CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

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Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

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Implementation of biomass based Thermic fluid heater

Version 1

15/05/08

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

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Industrial Clothings Limited (ICL) is in the business of manufacturing disposable nitrile and latex gloves in its facility, as also PU Coated Gloves; at their Prime Polymers division, Avisawella, Sri Lanka.
The project activity involves the installation of two biomass based thermic fluid heaters, each of 4 Million K.Cal/Hour capacity. The purpose of the project activity is to reduce the green house gas emissions by displacing the fossil fuel based heaters with that of biomass based heaters. Gliricidia wood is used to fire the Thermic fluid heaters thereby contributing to reduction in green house gases emissions, which would have otherwise taken place. The project activity would ultimately result in emission reductions of about 25,348 tonnes of CO_2e every year.

The contributions of project activity towards sustainable development are explained with indicators like social, economical, environmental and technological well being as follows:

i) Social well being:

The project shall provide business opportunities to the local stakeholders like suppliers, manufacturers, contractors etc., thereby the project activity would help to improve the social status of the local populace. The project activity provides environmental awareness to the related industrial sector, which may lead to implementation of similar such projects in the future.

ii) Economic well being:

The project activity shall create employment opportunities approximately for 30,000 farmers through 600 Grama Niladhari Divisions. This will generate augmented income, thus contributing to the economic well being of the region.

iii) Technological well being:

Biomass serves as a heat source to provide hot thermic fluid for process applications. This heat is utilized for curing disposable gloves of nitrile and latex material. The technology used is an efficient and an environmentally safe technology.

Few features of the system are listed below:

- Flexibility in accepting any fuel
- Efficient heat transfer mechanism
- Improved design of convective coil
- Improved pollution control systems
- No SO_x and NO_x emissions in the system

The project activity provides encouragement to the related industrial sector, which may lead to transfer of technology in the future

iv) Environmental well being:

The project activity uses renewable biomass as an alternative to conventional fossil fuel, to fire the thermic fluid heaters. Since the fuel that would be deployed is bio-mass viz., wood chips, there is no So_x and No_x emissions from the system. This is a vital difference between heating systems that deploy fossil fuels and agri based fuels.

Since the project avoids the use of pollution intensive fuels, it contributes towards reduction in global warming. The project shall create an environmental awareness about the harmful effects of global warming and the need for emission reductions, which will encourage similar such projects in the future.

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)
Sri Lanka	Industrial Clothings Limited (Private entity)	No

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

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

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A.4.1.1. Host Party(ies):

>>
Sri Lanka

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

>>
Seethawaka Industrial Park

A.4.1.3. City/Town/Community etc:

>>
Avissawella

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

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

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Type 1 : Renewable Energy Projects

Category C: Thermal Energy for the user with or without electricity

This category generally comprises renewable energy technologies that supply thermal energy which displaces fossil fuels. Examples include, solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass for water heating, space heating, or drying, biomass based captive co-generation systems and other technologies that provide thermal energy displacing fossil fuel. The project activity employs renewable energy technology that displaces furnace oil. The process involves the use of biomass to fire the thermic fluid heaters, which supply heat for process applications. Since the displaced biomass is a clean fuel that does not emit green house gas, the project activity contributes to reduction in global warming. The project activity employs the technology, imported from India that is environmentally safe and sound. Therefore, the project can be claimed as an environment friendly project, which leads to a greener atmosphere.

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

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Years	Estimation of annual emission reductions in tonnes of CO_2e
2008 – 09	25,348
2009 – 10	25,348
2010 – 11	25,348
2011 – 12	25,348
2012 – 13	25,348
2013 – 14	25,348
2014 – 15	25,348
2015 – 16	25,348

2016 – 17	25,348
2017 – 18	25,348
Total estimated reductions (tonnes of CO_2e)	**2,53,480**
Total number of crediting years	10
Annual average of the estimated reductions over the crediting period	25,348

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

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

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

According to Appendix C of simplified modalities and procedures for small scale CDM project activities, "**debundling**" is defined as the fragmentation of the large scale project activity into smaller parts. A proposed small scale project activity shall deemed to be a "debundled" component of large scale project activity, if there is a registered small scale CDM project activity or a request for registration by another small-scale project activity:

- By the same project participants;
- In the same project category and technology/measure;
- Registered within the previous two years; and
- Whose project boundary is within 1 Km of the project boundary of the proposed small-scale activity at the closest point.

ICL's project activity is not a part of any of the above, and therefore it is a 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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Title: Thermal energy for the user with or without electricity (Version 13 of AMS I C)
http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_Q5LOZVUT3BZ8WIP7NR9KGQ76B

AZIE1

Reference: Reference for the approved baseline and monitoring methodology is taken from Appendix B to the simplified modalities and procedures for small scale CDM project activities.

