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

CONTENTS

Annexes

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:

Clean energy project at Swastik Pipes Limited, India.
Version: 1.0
Date: 29/05/2007

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

The project activity is proposed by Swastik Pipes Limited (herein after referred as SWASTIK) in its unit at Asaudha- Bahadurgarh in Haryana. The unit produces ERW (Electric Resistance Welded) steel pipes and CR (cold rolled) strips and sheets. The unit operations at the plant require fossil fuels (FO & LDO) combustion in plant operations (annealing & galvanizing furnaces) and in steam & power generation. SWASTIK proposes to switch from use of FO & LDO to Natural Gas in these operations and steam & power generation. Natural gas is a cleaner fuel (IPCC default = 15.3 tC/ TJ) as compared to FO (IPCC default = 21.1tC/ TJ) and LDO (IPCC default = 20.2 tC/ TJ) and so project activity results in lower emissions in plant operations (annealing & galvanizing furnaces) and energy (steam & power) generation.

SWASTIK produces ERW Galvanized Pipes & Tubes to cater to a variety of requirements of Agriculture and Industrial usage, Oil, Gas, Sanitary Water, Power, Electrification, Tubular Poles, Structural, etc. ranging in Light (A) Medium (B) and Heavy (C) series. The manufacturing facility has ISO 9001:2000 accreditation for all its operations.

Following are the areas in the unit of SWASTIK where fuel switching is proposed –

Equipment/ Area	Pre-project fuel used	Fuel used in project activity
DG sets	HSD/ LDO	Natural Gas
Furnaces	FO	Natural Gas
Boilers	FO	Waste heat recovery from gas engine

The project activity faces many hurdles in its implementation such as capital investment, barriers to sustainable supply of natural gas and uncertain natural gas prices apart from technological barriers due to non-availability of spares and lack of service support in India from the manufacturer. SWASTIK foresee overcoming these hurdles from CDM backed revenue.

The project activity is a small scale project activity and has following sustainable development aspects:

1. The project activity uses cleaner fuel i.e. natural gas and helps improve environmental conditions inside the plant and overall improvement in the region's environment due to lower emissions.
2. The project activity helps reduction of GHG emission and mitigates the ill effects of climate change.
3. It helps in generation of employment during erection & commissioning and later on in its operation.
4. Project activity would help spread awareness among the industry and promote its speedy implementation among industrial sectors.

5. Efforts will be renewed in the field of Research & Development of gas based technologies for different application areas.

A.3. Project participants:

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) Project participants (*) (as applicable)	Kindly indicate if the party involved wishes to be considered as project participant (yes/no)
Government of India (Host)	Swastik Pipes Limited (Private Entity)	No

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

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

A.4.1.1. Host Party(ies):

Country: India

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

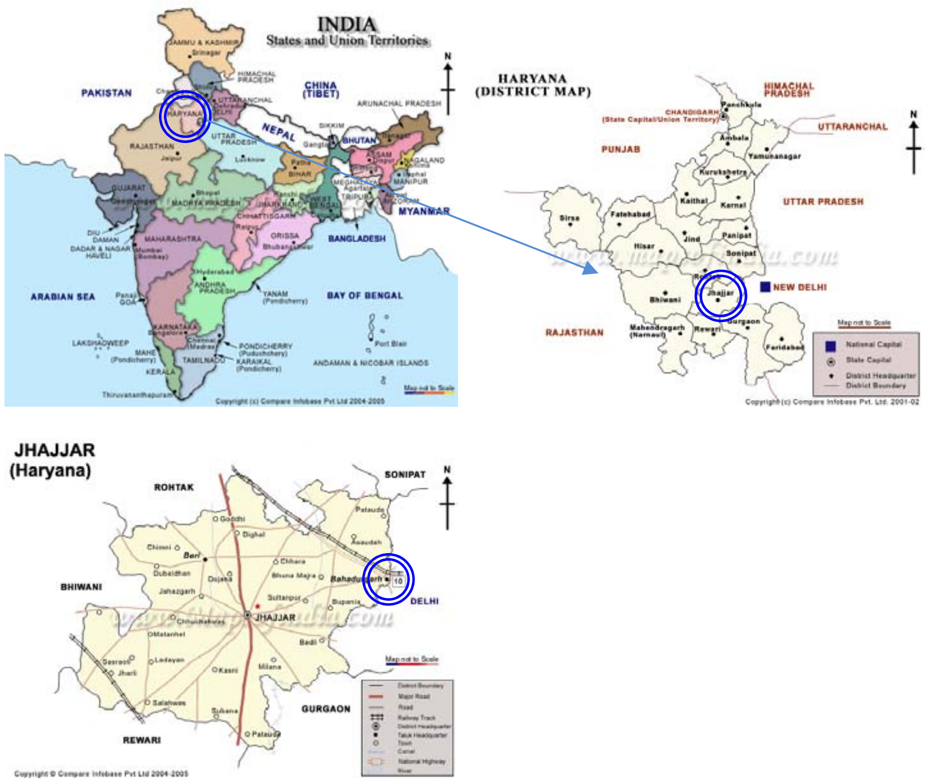
State: Haryana

A.4.1.3. City/Town/Community etc:

