as below:



Month	Solar irradiance rate W/m ²	Actual Power of Solar Cooker W	Monthly Usage Time h	Net Heat Supplied Monthly TJ	CER Generated Monthly tCO ₂ e
	R_i	P_i formula (7)	t_i	$EG_{thermal,i}$ formula (5)	$BE_{thermal,CO_2,i}$ formula (4)
1	412.50	455.81	120	9.45	5501
2	446.09	492.93	120	10.22	5949
3	492.77	544.51	120	11.29	6571
4	545.30	602.56	120	12.49	7272
5	687.42	759.60	120	15.75	9167
6	722.5	798.36	120	16.55	9635
7	742.62	820.60	120	17.02	9903
8	703.53	777.40	120	16.12	9382
9	631.01	697.27	120	14.46	8415
10	527.32	582.69	120	12.08	7032
11	451.44	498.84	120	10.34	6020
12	401.70	443.88	120	9.20	5357

Therefore, the annual emission reduction (ER_y) of the proposed project is estimated to be 90,204 tCO₂e, i.e., $ER_y = BE_y = 90,204 \text{ tCO}_2\text{e}$

B.6.4 Summary of the ex-ante estimation of emission reductions:

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Year	Estimation of baseline emissions(tCO ₂ e)	Estimation of the project activity emissions(tCO ₂ e)	Estimation of leakage(tCO ₂ e)	Estimation of emission reductions(tCO ₂ e)
2012(05.01~12.31)	0	64,911	0	64,911
2013	0	90,204	0	90,204
2014	0	90,204	0	90,204
2015	0	90,204	0	90,204
2016	0	90,204	0	90,204
2017	0	90,204	0	90,204
2018	0	90,204	0	90,204
2019	0	90,204	0	90,204
2020	0	90,204	0	90,204
2021	0	90,204	0	90,204
2022(01.01~04.30)	0	25,293	0	25,293
Total(tCO₂e)	0	902,040	0	902,040

B.7 Application of a monitoring methodology and description of the monitoring plan:

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**B.7.1 Data and parameters monitored:**

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Parameter:	n
Unit:	
Description:	Number of solar cookers engaged in the proposed project
Source of data:	Sales contract and invoice of the solar cookers. Annual monitoring result
Value of data:	48,000
Brief description of measurement methods and procedures to be applied:	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. The details of monitoring of this parameter is in section B7.2, "Description of the monitoring plan"
QA/QC procedures to be applied (if any):	Refer to B.7.2
Any comment:	Record will be kept in electronic form and paper form.

Parameter:	t_i
Unit:	Hour
Description:	The monthly operating time of each solar cooker
Source of data:	To be determined by the result of the sampling survey
Value of data:	120
Brief description of measurement methods and procedures to be applied:	The monitoring will be conducted daily on the 312 selected sample users and value is the weighted mean value of 312 households in month i. The data will be summarized, analyzed, and archived monthly by the CDM Department.
QA/QC procedures to be applied (if any):	Refer to B.7.2
Any comment:	Record will be kept in electronic form and paper form.

Parameter:	EF_{FF,CO_2}
Unit:	tCO ₂ /TJ
Description:	Baseline emission factor
Source of data:	IPCC2006, page 2.22, Table2.5
Value of data:	87.3
Brief description of measurement methods and procedures to be applied:	The testing data for local coal is not available and the IPCC default value is deemed to reasonably represent local circumstances. In this case, according to paragraph 22 of AMS-I.C. (version 19), IPCC default emission factor can be used.
QA/QC procedures to be applied (if any):	The data is source from IPCC and no addition QA/AC procedures may need to be planned.
Any comment:	Any future revision of the IPCC Guidelines should be taken into account.

Parameter:	R_i
Unit:	W _{th} /m ²
Description:	Monthly solar irradiance intensity in project region
Source of data:	Statistical data of Nanyang Meteorological Bureau
Value of data:	Month R_i



	1	412.50
	2	446.09
	3	492.77
	4	545.30
	5	687.42
	6	722.5
	7	742.62
	8	703.53
	9	631.01
	10	527.32
	11	451.44
	12	401.70
Brief description of measurement methods and procedures to be applied:	Official source meteorological data	
QA/QC procedures to be applied (if any):	The data is official source and no addition QA/AC procedures may need to be planned.	
Any Comments:	Record will be kept in electronic form and paper form.	