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

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Applicability Criteria	Justification of the choice
Renewable energy technologies that supply users with thermal energy that displaces fossil fuels.	The project activity uses renewable biomass to fire Thermic fluid heater. The heat provided by the project activity displaces pollution intensive fossil fuels. The project activity thus justifies the choice of the methodology.
Examples include solar thermal water heaters and dryers, solar cookers, *energy derived from renewable biomass for water heating,* space heating, or drying, and other technologies that provide thermal energy that displaces fossil fuel.	The project activity involves deriving heat from renewable biomass for fluid heating. The heat is used for process application in the facility.

Where thermal generation capacity is specified by the manufacturer, it shall be less than 45 MW_{th}.	The project activity has thermal generation capacity of 9.304 MW_{th}[1], which is well below 45 MW_{th}. Hence, this project activity qualifies itself as a small scale project.
For co-fired systems the aggregate installed capacity (specified for fossil fuel use) of all systems affected by the project activity shall not exceed 45 MWth.	The project activity is not a co-fired system. This condition does not apply. However as stated above, the thermal capacity of the thermic fluid heater is less than 45 MW.
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 be lower than 45 MWth and should be physically distinct from the existing units.	The project activity does not involve the addition of renewable energy units at an existing renewable energy facility.

B.3. Description of the project boundary:

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As per AMS I.C, the boundary consists of the physical geographical site of the renewable energy generation. The project boundary encompasses the biomass fired thermic fluid heater, which includes the combustion furnace, air pre-heater, heat exchangers, and the saw dust feeding system.

B.4. Description of baseline and its development:

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AMS I.C states that

For thermal energy generation using renewable technologies that displace technologies using fossil fuels, the simplified baseline is the fuel consumption of the technologies that would have been used in the

[1] Calculation of thermal generation capacity:

Total Capacity of the biomass fired thermic fluid heaters = 8 Million kCal/hr

= (8* 4.1868* 1000) /3600 MJ/S

= 9.304 MW_{th}

absence of the project activity times an emission coefficient of the fossil fuel displaced, divided by the efficiency.

Here, the baseline BE_y is calculated as the product of the net quantity of steam/heat supplied by the project activity during the year y, HG_y and the CO_2 emission factor per unit of energy of the fuel that would have been used in the baseline plant $EFCO_2$ divided by the efficiency of the boiler η_{th}.

$$BE_y \Rightarrow \frac{HG_y * EFCO_2}{\eta_{th}}$$

Where:

BE_y= the baseline emissions from steam/heat displaced by the project activity during the year y in tCO_2e

HG_y = the net quantity of steam/heat supplied by the project activity during the year y in TJ.

$EFCO_2$ = CO_2 emission factor per unit of energy of the fuel that would have been used in the baseline plant in (tCO_2e/ TJ). IPCC default values are used.

η_{th}= efficiency of the plant using fossil fuel that would have been used in the absence of the project activity

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:

As per the Attachment of A to Appendix B, 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.

Technological Barrier:

The project activity uses two biomass fired thermic fluid heaters, each 4 Million kcal/hr of capacity. The alternative to the project activity involves the use of furnace oil fired thermic fluid heaters, which are pollution intensive in nature. All these years, the project promoter has been depending on reliable furnace oil for its thermic fluid heaters. The technology was well known and the operation and maintenance team was well trained, on a long term basis. Installation of biomass fired heaters poses an evident risk of operational reliability as the technology is not prevalent in the region. Moreover, the O&M team has to face all the critical technical issues related to the new technology. Suitable precaution measures have to be taken by the project team to ensure loss of productivity. The operational risks in furnace oil fired heaters are comparatively much lower and the market share is high which ensures operational reliability.

The biomass fired thermic fluid system has not penetrated so well into the Sri Lankan market. In spite of the furnace oil fired heaters dominating the whole Sri Lankan market, the project promoter has decided to proceed with the biomass fired heaters, keeping in mind the positive environmental impacts. Even though the existing furnace oil heaters have an adequate residual life time, the project promoter has decided to implement biomass fired heaters while they are more likely to face hurdles in terms of supply management, operation & maintenance and problems due to low market share.