Village	Asaudha -Bahadurgarh
District	Jhajjar
State	Haryana

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

Swastik Pipes Limited at Bahadurgah is about 41 km from Delhi on Delhi-Rohtak Road (NH-10). The location is depicted in the pictures below -



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

The project is a small scale CDM project activity and is based on Appendix B of the simplified modalities and procedures for small-scale CDM project activities. The project activity conforms to the following category -

Project Type: III– Other project activities

Project Category: IIIB. Switching Fossil Fuels; Sectoral Scope: 1

Technology in the project activity:

Steel Furnaces:
SWASTIK in the project activity has retrofitted existing steel furnaces. The retrofit has allowed use of natural gas in the furnaces. Retrofits measures comprised of laying of natural gas piping to the furnace area, gas feeding arrangement, gas metering and control systems.

Boilers:
In the project activity, SWASTIK proposes to do away with the use of FO for steam generation in existing boilers. Instead, waste heat from gas engines shall be used to meet the steam demand for galvanizing process and pickling line. For the purpose, a waste heat recovery boiler (WHRB) is being installed to recover waste heat from gas engine.

Technical specifications of Waste Heat Recovery Boiler (WHRB):

Parameter	WHRB
Source of waste heat	IC engine exhaust
Exhaust gas quantity	21000 kg/ hour
Exhaust gas temperature	340 deg C
Steam pressure	10.54 kg/cm2
Capacity	1.6 TPH

Gas engines:
To meet the in-house power demand of the plant, SWASTIK use a mix of grid power and captive power generated in existing FO based DG sets (DG sets are run during unavailability of grid power). Project activity will help displace power largely from the grid and partly from the DG sets. SWASTIK has installed 01 No. gas engine in the project activity.

Technical Specifications of Installed Gas Engine:

Parameter	Gas Engine
Manufacturer – Engine	NIIGATA, Japan
Engine Type	18 V 26 HX - G
Working Principal	4 stroke
Rated Output	3515 kVA

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

Years	**Annual estimation of emission reductions in tones of CO2 e**
2007-08	8470
2008-09	8470
2009-10	8470
2010-11	8470
2011-12	8470
2012-13	8470
2013-14	8470
2014-15	8470
2015-16	8470
2016-17	8470
Total estimated reductions (tonnes of CO2 e**)**	84703
Total number of crediting years	10 years Fixed
Annual average over the crediting period of estimated reductions (tonnes of CO2e)	8470

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

No public funding from Annex 1 countries for the project activity.

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

As per 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 de-bundled component of a large 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; and
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point"

The project activity is not a de-bundled component of a large project activity as –

There is no small scale CDM project activity or an application registered by SWASTIK, in the same project category in the last two years within 1 km of the project boundary of the proposed small-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:

The project is a small scale CDM project activity and is based on Appendix B of the simplified modalities and procedures for small-scale CDM project activities. The project activity conforms to the following category -

Project Type: III– Other project activities

Project Category: IIIB. Switching Fossil Fuels

Version 10, Scope 1; dated 23 December 2006

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

Category	Applicability Criteria	Project Status

IIIB: Switching fossil fuels	This category comprises fossil fuel switching in existing industrial, residential, commercial, institutional or electricity generation applications. Fuel switching may change efficiency as well. If the project activity primarily aims at reducing emissions through fuel switching, it falls into this category. If fuel switching is part of a project activity focussed primarily on energy efficiency, the project activity falls in category II.D or II.E.	The project is primarily one of switching of fossil fuel in existing industrial and electricity generation applications.
	Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO_2 equivalent annually.	Implementation of project activity will result in emissions reduction less than or equal to 60 kt CO_2e annually.

B.3. Description of the project boundary:

The project boundary is the physical, geographical site where the fuel combustion affected by the fuel-switching measure occurs.

B.4. Description of baseline and its development:

Baseline emission factors for unit operations & power generation has been estimated based on past performance. The method adopted is explained in following sections.