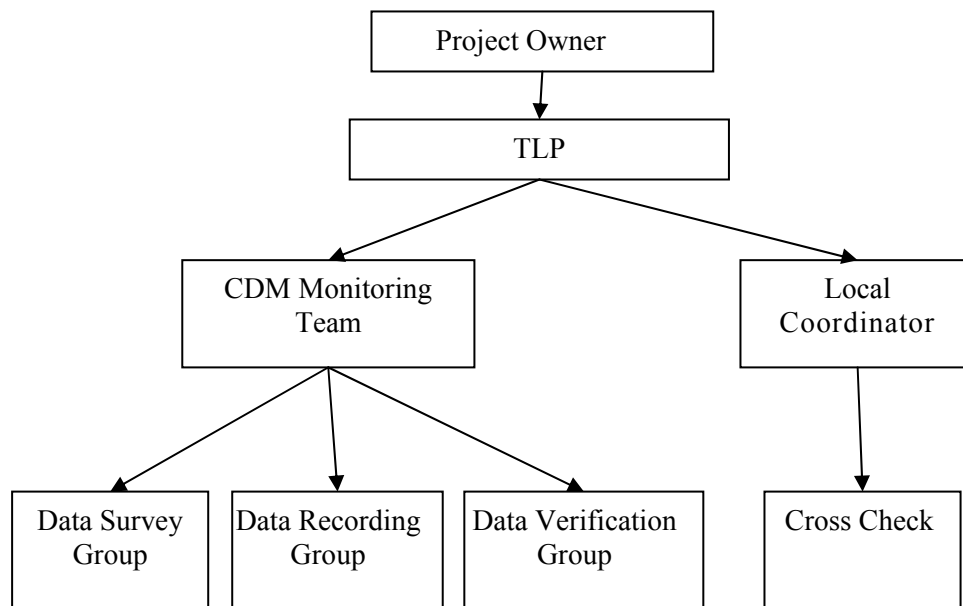
B.7.2. Description of the monitoring plan:

According to the methodology, the data to be monitored are number of solar cookers engaged in the proposed project and the monthly operating time of each solar cooker.

1. General Description of the Monitoring Plan

The overall monitoring structure of the project shows as below. The project owner will take the overall monitoring responsibility in the whole monitoring process. The Xichuan Agricultural Bureau (hereinafter referred to as TLP, i.e., the local partner), will implement the monitoring under the supervision of the project owner. TLP will establish CDM Monitoring Team for the villages to be monitored within the project boundary to collect and record monitoring data. The CDM Monitoring Team includes three CDM groups, data survey group, data recording group and data verification group. The CDM groups will be recruited locally, managed by TLP and supervised by the project owner. The candidates will be carefully screened to ensure that each CDM group member has the proper ability to perform the monitoring task. Each CDM group will consist of 30 people and each person will be in charge of the monitoring of 10 or 11 users. The group directors will be trained and supported by the CDM department of the project owner and experienced CDM consultants. The project owner will work closely with TLP to ensure proper equipment installation, training of the users, monitoring, document preservation, and maintenance.

The organization of the project monitoring is as the following:



2. Avoiding Double Counting

The TLP is the overall data management department and all the data collected should be submitted to the TLP for the purpose of effective management. To avoid double counting, the following measures will be taken:

(i) Once one of the households stops using solar cooker halfway, the local coordinator will redistribute it to another household immediately and report the changed information such as date, user address, user name, user ID and user contact information to the TLP by the *user information alternation form*. The CDM monitoring team will be asked to update the *user information registration form* if the changes were verified.

Therefore, only one solar cooker will be taken into account when monitoring the number of solar cookers operating and the emission reduction generated by this solar cooker will be counted only once.

(ii) For the situation of the solar cookers was transfer to another place halfway. Usually, the solar cookers could be redistributed to other users in same village because there are more householders without solar cookers than that of who have. So this situation could barely occur.

But if this situation is occur, the local coordinator will report the changed information such as date, user address, user name, user ID and user contact information to the TLP. The TLP will appoint another local coordinator to find a qualified user within the aforementioned 7 townships immediately and re-register the information by the *user information alternation form*. The CDM monitoring team will be asked to update the information of *user information registration form*.

For this situation, only one solar cooker will be taken into account when monitoring the number of solar cookers operating and the emission reduction generated by this solar cooker will be counted only once.