Barrier due to prevailing practice:

The furnace oil fired systems are more common in Sri Lanka as it is an economically viable one. Most of the industries have gone for this source also because it is easily available and the technology is an existing one. But furnace oil is pollution intensive and it will lead to higher emissions of green house gases. Considering this, the project promoter has gone for biomass based heating system, even though the technology is not a prevalent one in the region. The biomass heating system being fresh in the market, the implementation of the project activity may not be a reliable one. Moreover, the project promoter is totally into the manufacture of leather gloves, hence the promoter is not exposed to any area of renewable energy. The alternative being much common in the region, the implementation of the biomass heaters by the project promoter will lead them to face trouble in terms of experience, as the alternative is more comfortable in terms of operation and maintenance.

Other barriers:

Managerial Resources:

The project activity uses new technology that is imported from India. The project promoter has taken measures to import the technology since it avoids green house gases emissions. The new technology requires training of people to operate the new equipments. Historically, in Prime Polymers of Industrial Clothings Limited, the expertise has been built around furnace oil or diesel fired heating systems and all the house-in expertise is centered on such systems. This project activity would be a first of its kind experience and the promoter has to spend time on its personnel to understand the process in procurement of biomass, operation and maintenance of the system. Since the technology has not penetrated in the market, it is really challenging for the promoter to ensure sustainable production.

B**.6. Emission reductions:**

B.6.1. Explanation of methodological choices:

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The emission reduction ER_y due to the project during a given year 'y' is calculated as the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (L_y), as per the formulae given below:

Emission Reductions

Emission Reductions (ER_y) = Baseline Emissions (BE_y) - Project Emissions (PE_y) - Leakages (LE_y)

Baseline Emissions

The baseline is calculated as follows:

$$BE_y \Rightarrow \frac{HG_y * EFCO_2}{\eta_{th}}$$

Where,

HG_y = Net quantity of heat supplied by the project activity, in the year y in TJ

$EFCO_2$ = CO_2 emission factor per unit of energy of the fuel that would have been used in the baseline plant in (tCO_2 / TJ)

η_{th} = efficiency of the plant using fossil fuel that would have been used in the absence of the project activity.

$$HG_y = Min(HG_{Estimated}, HG_{Metered})$$

$HG_{Metered}$ = If fossil fuel is used the electricity generation metered should be adjusted to deduct electricity generation from fossil fuels using the specific fuel consumption and the quantity of fossil fuel consumed.

$$= \quad HG_{monitored} - \left(\frac{Qty_{Coal}}{SFC_{Coal}}\right)$$

Where

$HG_{Monitored}$ = heat monitored through flow and temperature difference of thermic fluid

SFC_{Coal} = Specific fuel consumption of Coal

Qty_{coal} = Quantity of coal consumed

$HG_{Estimated}$ = the amount of electricity generated calculated using specific fuel consumption and amount of each type of biomass fuel used.

$$= \left(\frac{FC_{Gliricidia}}{SFC_{Gliricidia}} \right)$$

Where

$SFC_{Gliricidia}$ = Specific fuel consumption of Gliricidia

$FC_{Gliricidia}$ = Quantity of Gliricidia consumed

Project Emissions

The project does not involve firing of any waste gas or any other activity that would result in project emissions. Hence the value of project emissions for the year, PE_y is taken as 0

Leakage (L_y)

As per attachment C to Appendix B of simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories - version 02, the emission source per type of biomass is given in the table below:

Biomass Type	Activity/Source	Shift of pre-project activities	Emissions from biomass generation/cultivation	Competing use of biomass
Biomass from forests	Existing forests	_	_	X
	New Forests	X	X	_
Biomass from croplands or	In the absence of the project, the land would be used as cropland/ wetland	X	X	_

grasslands (Woody or Non-woody)				
	In the absence of the project, the land would be abandoned	_	X	_
Biomass Residues or wastes	Biomass residues or wastes are collected and used	_	_	X

Since the project activity utilizes woody biomass from croplands, the following activity/ source is considered and demonstrated:

In the absence of project activity, the land would be used as cropland/wetland:

1) Shift of pre-project activities:

Shifts of pre-project activities are relevant where in the absence of the project activity, the land areas would be used for other purposes (i.e. agriculture). For example: where cropland is converted to forest to produce wood for energy purposes, the pre-project activity (crop production) might be shifted to other land areas. In the worst case, this shift of the pre-project activity could result in deforestation on other land areas.

The project activity involves the usage of a cropland, where in coconut trees were planted and utilized. The present scenario uses the same cropland, where in inter cropping of the biomass species (Gliricidia) is done without affecting the existing plantation. Shifting of pre-project activity does not take place, since there is inter-cropping of Gliricidia is done without cutting off the existing plantation. There is no deforestation involved; hence there is no decrease of carbon stocks due to the project activity. Therefore, leakage due to the shift of project activity may be considered as Zero.