Baseline Emission Factor for Steel Furnace:

SWASTIK has 06 Nos. of furnaces at the facility. Among these 04 Nos. are annealing furnaces and 02 Nos. are galvanizing furnaces. In the baseline FO was being used in all these furnaces. Hence, baseline emission factor is estimated for per tonne of steel produced from the furnaces in the existing system based on plant operation data and fuel consumptions for the most recent years.

Following methodology has been adopted for estimating baseline emission prior to the project activity:

1. Emissions associated with FO consumption in furnaces are calculated for each year.
2. Ratio of total emissions to total production in a year gives emissions for per tonne of furnace output for respective year.
3. Weighted average of emissions for last 2 years has been taken as baseline emission factor for per tonne of steel produced from furnaces.

Annealing Furnaces:

Parameter	**Year -->**	***2004-05***	***2005-06* (Apr – Sep)***
Production Output	MT/ annum	18752	9998.8
Sp. Baseline Emissions	tCO_2e/ t of glass drawn	0.075	0.085

Baseline Emissions Factor	tCO_2e/ t of glass drawn	0.078

*Gas use started in October 2005

Galvanizing Furnaces:

Parameter	**Year -->**	***2004-05***	***2005-06* (Apr – Sep)***
Production Output	MT/ annum	13517.4	8343.4
Sp. Baseline Emissions	tCO_2e/ t of glass drawn	0.090	0.089
Baseline Emissions Factor	tCO_2e/ t of glass drawn	0.089	

*Gas use started in October 2005

Baseline Emission Factor for Boilers:

In the production process, SWASTIK require steam for heating purpose. Steam in the baseline is generated with FO as fuel. Baseline emission factor is estimated for per unit of steam energy produced in the existing boilers based on plant operation data and fuel consumptions for most recent years.

Following methodology has been adopted for estimating baseline emission prior to the project activity:

1. Emissions associated with FO consumption in operation are calculated for each year.
2. Ratio of total emissions to total production in a year gives emissions for per unit of steam energy.
3. Weighted average of emissions for last 2 years has been taken as baseline emission factor for per unit of steam energy.

Parameter	**Year -->**	***2003-04***
Steam raising ratio (design data)*	t of steam/ t FO	14.3
Baseline Emissions Factor	tCO_2e/ t of steam	0.20

*Conservative estimate

Baseline Emission Factor for DG set:

Baseline emission factor is estimated for per unit of power generation in DG sets. Following methodology has been adopted for estimating baseline emission prior the project activity:

1. Emissions associated with FO consumption in DG sets are calculated for each year.
2. Ratio of total emissions to total production in a year gives emissions for per unit of power generation for respective year.
3. Weighted average of emissions for last 2 years has been taken as baseline emission factor for per unit power generation.

Parameter	**Year -->**	***2005-06***	***2006-07***
Net power generation	MWh/ annum	2299.28	2244.14

Sp. Baseline Emissions	tCO_2e/ MWh	0.87	0.87
Baseline Emissions Factor	tCO_2e/ MWh	0.87	

Grid emission factor:
Grid emission factor for the Northern Grid is taken as suggested in "**CO_2 Baseline Database for the Indian Power Sector"** by Central Electricity Authority (CEA), Ministry of Power, Government of India.

SWASTIK is located in the Northern Region (NR) grid. The value for Combined Margin for NR Grid (grid in the project activity) is given as 0.80 tCO_2e/ MWh.[1]

Since power from Gas engines are to displace power mix from grid and DG sets in baseline, it is conservative to take Grid Emission Factor instead of Baseline Emission Factor due to fuel combustion in DG sets for calculating baseline emissions; the same has been applied.

Developed by:
Swastik Pipes Limited (also a project participant) & their consultants
Dated: 23/05/2007

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:

The barrier analysis has been carried out to show that the project activity is not a business-as-usual scenario and is additional over the baseline.

Investment barrier:
SWASTIK is a medium size enterprise engaged in the production of steel pipes and CR strips. The capacity of the unit is ~0.22 million tonnes per annum. The investment in the project activity incurred by SWASTIK is ~15.6 million INR. The investment of this scale in a project activity, which is uncertain and is prone to failure more due to externalities involved beyond SWASTIK's control, was a big decision. These uncertainties are due to uncertainty in natural gas prices (post December 31 2008, price of natural gas is subject to revision as per the contract signed with GAIL and any drastic hike in prices would impact the project negatively) unavailability of domestic supply of spare parts of the gas engines, absent service support from the manufacturer and conditioned environment required for operation of these gas engine. Additional investments are required in recruiting/hiring and training operation personnel for the same. These investments were not necessary in the baseline and are additional.