(iii) The Xichuan Agricultural Bureau is the overall coordination organization that in charge of solar cooker distributing and serial number naming. The cross serial number is not allowed between different projects and each project has a unique serial number naming rule. Furthermore, each solar cooker also has its unique serial number. All the solar cookers will be distributed to the households who meet the aforementioned requirements. If there are other solar cookers that don't belong to the proposed project was used within the project boundary, these solar cookers will not have the unique serial number and will not be taken into account when monitoring the number of solar cookers operating.

For this situation, the emission reduction generated by these solar cookers will not be included.

2. Data Monitoring

According to paragraph 50 (19th edition) of AMS-I.C., If the emissions reduction per system is less than five tonnes of CO₂e a year:

- (i) Recording annually the number of systems operating (evidence of continuing operation, such as on-going rental/lease payments could be a substitute), if necessary using survey methods; each solar cooker has its unique serial number. As a result, once one of these households stops using solar cooker halfway, the local coordinator will redistribute it to another household in the same village and re-register related information.
- (ii) The working group comprises 480 part-time coordinators. At the beginning of each quarter of a year, everyone should visit and survey one hundred households, one by one, and submit the survey results in table form to the local partner for compiling. The submitted tables will be used for cross check, comparing with the report from CDM monitoring team.

In the proposed activity, the emission reduction from each solar cooker is $90204/48000 = 1.88 < 5\text{tCO}_2\text{e}$. Therefore, what need to be monitored are the number of solar cookers in operation and the average operating time of each solar cooker. After the end of crediting period, all the monitoring data will be placed on file for at least two years.

3. Monitoring Method

i) Monitoring number of solar cookers operating

For the number of operation systems, CDM Monitoring Team will track the number of operating solar cookers. The monitoring of total number of operating solar cookers will be conducted annually at the last quarter of each year. The following table will be used for monitoring and recording this parameter. All the data should be written down annually, collected and checked by Data Survey Group at the end of the year and saved finally. There should be more than one copies of each data, which should be done by Data Recording Group. Furthermore, Data Verification Group should in charge of verifying the monitoring results.

To track the solar cookers easily, a serial number will be put on each of the solar cookers distributed to the users. A list of all the users and the corresponding serial numbers of their solar cookers will be kept. Then during the monitoring of total number of operating solar cookers, the monitoring team will also check if the serial number of each solar cooker matches its user according to the abovementioned list. This way, it can be ensured that no solar cooker will be transferred without being tracked.

Once one of these households stops using solar cooker halfway, the local coordinator will redistribute it to another household in the same village and re-register related information. The changes will be reported to the CDM monitoring team to update related information after being verified.



For re-allocation of solar cooker, the new householder should still meet the following standard:

- i) Utilizing coal as the main energy source for daily lives;
- ii) Family members should be more than 2;
- iii) Annual family income should be on a lower/middling level.

The management of the 48000 solar cookers are summarized as follows:

	Key Control Factors	Procedure	Responsible Party
1	Serial number	Each solar cooker has its unique serial number which will be pasted on the back of the shell of the solar cooker.	the TLP
2	Number of solar cookers	A form with all the information of each households including serial number, location, username, ID and contact information will be recorded.	the CDM Monitoring Team
3	Ensure Distribution and Installation	i) All the solar cookers should be transferred to the TLP and the TLP will record and confirm the transfer. ii) There were several distribution units organized by the TLP and the solar cookers will be divided into appropriate batches. the TLP will record the information of each batch of solar cookers and the corresponding distribution units. iii) The user information should be registered and must be confirmed by users' signature and after the solar cookers distributed to the users iv) All the records should be kept by the TLP and confirmed by the project owner.	the TLP
4	Ensure Operation	All of the 480 coordinators will survey the households of responsibility one by one at the beginning of each quarter of a year. The survey results will be submitted to the TLP. Besides, the local coordinator also will follow up the households' daily utilization irregularly. If the situation of stop using, structure damage, efficiency decline or other problems were found, the TLP will be reported and the problems will be dissolved according to the procedure immediately.	the local coordinator
5	Procedure of user replacement	Once one of the households stops using solar cooker halfway, the local coordinator will redistribute it to another household immediately and report the changed information to the TLP by the <i>user information alternation form</i> . The CDM monitoring team will be asked to update the <i>user information registration form</i> if the changes were verified.	the TLP