2) Emissions from biomass generation / cultivation:

Potentially significant emission sources from the production of renewable biomass can be:

(a) Emissions from application of fertilizer; and

(b) Project emissions from clearance of lands.

a) Emissions from application of fertilizer:

Project participants should monitor the type and quantity of fertilizer applied to the land areas. N_2O emissions from the use of synthetic and organic fertilizers should be estimated according to provisions outlined in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (Chapter. 4.5).

The project activity does not involve the usage of synthetic or organic fertilizers to the land areas, for the biomass cultivation. Hence, there are no emissions generated due to synthetic or organic fertilizers.

b) Project emissions from clearance of lands:

Project emissions from clearance of lands can be significant in cases, where an area is deforested to produce the biomass. In other cases, the land area (e.g. abandoned land) can regenerate in the absence of production of the biomass resulting in increasing carbon stocks in carbon pools.

The project activity uses an inter-cropping phenomenon of Gliricidia Species, in the already existing coconut tree plantation. The biomass (Gliricidia) generation takes place without disturbing the existing coconut tree plantation; hence there is no deforestation of the area to produce required biomass.

Since the land area has already been in use to cultivate coconut trees, it cannot be considered as an abandoned land, which would otherwise regenerate and result in increase of carbon stocks in carbon pools.

Where the project activity involves the use of a type of renewable biomass that is not a biomass residues or waste, project participants should demonstrate that the area where the biomass is grown is not a forest (as per DNA forest definition) and has not been deforested, according to the forest definition by the national DNA, during the last 10 years prior to the implementation of the project activity.

As per the DNA definition, “Forest” is a minimum area of land of 0.05-1.0 hectares with tree crown cover (or equivalent stocking level) of more than 10-30 per cent with trees with the potential to reach a minimum height of 2-5 metres at maturity *in situ*. A forest may consist either of closed forest formations where trees of various storey and undergrowth cover a high proportion of the ground or open forest.

The pre-project activity involves the cultivation of coconut trees, which are of the same type. The plantation does not include different types of trees and hence it cannot be considered as a forest, where trees are of different genus, nature and length. Moreover, the land area has not been un-stocked as a result of human intervention such as harvesting or natural causes during the last ten years, prior to the implementation of the project activity. Thus, it is evident that the land area has not been deforested.

Since all the project activity does not carry out any of the above mentioned processes, the leakage component (L_y) can be considered as zero.

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

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Data / Parameter:	η_{th}
Data unit:	-
Description:	The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity
Source of data used:	Data from furnace oil fired thermic fluid heater of ICL
Value applied:	80%
Justification of the choice of data or description of measurement methods and procedures actually applied :	Based on measurements of flue gas analysis.
Any comment:	

Data / Parameter:	EF CO_2
Data unit:	Tonnes / TJ
Description:	The CO_2 emission factor per unit of energy of the fuel that would have been used in the baseline plant
Source of data used:	Page 2.16, Table 2.2, Chapter 2, Volume 2, 2006 IPCC Guideline for National Greenhouse gas inventories.
Value applied:	77.4
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per AMS IC, the default IPCC emission factor is to be used if reliable local or national data is not available.
Any comment:	

Data / Parameter:	$\rho_{thermic\ fluid}$
Data unit:	kg/m^3
Description:	Density of thermic fluid at 200°C
Source of data used:	Manufacturer specification.
Value applied:	770
Justification of the choice of data or description of measurement methods and procedures actually applied :	Density is taken from manufacturer specification and referred for operating temperature.
Any comment:	

Data / Parameter:	$CP_{thermic\ fluid}$
Data unit:	kJ/kg °C
Description:	Specific heat of thermic fluid
Source of data used:	Manufacturer specification.
Value applied:	2.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	Specific heat is taken from manufacturer specification
Any comment:	

Data / Parameter:	$SFC_{Gliricidia}$
Data unit:	Tonnes/TJ
Description:	Specific fuel consumption of Gliricidia
Source of data used:	Manufacturer specification.
Value applied:	65.38
Justification of the choice of data or description of measurement methods and procedures actually applied :	Specific fuel consumption is taken from manufacturer specification
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

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The project activity reduces carbon dioxide emissions through displacement of grid electricity generation with fossil fuel based thermic fluid heater by renewable-biomass. The emission reduction ERy due to the project during a given year ‘y’ is calculated as the difference between baseline emissions (BEy), project emissions (PEy) and emissions due to leakage (Ly), as per the formulae given below:

$ER_y = BE_y – PE_y - L_y$

Where,

BEy = baseline emissions

$$BE_y \Rightarrow \frac{HG_y * EFCO_2}{\eta_{th}}$$

Where,

HG_y = Net quantity of heat supplied by the project activity, in the year y in TJ