Technology barrier:
SWASTIK has installed NIIGATA gas engine from Japan. This company does not have their after-sales service network in India. Another problem is of the unavailability of spare parts of the gas engine in the country. Installation of NIIGATA Gas engines not only requires additional investments, but also needs lots of managerial and technical prerequisites in their operation and maintenance. The parts of the engine are required to be imported which may lead to time lag, and this may also hamper the production output of the company. To meet requirements of spare parts, SWASTIK have to have substantial inventory of spare parts, practically more than required, to avoid any unplanned shut downs and the resulting production losses. Furthermore, SWASTIK required putting extra efforts for managing these changes.

[1] CEA Data on grid emission factor in India

Management had to devote efforts for better understanding and administration for the successful and efficient running of the engine. New dedicated recruitment and training programme conducted for the purpose are the confirmation for the same. These efforts would not, however have been required in baseline scenario i.e. running LDO based DG sets, which is a common and established practice in the industry including in-house capabilities developed by SWASTIK over the years. Spare parts and services are also readily available for LDO based DG sets.

Similarly, the operation and maintenance of waste heat recovery boiler (WHRB), was also first experience for the unit and thus required additional efforts and care. The functioning of installed WHRB depends on the quality and quantity of waste heat produced from the gas engine. In case there is any malfunction or shut down in the gas engine, the WHRB may not be fed and production losses may occur unlike FO fired boilers in the baseline.

Stable and reliable combustion of natural gas in annealing and galvanising furnaces is problematic at times due to its variable calorific value; moisture in regasified liquefied natural gas and fluctuation in gas pressure. There have been cases of erratic operation of the system due to this inconsistency in the quality of natural gas and has led to problems of poor flame control in the burner and at times flame getting switched off at low pressure etc. The problem of inconsistent supply of natural gas adds to the system underperformance. Any leakage or breakdown of pipelines may lead to cut-off of its supply to SWASTIK.

Due to varying quantity and quality of natural gas, plant operation may suffer leading to production problems. On the other hand, use of FO/LDO causes no such problems to plant operations making it the natural choice for use as fuel because it can be stored at the plant site also. But the use of FO/LDO leads to more GHG emissions. Hence, being an energy and environment conscious group, and taking CDM benefits into consideration, SWASTIK took decision in the favour of the project activity.

Barriers due to prevailing practice:

Natural Gas Prices:
The prices on natural gas are fixed up to 31st December, 2008. Revision of prices will be done thereafter. Any drastic hike in natural gas prices would have negative impact on project's viability. Apart from that, at any time, change in Government laws/regulations/policy pertaining to the pricing of natural gas may lead to the revision of its market prices.

The market for natural gas in India is an evolving market.There are a number of factors that affect the price of natural gas. These are upside availability, location (transaction cost), quality, demand- supply gaps etc. Thus, the natural gas prices are dynamic in nature. Apart from that, the market of natural gas is not homogeneous: different sectors face different cost economics for natural gas. The Ministry of Petroleum and Natural gas revised the price of natural gas in June 2006. The industrial customers have to pay Rs. 8,675 per tcm (an increase of 23 %). Natural gas in India is primarily used in two sectors i.e. power and fertilizers. These priority sectors had been kept out of this price hike. [(2)] If any such change occurs again, price hike may be imposed on small consumers like SWASTIK but not on priority consumers. Another issue which is of concern is the monopoly of supplier for natural gas in the region which does not leave space for SWASTIK to purchase gas from other players. Baseline fuels (FO/LDO) are not exposed to such degree of monopoly in market.

[(2)] *CRIS Research, July 2006. Impact of June 2006 Natural Gas Price Hike.*

As per the Gas Sales Agreement (GSA) between the project participant and Gas Authority of India Limited (GAIL), the pressure has to be maintained in a certain range. If the gas supplied does not meet the specification and SWASTIK agrees to take it, the seller will not have any further liabilities and the prices to be paid will be the same as prevailing. Now if there are any changes in quality of gas, SWASTIK have to either accept the same (on varied quality) or use fossil fuel.

Additional investments:
The project proponents had to make a security deposit of Rs. 1.35 million and to submit a bank guarantee for Rs. 4.05 million for obtaining gas from GAIL. No such securities/ guarantees were required in the baseline case as the FO use is an already established practice. On the amount of security deposit GAIL has agreed to pay a simple interest at the rate of 5% per annum. This interest is much lower as compared to the expected return on equity (14-16% per year) which may have been realised in the baseline.