6	User selection criteria for re-allocation	For re-allocation of solar cooker, the new householder should still meet the aforementioned selection standard.	the TLP
7	Efficiency management	i) The use of solar cookers will be trained by the TLP to ensure the equipment can be used properly. ii) For solar cooker structure damage situation, the householders also have been told to report immediately to the local coordinators. The local coordinator will change the solar cooker as soon as possible. iii) A table with the average time required to boil water in different month will be provide to the householders. It should be considered to energy efficiency decline when the time required boiling water over 10% of the value listed in the table. iv) If the thermal efficiency decline were found, the reflex film will be replaced immediately for free. v) The project owner will provide guidance for the households to change the reflex film. Besides, local coordinator will follow up the households' daily utilization and change the solar cooker when necessary.	i) the TLP ii) the local coordinator iii) the local coordinator iv) the local coordinator v) the local coordinator

The form for monitoring number of solar cookers operating shows as follow:

Solar Cooker No.	User Name	If this solar cooker exists and is operational	Date of Checking	Checked by	Note
DJ-I-00001					
DJ-I-00002					
DJ-I-00003					
.....					
DJ-I-47999					
DJ-I-48000					
Summary	Number of operational solar cookers		Summarized by:		
	Number of nonoperational solar cookers				

ii) Monitoring annual hours of operating

For the annual hours of operation of the solar cookers, sampling survey will be utilized to calculate each solar cooker's average operating hours in every month. The format of the monitoring form to record the daily operating time of solar cooker shows as below:



June.2011	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Actually operating period(H)		1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31	Principal:		

The format of the solar cooker utilization form kept by each household as below, the monitoring team should sum them up to fulfill the daily operating time record table.

Serial Number:	Date:	Name:	Address:
	Using time		Usage (boiling//cooking)
8:00~9:00			
9:00~10:00			
10:00~11:00			
11:00~12:00			
12:00~13:00			
13:00~14:00			
14:00~15:00			
15:00~16:00			
16:00~17:00			
17:00~18:00			
18:00~19:00			
19:00~20:00			

4. Sampling Plan

The sampling objective: determining the annual hours of operation of the solar cookers during the crediting period with a 90/10 confidence/precision.

Field measurement objective and data to be collected: Field measurement objective is measuring the daily usage time of the solar cooker for each of the sample users during the crediting period, and the data to be collected is the above mentioned average operating hours of each solar cooker and number of solar cookers operating.

The target population and sampling frame: the 48,000 solar cookers to be installed by the proposed project.

Sample method: The project will be implemented in the 7 townships within Xichuan County. The stratified sampling was taken based on the 7 townships to reduce the errors and the sample size of each township was determined proportionately on the basis of the number of solar cooker distributed. According the principle of stratified sampling method, the simple random sampling method will be taken within each Stratum by using Microsoft Excel.



Desired precision and sample size: According to “General Guidelines for Sampling and Surveys for Small-Scale CDM Project Activities”, the desired confidence level is 90% and the desired precision is 10%. According to statistical principles and sampling survey method, 312 samples should be sufficient to satisfy the desired confidence and precision. For mean value sampling, the required sampling quantity is calculated by the following steps:

$$n_1 = \frac{Z^2 \sigma^2}{d^2} = \frac{Z^2 (\sigma^2 / X^2)}{d^2 / X^2} = Z^2 V^2 / e^2$$

$$n_2 = n_1 N / (N + n_1)$$

$$n_3 = B n_2$$

$$n_4 = n_3 / r$$

$$n = n_4 (110\%)$$

Where:

Z the Z-statistic and the value taken is 1.645 (corresponding to 90% confidence level);

σ the standard deviation;

d the maximum error of estimate;

X the mean value of samples;

V the coefficient of variation, $V = \sigma / X \leq 1$ and its maximum value 1 is taken;

e the allowed relative sampling error (“precision”) and the e value taken is 10% (According to “General Guidelines for Sampling and Surveys for Small-Scale CDM Project Activities” in Annex 30 of EB50, 90% confidence level and 10% precision shall be used if there is no specific guidance in the applied methodology);

N the total number of solar cookers 48,000;

B the survey design effect and the B value taken is 1 because for stratification sampling the B value is less than or equal to 1;

r the survey reply rate and the value taken is 95%;

110% 10% contingency was added to produce the final sample size;

n_1, n_2, n_3, n_4, n the adjusted values after each step with n being the final number of samples to be taken. Actually n_4 is the required number of samples based on calculation, 10% contingency was added to n_4 to produce n in this sampling.