$EFCO_2$ = CO_2 emission factor per unit of energy of the fuel that would have been used in the baseline plant in (tCO_2 / TJ)

η_{th} = efficiency of the plant using fossil fuel that would have been used in the absence of the project activity.

$$HG_y = Min(HG_{Estimated}, HG_{Metered})$$

$HG_{Metered}$ = If fossil fuel is used the electricity generation metered should be adjusted to deduct electricity generation from fossil fuels using the specific fuel consumption and the quantity of fossil fuel consumed.

$$= HG_{Monitored} - \left(\frac{Qty_{Coal}}{SFC_{Coal}}\right)$$

= 262 – 0

= 262

Where

$HG_{Monitored}$ = heat monitored from flow and temperature difference of thermic fluid.

SFC_{Coal} = Specific fuel consumption of Coal

Qty_{coal} = Quantity of coal consumed, since there is no coal usage, it is considered as nil.

$HG_{Estimated}$ = the amount of electricity generated calculated using specific fuel consumption and amount of each type of biomass fuel used.

$$= \left(\frac{FC_{Gliricidia}}{SFC_{Gliricidia}}\right)$$

= 18396/65.38

= 281.35 TJ/yr

Where

$SFC_{Gliricidia}$ = Specific fuel consumption of Gliricidia

$FC_{Gliricidia}$ = Quantity of Gliricidia consumed

$$HG_y = Min(HG_{Estimated}, HG_{Metered})$$

$$HG_y = Min(281.35, 262)$$

= 281.35

$$BE_y \Rightarrow \frac{HG_y * EFCO_2}{\eta_{th}}$$

$$BE_y \Rightarrow \frac{262 * 77.4}{0.8}$$

= 25,348 tonnes CO_2/yr

PE_y = project emissions

= 0

Since the project activity generates heat from renewable energy (renewable biomass), the project emission is carbon neutral.

Ly = emissions due to leakage.

= 0

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

Years	Estimation of project emissions (tCO_2e)	Estimation of baseline emissions (tCO_2e)	Estimation of Leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
2008-2009	0	25,348	0	25,348
2009-2010	0	25,348	0	25,348
2010-2011	0	25,348	0	25,348
2011-2012	0	25,348	0	25,348
2012-2013	0	25,348	0	25,348
2013-2014	0	25,348	0	25,348
2014-2015	0	25,348	0	25,348
2015-2016	0	25,348	0	25,348
2016-2017	0	25,348	0	25,348
2017-2018	0	25,348	0	25,348
Total (tonnes of CO_2e)	**0**	**2,53,480**	**0**	**2,53,480**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	**$HG_{metered}$**
Data unit:	TJ
Description:	Measured net quantity of heat supplied by the project activity excluding the coal component during the year y
Source of data to be used:	The data will be determined by monitoring the thermic fluid oil flow rate through

	ampere reading and pump performance curve, temperature difference across the heater.
Value of data	262
Description of measurement methods and procedures to be applied:	The performance characteristic curve of the pumps will be used to calculate the flow rate from the ampere reading and impeller diameter. Inlet and outlet temperatures of Thermic fluid will be monitored using temperature indicators. In addition, density and specific heat of Thermic fluid as given by the manufacturer will be used to compute the heat supplied.
QA/QC procedures to be applied:	Quality will be assured and controlled by following calibrating schedule. Ammeter will be calibrated once in six months.
Any comment:	Instrument used: Derived from flow, density and specific heat. $\mathbf{HG_{metered}}$ and $\mathbf{HG_{monitored}}$ are same, since there is no coal usage.

Data / Parameter:	$\mathbf{HG_{estimated}}$
Data unit:	TJ
Description:	Estimated net quantity of heat supplied by the project activity during the year y
Source of data to be used:	The data will be determined from measurements of biomass fuel consumption and specific fuel consumption
Value of data	281.35
Description of measurement methods and procedures to be applied:	Biomass consumption will be monitored by weigh bridge. Specific fuel consumption is referred from manufacturer data.
QA/QC procedures to be applied:	Quality will be assured and controlled by following calibrating schedule. Ammeter will be calibrated once in six months.
Any comment:	Instrument used: Derived from flow, density and specific heat. Data Type: Quantity