Summary:
As discussed above it is clear that the project activity is not a business as usual case as it faces a number of barriers which are technological, investment and regulatory barriers. In the absence of CDM, SWASTIK would have continued with the earlier practice of FO/LDO based energy generation in furnaces, boilers and DG sets. However, with CDM in place, SWASTIK have decided to go ahead with the project activity and cover the risks involved with CDM backed benefits.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

Baseline Emissions:

Annealing/ Galvanizing Furnace:
$BE_{y,1} = Q_{steel,y} \times EF_{BSL,1}$

Where;
$BE_{y,1}$ = Emissions in the baseline in year y, tCO2
$Q_{steel,y}$ = Quantity of steel output from furnace in year y, tonne
$EF_{BSL,1}$ = Baseline emission factor for steel production in furnace, tCO2/ tonne steel output

Boilers:
$BE_{y,2} = Q_{steam,y} \times EF_{BSL,2}$

Where;
$BE_{y,2}$ = Emissions in the baseline in year y, tCO2
$Q_{steam,y}$ = Quantity of steam generated in year y, tonne
$EF_{BSL,2}$ = Baseline emission factor for steam generation, tCO2/Tonne of steam

DG set:
$BE_{y,3} = NET_y \times EF_{grid}$

Where;
$BE_{y,3}$ = Emissions in the baseline in year y, tCO2
NET_y = Net power generation in gas engine in year y, MWh
EF_{grid} = Baseline emission factor for power generation in NR Grid, tCO2/MWh

Project Emissions:

Annealing/ Galvanizing Furnace:
$PE_{y,1} = Q_{steel,y} \times EF_{y,1}$

Where;
$PE_{y,1}$ = Emissions in the project activity in year y, tCO2
$Q_{steel,y}$ = Quantity of steel output from furnace in year y, tonne
$EF_{y,1}$ = Emission factor for steel production in furnace in year y, tCO2/ tonne steel output

Boilers:
$PE_{y,2} = Q_{steam,y} \times EF_{y,2}$

Where;
$PE_{y,2}$ = Emissions in the project activity in year y, tCO2
$Q_{steam,y}$ = Quantity of steam generated in year y, tonne
$EF_{y,2}$ = Project activity emission factor for steam generation, tCO2/Tonne of steam

No project emissions in waste heat recovery boiler as this runs on waste heat from gas engine.

DG set:
$PE_{y,3} = NET_y \times EF_{y,3}$

Where;
$PE_{y,3}$ = Emissions in the project activity in year y, tCO2
NET_y = Net power generation in gas engine in year y, MWh
$EF_{y,3}$ = Emission factor for power generation in gas engine in year y, tCO2/MWh

Emission Reduction:
$ER_y = BE_y – PE_y$

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

(Copy this table for each data and parameter)

Data / Parameter:	**EF_{grid}**
Data unit:	tCO2/MWh
Description:	Grid emission factor
Source of data used:	“CO2 Baseline Database for the Indian Power Sector”; Central Electricity Authority, India
Value applied:	0.80 tCO2/MWh – NR Grid

Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	

Data / Parameter:	**$EF_{BSL,1}$**
Data unit:	tCO2/ tonne of steel produced from furnace
Description:	Baseline Emission factor for steel production in furnace
Source of data used:	On-site measurements
Value applied:	0.075 for annealing and 0.085 for galvanizing furnace
Justification of the choice of data or description of measurement methods and procedures actually applied :	Based on plant operation data for past years
Any comment:	

Data / Parameter:	**$EF_{BSL,2}$**
Data unit:	tCO2/ Tonnne of steam
Description:	Baseline emission factor for per unit of steam produced in boiler
Source of data used:	On-site measurements
Value applied:	0.20
Justification of the choice of data or description of measurement methods and procedures actually applied :	Based on plant operation data for past years
Any comment:	

Data / Parameter:	**$EF_{BSL,3}$**
Data unit:	tCO2/ MWh
Description:	Baseline emission factor for power generation in DG set
Source of data used:	On-site measurements
Value applied:	0.87
Justification of the choice of data or description of measurement methods and procedures actually applied :	Based on plant operation data for past years
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

Annealing Furnaces:
Production from Annealing Furnace = 50000 TPA
Baseline emission factor = 0.0747 tCO_2/T production
Baseline emissions = 50000 x 0.0747 = 3735 tCO_2/annum
Project emission factor = 0.054 tCO_2/ T production
Project emissions = 50000 x 0.0542 = 2709
Emission reduction = 3735-2709 = 1027 tCO_2/annum

Galvanising Furnace:
Production from Galvanising Furnace = 36000 TPA
Baseline emission factor = 0.0895 tCO_2/T production
Baseline emissions = 36000 x 0.0895 = 3223 tCO_2/annum
Project emission factor = 0.0649 tCO_2/ T production
Project emissions = 36000 x 0.0649 = 2337 t CO_2/annum
Emission reduction = 3223 - 2337 = 886 tCO_2/annum