The calculation result for n is 312. Therefore 312 sample users will be selected from the sampling frame according to stratified sampling method at the beginning of each year during the crediting period. An inclusion of



312 samples in total, the sample size of each township was decided on the method of proportional distribution.

Procedures for Administering Data Collection and Minimizing Non-sampling Errors: CDM monitoring team will conduct the daily monitoring of the operating hours of the sample users. The monitoring forms will be filled out daily to record the daily usage data of these sample users. Then average usage time per user will be calculated based on these data. The data will be cross checked with the survey results by coordinators quarterly.

If the recorded raw data on the monitoring form are reasonable and basically consistent with the actual meteorological information, the raw data will be archived.

If the data record is missing or damaged, the following makeup process will be conducted:

- 1) The general principle is that zero value will be used for the missing or damaged data. This is most conservative approach. The monitoring personnel will be 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 will be required to strictly abide by the above conservative principle in data recording, i.e., use zero values for all the missing or damaged data.
- 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 meantime, use zero value for the missing or damaged data;
- 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 meantime, use zero value for the missing or damaged data;
- 4) If the monitoring team as a whole does not meet the job requirement of monitoring process, the project owner, has the right to require that REB create new monitoring team.
- 5) If some data recorded are 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, it will be viewed as thermal efficiency decline, local coordinator's follow-up actions should be taken to replace the reflex film, zero value will be used for that day's data.

If the monitoring results are satisfactory in terms of correct reporting, data completeness and correct analysis, the data will be accepted for the monitoring report.

Implementation: The sampling process will start as soon as the target population is determined and will finish before the beginning of the monitoring period.

The CDM Monitoring Team and local coordinators will implement the sampling investigation strictly follow the guidance and the sampling work will be conducted by the person with no interest in the proposed project, i.e. the sampling person should exclude the following personnel: 1) the solar cooker users; 2) the persons from the solar cooker manufacturer; 3) other persons that are believed to be not the fit and proper persons. Each township is treated as a stratum and total of 312 sample users will be selected among the 10 stratum. The sample size of each stratum was determined proportionately on the basis of the number of solar cooker distributed.

According the principle of stratified sampling method, the samples within each stratum will be randomly selected through simple random sampling method by using Microsoft Excel..

All of the 312 samples will be totally changed at the beginning of each year during the crediting period. The monitoring data will be collected and recorded throughout the entire crediting period. All archived data and documentation will be kept at least for 2 years after the end of the last crediting period.



4. Maintenance

The coordinator will write down and report the problems appear in the daily operation. At the same time, if there is any trouble appears in the using process, will let the coordinator know and resolve. The project owner will maintain and replace the trouble ones according to the actual situation.

The project owner will provide the households with the guidance for change the reflex film and a table with the average time required to boil water in different month. It should be considered to energy efficiency decline when the time required boiling water over 10% of the value listed in the table.

The householders have been told to report immediately to the person in charge and get their reflex film replaced for free once thermal efficiency depression was found during using of the solar cooker. The local coordinators will also check the reflex films at random during the survey. Besides, local coordinator will follow up the households' daily utilization and change the solar cooker when necessary.

For solar cooker structure damage situation, the householders also will report to the local coordinators immediately. The local coordinator will change the solar cooker when necessary.

5. QA/QC Procedures

Before implementing the project, the project owner will train the personnel of monitoring teams on how to properly conduct the monitoring process.

If the data reported by the user significantly deviates from the normal range, the monitoring personnel should write down the reasons and report to the team leader, any action is forbidden before the permission. The monitoring team will arrange a research according to the attached form. At the same time, when the verification group has any doubt with the right result, they can arrange a related research. During the research process, the CDM monitoring team will do survey for the operating equipments, intention of the users, check and maintain the equipments, monitor data checking and so on. The research aims to: 1) investigating the operating status of the solar cooker; 2) investigating the households' use intention in future days; 3) obtain any other information necessary. The verifier should research carefully to get the conclusion.