Data / Parameter:	$\mathbf{HG_y}$
Data unit:	TJ
Description:	Net quantity of heat supplied by the project activity during the year y
Source of data to be used:	The data will be determined from measurements of Thermic fluid oil flow rate and temperature difference across the heater
Value of data	262
Description of measurement methods and procedures to be	An ammeter will be utilized to monitor the load supplying thermic fluid to the heater. The performance curve of the characteristic pumps will be used to calculate the flow rate from the load and impeller diameter. Inlet and outlet

applied:	temperatures of Thermic fluid will be monitored using temperature indicators. In addition, density and specific heat of Thermic fluid as given by the manufacturer will be used to compute the heat supplied.
QA/QC procedures to be applied:	Quality will be assured and controlled by following calibrating schedule. Ammeter will be calibrated once in six months.
Any comment:	Instrument used: Derived from flow, density and specific heat. Data Type: Quantity

Data / Parameter:	**$M_{1,y}$**
Data unit:	M^3/hr
Description:	Flow rate of thermic fluid flow of Unit 1
Source of data to be used:	The data will be determined from measurements of Ampere reading and performance curve
Value of data	290
Description of measurement methods and procedures to be applied:	An ammeter will be utilized to monitor the load supplying thermic fluid to the heater. The performance curve of the characteristic pumps will be used to calculate the flow rate from the load and impeller diameter.
QA/QC procedures to be applied:	Quality will be assured and controlled by following calibrating schedule. Ammeter will be calibrated once in six months.
Any comment:	Instrument used: Ammeter. Data Type: Quantity

Data / Parameter:	**$M_{2,y}$**
Data unit:	M^3/hr
Description:	Flow rate of thermic fluid flow of Unit 1I
Source of data to be used:	The data will be determined from measurements of Ampere reading
Value of data	290
Description of measurement methods and procedures to be applied:	An ammeter will be utilized to monitor the load supplying thermic fluid to the heater. The performance curve of the characteristic pumps will be used to calculate the flow rate from the load and impeller diameter.
QA/QC procedures to be applied:	Quality will be assured and controlled by following calibrating schedule. Ammeter will be calibrated once in six months.
Any comment:	Instrument used: Ammeter. Data Type: Quantity

Data / Parameter:	$T_{in1,y}$

Data unit:	^{o}C
Description:	Inlet Temperature of thermic fluid of Unit 1
Source of data to be used:	The data will be determined from measurements of thermocouple
Value of data	252
Description of measurement methods and procedures to be applied:	Temperature will be monitored by thermocouple
QA/QC procedures to be applied:	Thermo couple will be calibrated once in six months.
Any comment:	Instrument used: thermocouple Data Type: Quantity

Data / Parameter:	T_{in2y}
Data unit:	^{o}C
Description:	Inlet Temperature of thermic fluid of Unit II
Source of data to be used:	The data will be determined from measurements of thermocouple
Value of data	252
Description of measurement methods and procedures to be applied:	Temperature will be monitored by thermocouple
QA/QC procedures to be applied:	Thermo couple will be calibrated once in six months.
Any comment:	Instrument used: thermocouple Data Type: Quantity

Data / Parameter:	$T_{out1,y}$
Data unit:	^{o}C
Description:	Outlet Temperature of thermic fluid of Unit I
Source of data to be used:	The data will be determined from measurements of thermocouple
Value of data	280

Description of measurement methods and procedures to be applied:	Temperature will be monitored by thermocouple
QA/QC procedures to be applied:	Thermo couple will be calibrated once in six months.
Any comment:	Instrument used: thermocouple Data Type: Quantity

Data / Parameter:	$T_{out2,y}$
Data unit:	^{o}C
Description:	Outlet Temperature of thermic fluid of Unit II
Source of data to be used:	The data will be determined from measurements of thermocouple
Value of data	280
Description of measurement methods and procedures to be applied:	Temperature will be monitored by thermocouple
QA/QC procedures to be applied:	Thermo couple will be calibrated once in six months.
Any comment:	Instrument used: thermocouple Data Type: Quantity

Data / Parameter:	**FC_y**
Data unit:	Tonnes/yr
Description:	Fuel consumption of Unit I and Unit 2
Source of data to be used:	The data will be determined from measurements of weigh bridge
Value of data	18,396
Description of measurement methods and procedures to be applied:	Biomass consumption will be weighed for every stock received and will be logged in stock register.
QA/QC procedures to be applied:	Quality will be assured and controlled by following calibrating schedule. Weighbridge will be calibrated once in six months.
Any comment:	Instrument used: Weighbridge. Data Type: Quantity

B.7.2 Description of the monitoring plan:

>>

The objective of monitoring plan is to measure the net heat supplied by the project activity to the manufacturing process. The net heat supplied is calculated as the product of fluid flow rate (Q), temperature difference (ΔT) and specific heat of the fluid (C_p). The performance curve of the pumps gives the relationship between the flow rate of the pumps and the load on the equipment for different impeller diameter. The operation and maintenance staff will arrive at thermic fluid flow rate using performance curve, by referring load based on ampere readings for the specific impeller diameter. Further, they will be responsible for recording temperature readings, ammeter readings, and operating hours for the project activity. The data will be recorded in logbooks and collated in monthly reports. Maintenance issues that arise in the day to day operation of the Thermic fluid heater will also be reported in the monthly reports. The monthly reports will be assessed by the operation manager and submitted to the CDM team. The calibration of the flow meter and temperature indicators will be carried out on an annual basis. Further information on monitoring is provided in Annex 4.