Power Gen:
Net power generation = 3515 x 0.8 x 80% load factor x (350x20) x (1-3%)/1000 = 15275 MWh/annum
Baseline emission factor = 0.80 tCO_2/MWh
Baseline emissions= 15275 x 0.80 = 12220 tCO_2/annum
Project emission factor = 0.505 tCO_2/MWh
Project emissions= 15275 x 0.505 = 7711 t CO_2/annum
Emission reduction = 12220 - 7711 = 4509 tCO_2/annum

Boiler:
Steam generation = 1.6 x 0.90 x 350 x 20 = 10080 Tonne /annum
Baseline emission factor = 0.203 tCO_2/ T steam
Baseline emissions= 10080 x 0.203 = 2049 tCO_2/ T steam
Project emission factor = 0 (Boiler run on waste heat from Gas engine)
Project emission= 10080 x 0 = 0 t CO_2/annum
Emission reduction =2049 - 0 = 2049 tCO_2/annum

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

Parameter	**Baseline Emission**			**Project Emission**			**Emissions Reduction**		
Year	Furnace	Power Gen	Boilers	Furnace	Power Gen	Boilers	Furnace	Power Gen	Boilers
2007-08	6958	12220	2049	5046	7711	0	1913	4509	2049
2008-09	6958	11455	2049	5046	7711	0	1913	4509	2049
2009-10	6958	11455	2049	5046	7711	0	1913	4509	2049
2010-11	6958	11455	2049	5046	7711	0	1913	4509	2049
2011-12	6958	11455	2049	5046	7711	0	1913	4509	2049

2012-13	6958	11455	2049	5046	7711	0	1913	4509	2049
2013-14	6958	11455	2049	5046	7711	0	1913	4509	2049
2014-15	6958	11455	2049	5046	7711	0	1913	4509	2049
2015-16	6958	11455	2049	5046	7711	0	1913	4509	2049
2016-17	6958	11455	2049	5046	7711	0	1913	4509	2049

Total Emission Reduction = 8471 tCO2/annum

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

B.7.1 Data and parameters monitored:

(Copy this table for each data and parameter)

Data / Parameter:	**$EF_{y,1}$**
Data unit:	tCO2/ tonne of steel production from furnace
Description:	Emission factor for steel production from furnace in year y
Source of data to be used:	Calculated
Value of data	0.0542 for annealing furnace and 0.0649 for galvanising furnace
Description of measurement methods and procedures to be applied:	Calculated based on production and gas consumption in furnaces
QA/QC procedures to be applied:	-
Any comment:	

Data / Parameter:	**$EF_{y,3}$**
Data unit:	tCO2/ MWh
Description:	Emission factor for power generation in gas engine
Source of data to be used:	Calculated
Value of data	0.505
Description of measurement methods and procedures to be applied:	Calculated based on net power generation and fuel consumption in gas engine
QA/QC procedures to be applied:	-
Any comment:	

Data / Parameter:	**$Q_{steel,y}$**
Data unit:	Tonne
Description:	Quantity of steel production from furnace in year y
Source of data to be	On-site measurements

used:	
Value of data	50000 from annealing and 36000 from galvanising furnaces
Description of measurement methods and procedures to be applied:	Direct measurements using weigh bridges
QA/QC procedures to be applied:	Weighbridges are calibrated regularly.
Any comment:	

Data / Parameter:	**$Q_{steam,y}$**
Data unit:	Tonne per annum
Description:	Quantity of steam produced in year y
Source of data to be used:	On-site measurements
Value of data	10080
Description of measurement methods and procedures to be applied:	Steam flow is measured direct on line
QA/QC procedures to be applied:	Meter is calibrated regularly.
Any comment:	

Data / Parameter:	**NET_y**
Data unit:	MWh
Description:	Net power supplied from the gas engine
Source of data to be used:	On-site measurements
Value of data	15275
Description of measurement methods and procedures to be applied:	In-line energy meters at the site are used.
QA/QC procedures to be applied:	Meters are calibrated regularly.
Any comment:	

Data / Parameter:	**$GC_{furnace}$**
Data unit:	MMBTU
Description:	Gas consumption in furnaces
Source of data to be used:	On-site measurements
Value of data	85247
Description of measurement methods and procedures to be	In-line gas meters at the site are used.

applied:	
QA/QC procedures to be applied:	Meters are calibrated regularly.
Any comment:	

Data / Parameter:	**$GC_{gasengine}$**
Data unit:	MMBTU
Description:	Gas consumption in gas engine
Source of data to be used:	On-site measurements
Value of data	130283
Description of measurement methods and procedures to be applied:	In-line gas meters at the site are used.
QA/QC procedures to be applied:	Meters are calibrated regularly.
Any comment:	

B.7.2 Description of the monitoring plan:

SWASTIK is an ISO9001:2000 certified plant and has procedures in place for monitoring, measurement, maintenance and operation in place. SWASTIK proposes following procedures to assure the completeness and correctness of the data needed to be monitored for CDM project.