NO.	user	operating status	Intention of users	Other notes	Research date	Researcher
1						
2						
3						
.....						
311						
312						

At the end of each crediting period, all the forms submitted to the project owner will be typed into the database, Using SPSS to calculate the weighted mean value of everyday using hours from 312 households, compared with the everyday meteorological data. If any irrational data occurs, all the forms of this day will be find out to get at the root of the problem and replaced by the minimum value of the present day. Also, the data analysis function of SPSS will be utilized to ensure the data and information is sufficiently accurate and reliable.

B.8 Date of completion of the application of the baseline and monitoring methodology and the

**name of the responsible person(s)/entity(ies)**

>>

Date of completion of baseline and monitoring methodology study: 1/12/2011

Su Fanglei
Sirreon technology & development (Beijing) Co., Ltd
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The above organization is a project participant.

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:**

>>

13/12/2010, i.e. the date on which the investment on the proposed project activity was approved in the shareholders' meeting

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

>>

10 years and 0 month.

C.2 Choice of the crediting period and related information:**C.2.1. Renewable crediting period****C.2.1.1. Starting date of the first crediting period:**

>>

Not applicable

C.2.1.2. Length of the first crediting period:

>>

Not applicable

C.2.2. Fixed crediting period:

>>

C.2.2.1. Starting date:

>>

1 May 2012 or date of registration, whichever is later

C.2.2.2. Length:

>>

10 years

**SECTION D. Environmental impacts**

>>

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

>>

The EIA Registration Form of the project was approved by Xichuan Environmental Protection Administration on October 28th, 2010.

It is a characteristic of such projects that there are no emissions or wastes. The solar cookers have a long lifetime, and all parts are totally recyclable.

D.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:

>>

According to the opinion of the local environmental authority, the project has positive environmental impacts and it has no negative environmental impact.

SECTION E. Stakeholders' comments

>>

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

>>

A public survey of local habitants was conducted in writing by the EIA study group to evaluate their opinions towards the project on October 20th, 2010. A total of 100 questionnaires were distributed according to the principle of representation and randomness in order to more accurately reflect the public opinion and concern. 97 valid questionnaires were returned. The questions were:

1. What do you know about the solar cooker project in this area?
2. What is your attitude towards the project?
3. Do you think the project will have any positive impacts?
4. Do you think the project will have any negative impacts?
5. Do you think the project will have any negative impact on your personal lifestyle?

The project was supported by 97 of 97 respondents while 3 were indifferent. The brief summary of the survey was circulated to all the stakeholders. The opinions expressed by the stakeholders were recorded and are available on request. The composition of the respondents is as below:

Age	20~30	31~40	41~50	51~70
	28	36	16	17
Academy Degree	Elementary School	Junior Middle School	High School	University
	19	45	29	4
Gender	Male		Female	
	70		27	



E.2. Summary of the comments received:

>>

1. Many local inhabitants are aware of the project.
2. Of the 97 inhabitants in the survey, 100% of those surveyed supported the project. Nobody was against the project.
3. 100% of the people believed construction of project would benefit the development of the local economy.
4. Regarding the environmental pollution, 100% of the people believed that the construction would impact the local area in ways not related to the environment.
5. 100% of the people surveyed were willing to accept the solar cooker. None were opposed.

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

>>

All feedback from the stakeholders has been seriously considered by the project owner and the company will strictly obey all environmental laws and regulations.

The stakeholders (including local government and local residents) strongly supported the proposed project. Therefore, it is not necessary to make any adjustment on the current implementation plan.

**Annex 1****CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY**

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Annex 2



INFORMATION REGARDING PUBLIC FUNDING

No public funding from parties included in Annex I is available to the project activity.

Annex 3**BASELINE INFORMATION****Table A1: 2005-2009 Solar Irradiance Data in Nanyang City**

Month	Monthly solar insolation	Sunlight time	Solar irradiance rate
	MJ/m ²	hour	W/m ²
1	195.13	131.4	412.50
2	249.40	155.3	446.09
3	319.67	180.2	492.77
4	375.54	191.3	545.30
5	573.14	231.6	687.42
6	551.15	211.9	722.5
7	580.67	217.2	742.62
8	476.15	188.0	703.53
9	462.73	203.7	631.01
10	344.93	181.7	527.32
11	249.63	153.6	451.44
12	192.19	132.9	401.70
Total	4570.33	2178.8	6764.20

Annex 4

MONITORING INFORMATION

No additional information is provided.