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 the application of the baseline and monitoring methodology is 07/05/08

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:

>>

The purchase order to the thermic fluid heater supplier dated 04/10/2007 stands as testimony for the start date of the project activity.

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

>>

15 years, 0 months

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

The project activity shall use a fixed crediting period

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:

>>

01/12/2008 (or) upon registration with UNFCCC

C.2.2.2. Length:

>>

10 years, 0 months

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 project activity is located in prime polymer division, at Avissawella in Sri Lanka. The Central Environmental Authority of Sri Lanka has delegated the responsibility of environmental management to the Board of Investment (BOI) of Sri Lanka. The project proponent has obtained the necessary environmental clearance for the installation of the biomass fired thermic fluid heater from BOI.

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:

>>

There are no environmental impacts due to the project activity.

SECTION E. Stakeholders' comments

>>

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

>>

Industrial Clothings Limited is coming up with biomass based thermic fluid heaters that displaces fossil fuel.

The stakeholders identified for the project are listed below:

- Elected body of representatives administering the local area
- Neighbouring industries
- Board of Investment, Srilanka
- Fuel supplier
- Consultants
- Equipment suppliers

The stakeholder consultation process took place on 18/01/2008 for which representatives from various organisations were invited. The process took place in a transparent manner, wherein the stakeholders clarified their queries on CDM and the project activity. All the clarifications were addressed by the project promoter's (PP) representative. The participants expressed their views in the form of written responses. The same has been documented and shall be made available to the DOE.

E.2. Summary of the comments received:

>>

The stakeholders did not have any negative concern on the project activity. The stakeholders expressed positive remarks that the project activity not only generates employment opportunities in the local region but also contributes to a global cause of mitigating green house gases emissions. All the comments from the stakeholders were collected and compiled. On the whole the stakeholders encouraged the promoter to come up with more such projects that would ultimately reduce global warming.

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

>>

There were no negative comments received from the stakeholders. The stakeholders appreciated the promoter for their environmental friendly measures. They also felt that such project activities would encourage other promoters in that region to come up with similar such projects in the future.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Prime Polymers a division of Industrial Clothings Limited
Street/P.O.Box	
Building:	D-17, Seethawaka Industrial Park, Avisawella
City:	Avisawella
State/Region:	Western Province
Postfix/ZIP:	
Country:	Sri Lanka
Telephone:	0094-36-2231325
FAX:	0094-36-2231328
E-Mail:	rkumar@lankasafety.com
URL:	www.lankasafety.com
Represented by:	
Title:	Mr.
Salutation:	
Last Name:	A.R.
Middle Name:	Kumar
First Name:	Ravi
Department:	Project Manager
Mobile:	0094-773634614
Direct FAX:	0094-11-2448223
Direct tel:	0094-11-2437575
Personal E-Mail:	rattravanam@yahoo.co.in

Annex 2

Information regarding public funding

There is no Public funding from Annex I parties for this project activity.

Annex 3

Baseline information

Key elements to determine baseline

The baseline emissions are arrived at by multiplying the quantity of fossil fuel savings with an emission coefficient of the fossil fuel displaced (Residual Fuel Oil in this case).