Formation of CDM Team:
A CDM project team is constituted with participation from relevant departments. Members are trained on CDM concept and monitoring plan. This team is responsible for data collection and archiving. This team will meet periodically to review CDM project activity check data collected, emissions reduced etc. On a weekly basis, the monitoring reports are checked and discussed by the senior CDM team members/managers. In case of any irregularity observed by any of the CDM team member, it is informed to the concerned person for necessary actions. On monthly basis, these reports are forwarded to the management level.

Day to day data collection and record keeping:
Plant data shall be collected on operation under the supervision of the respective Shift-in-charge and record would be kept in daily logs.

Frequency of monitoring-
The frequency for data monitoring shall be as per the monitoring details in Section B.7.1 of this document.

Archiving of data-
The data is kept for two years after crediting period (total 12 years)

Checking data for its correctness and completeness:

Works Engineer would have the responsibility of checking data for its completeness and correctness. The data collected from daily logs is forwarded to the Technical Director after verification.

Calibration of monitoring equipments/ instruments:
SWASTIK get the energy meter calibrated regularly. A log of calibration records will be maintained. Quality Assurance cell in the company is responsible for the upkeep of instruments in the plant.

Maintenance of instruments and equipments used in data monitoring:
The operation department shall be responsible for the proper functioning of the equipments/ instruments and shall inform the concerned department for corrective action if found not operating as required. The concerned department shall take corrective action and a report on corrective action taken shall be maintained as done time to time along with the details of problems rectified.

Emergency preparedness:
The project activity does not result in any unidentified activity that can result in substantial emissions from the project activity. No need for emergency preparedness in data monitoring is visualized.

Report generation on monitoring:
After verification of the data and due diligence on correctness an annual report on monitoring and estimations shall be maintained by the CDM team and record to this effect shall be maintained for future verification.

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

Swastik Pipes Limited (also a project participant)
Mr. J P Sharma
Technical Director
Phone: +91-1276-241175
Fax: +91-1276-241250
Mobile: 94160 56174
Email: works1@swastikpipes.com
Dated: 13/04/2007

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:

01/11/2004 (date of contract for gas supply with GAIL)

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

20 years

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:

NA

C.2.1.2. Length of the first crediting period:

NA

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

01/10/2007

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:

Environment Impact Assessment study is not required for the project activity as per the regulations defined by Central Pollution Control Board in India (EIA notification 2006). The project activity has only positive impacts due to the use of cleaner fuel as compared to baseline scenario.

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:

The project activity is a fuel switch project. Cleaner fuel natural gas replaces use of high carbon intensive fuels such as FO. The switch is an environmentally positive project and has only good impact on environment.

SECTION E. Stakeholders' comments

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

Following stakeholders are identified for the project activity –

-Local community
-Local authorities
-State pollution control board

SWASTIK has invited views of stakeholders in the following manner –

-Advertisement published in local newspaper "Dainik Jagaran" on 15/03/2007. The advertisement invited views of all people on the project activity.
-Letter sent to gram panchayat – Asaudha Village
-Letter sent to District Magistrate – Jhajjar district
-Letter sent to The Worthy Deputy Commissioner – Jhajjar district
-General meeting at the project site at Asaudha
-Letter sent to pollution control board informing about the fuel switch in the plant

E.2. Summary of the comments received:

The meeting was conducted at the plant premises of SWASTIK on 16/03/2007. Village panchayat Sarpanch, village Panch and other people attended the meeting. Mr. J. P. Sharma – Technical Director, SWASTIK conducted the meeting.

He informed the gathering that the project activity is a clean fuel project and would help in better environmental conditions in the area. He also told that prior to the fuel switch, SWASTIK had been using FO and LDO in energy generation and that combustion of these fuels result in emission of carbon dioxide, which is detrimental to the environment.

He further elaborated the steps taken by SWASTIK in this direction and how the natural gas usage in energy generation will help in reduced emissions in plant operations.

The gathering noted the praiseworthy effort of M/s SWASTIK and addressed it as a model for other industries. No adverse comments were received.