Emission coefficient of Fuel oil

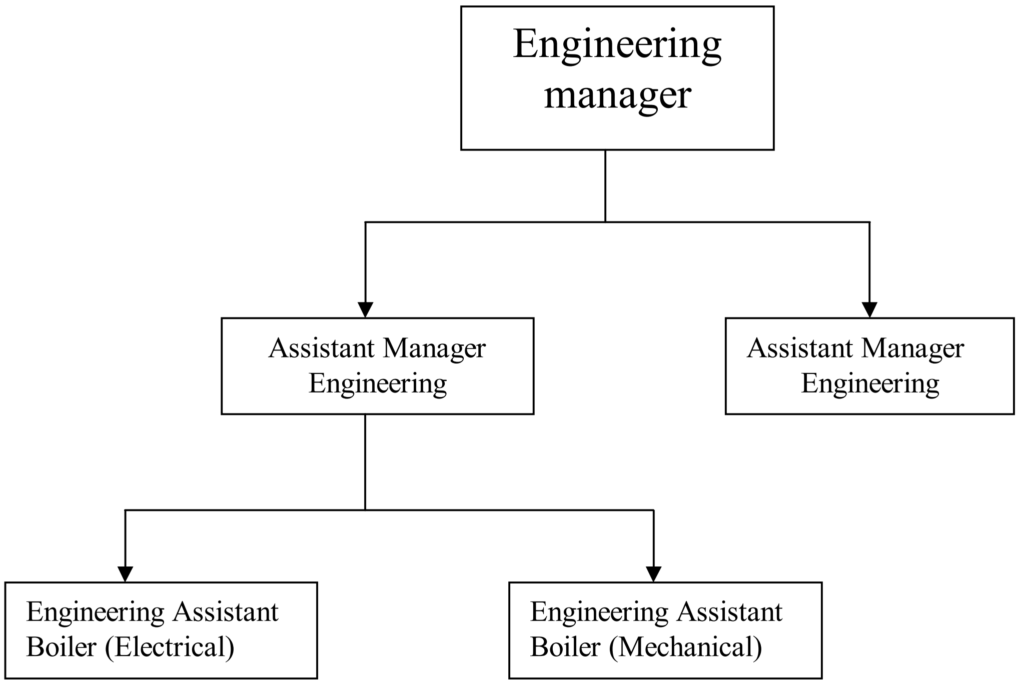
The emission coefficient of fuel oil is referred from "***2006 IPCC guideline for national GHG inventories***", and it is given as: 77.4 Tonnes CO_2/TJ

Net Calorific Value of Fuel oil

NCV **(**Net Calorific Value) of Fuel oil is referred from "***2006 IPCC guideline for national GHG inventories***", and it is given as: 40.4 TJ/Gg

Annex 4

MONITORING INFORMATION



Data to be monitored

1. Inlet temperature of thermic fluid to heater
2. Outlet temperature of thermic fluid to heater
3. Ampere for pumps driving flow of thermic fluid through heater
4. Gliricidia consumption

Monitoring Equipment

1. Inlet and outlet temperature indicators
2. Ammeters for pumps
3. Weighing bridge

Monitoring and Recording Frequency

Temperature and ampere data:

Temperature and ampere data will be recorded in log books on a daily basis. Based on ampere data, the flow rate of thermic fluid will be derived from the performance curve of the pumps and recorded. On a monthly basis, a consolidated report will be generated and submitted to the CDM co-ordinator.

Biomass Consumption Data:
The biomass is weighed on received basis. These values are presented in monthly consolidated reports and submitted to the CDM co-ordinator.

Data archiving:
Data archiving will be done by spreadsheets at the end of each year. Data archives will be maintained until two years after the end of the crediting period.

CDM Review Procedures:
The CDM team reviews the performance of the heater, implementation of the monitoring procedures and other aspects of the CDM project on a biannual basis.

Calibration Frequency
Monitoring equipment is to be calibrated out on an annual basis. Calibration records will be maintained by the CDM team.

Quality Assurance
The temperature indicators, ammeters, and weigh-bridge are checked for accuracy at the time of calibration.

Uncertainties related to GHG Emissions
There are no uncertainties envisioned in relation to GHG emissions.

Training Procedures
The operation and maintenance staff have completed the necessary training for operating and maintaining the biomass fluid thermic heater. Additional training may be conducted as and when required. The design of the boiler is thoroughly checked and is found to be effectively fabricated and designed to operate efficiently.

Appendix 1

Abbreviations

ICL	Industrial Clothings Limited
CDM	Clean Development Mechanism
AMS	Approved Methodology for Small scale
DOE	Designated Operational Entity
PP	Project Proponent
GHG	Green House Gases
IPCC	Intergovernmental Panel on Climate Change
HG	Net quantity of steam/heat supplied by the project activity
BE	Baseline Emissions
PE	Project Emissions
LE	Leakage
ER	Emission Reductions
EF CO_2	Emission Factor for residual fuel oil
D	Density of the fluid
C_p	Specific heat of the fluid
TJ	Tera Joule
K	Kilo
Cal	Calories
Hr	Hour
M	Mega
W	Watt

Appendix 2

List of References

Sl. No.	Particulars of the references
1	Kyoto Protocol to the United Nations Framework Convention on Climate Change
2	Website of United Nations Framework Convention on Climate Change (UNFCCC), http://unfccc.int
3	UNFCCC document: Simplified modalities and procedures for small-scale clean development mechanism project activities
4	UNFCCC document: Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories
5	IPCC Guideline for National Greenhouse gas inventories.
6	http://www.mapsofworld.com