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

The efforts put up by SWASTIK were appreciated by people and the panchayat Sarpanch. People suggested that gas engine system should be noise proof as this shall be running continuously and may disturb people in the vicinity. SWASTIK has taken appropriate steps to make it noise proof.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Swastik Pipes Limited
Street/P.O.Box:	41 KM Delhi-Rohtak Road
Building:	Village Asaudha, Bahadurgarh
City:	District Jhajjar
State/Region:	Haryana
Postfix/ZIP:	
Country:	India
Telephone:	91-1276-241175
FAX:	91-1276-241250
E-Mail:	Sandeep@swastikpipes.com
URL:	www.swastikpipes.com
Represented by:	
Title:	Technical Director
Salutation:	Mr.
Last Name:	Sharma
Middle Name:	P
First Name:	J
Department:	Technical
Mobile:	94160 56174
Direct FAX:	+91-11-23232797
Direct tel:	+91-11-23221991 (5 lines)
Personal E-Mail:	Works1@swastikpipes.com , Sandeep@swastikpipes.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No ODA funding or funding from annex 1 country for the project activity.

Annex 3

BASELINE INFORMATION

Annealing Furnace baseline data (Production v/s Fuel consumption)

2004-05	Production [MT]	FO used [L]	Sp. FO consumption [L]	Sp. Emission [tCO2/MT]
April	1536	23625	15.4	0.045
May	1638	32975	20.1	0.059
June	1270	31055	24.4	0.071
July	1159	29865	25.8	0.075
August	1596	37570	23.5	0.068
September	1310	39000	29.8	0.087
October	1102	15030	13.6	0.040
November	1405	38675	27.5	0.080
December	1847	61870	33.5	0.097
January	1760	30975	17.6	0.051
February	2311	73725	31.9	0.093
March	1818	67329	37.0	0.108
Total	**18752**	**481694**	**25.7**	**0.0747**

2005-06	Production [MT]	FO used [L]	Sp. FO consumption [L]	Sp. Emission [tCO2/MT]
April	1913.805	43646	22.8	0.066
May	1509.155	50388	33.4	0.097
June	1565.43	42072	26.9	0.078
July	1257.43	43290	34.4	0.100
August	1765.54	61085	34.6	0.101
September	1987.468	51685	26.0	0.076
October				
Total	**9999**	**292166**	**29.2**	**0.085**

Galvanising Furnace baseline data (Production v/s Fuel consumption)

Month	Production [MT]	FO used [L]	Sp. FO consumption [L/MT]	Sp. Emission [TCO2/MT production]
April	1204	31730	26.4	0.077
May	380	20100	53.0	0.154
June	311	16600	53.3	0.155
July	391	11520	29.4	0.086
August	1206	34880	28.9	0.084
September	864	46340	53.6	0.156
October	1166	16440	14.1	0.041
November	1124	34420	30.6	0.089
December	993	35800	36.0	0.105
January	1924	43610	22.7	0.066
February	2267	66180	29.2	0.085
March	1686	59240	35.1	0.102
Total	**13517.4**	**416860**	**30.8**	**0.090**

Month	Production [MT]	FO used [L]	Sp. FO consumption [L/MT]	Sp. Emission [TCO2/MT production]
April	2029.551	48470	23.9	0.069
May	1439.87	51670	35.9	0.104
June	1707.93	43930	25.7	0.075
July	363.225	21180	58.3	0.169
August	929.502	38080	41.0	0.119
September	1873.378	51010	27.2	0.079
October				
Total	**8343**	**254340**	30.5	**0.089**

DG set data (Power Generation v/s fuel consumption)

2005-06	Generation (kWh)	FO used (L)	Sp. FO consumption	Sp. Emission [tCO2/MWh]
April	45541	19755	0.43	1.12
May	119968	46500	0.39	1.00
June	167665	53130	0.32	0.82
July	89562	29160	0.33	0.84
August	318255	105615	0.33	0.86
September	330156	106960	0.32	0.84
October	182910	57480	0.31	0.81
November	102635	38543	0.38	0.97
December	325920	106700	0.33	0.85
January	224775	72955	0.32	0.84
February	243090	82145	0.34	0.87
March	148805	48685	0.33	0.85
Total	2299282	767628	0.33	0.86

2006-07	Generation (kWh)	FO used (L)	Sp. FO consumption	Sp. Emission [tCO2/MWh]
April	161880	50871	0.31	0.81
May	68570	17129	0.25	0.65
June	136210	39634	0.29	0.75
July	194594	64500	0.33	0.86
August	337194	96405	0.29	0.74
September	158438	52280	0.33	0.85
October	265934	95063	0.36	0.92
November	158346	59139	0.37	0.97
December	182575	65108	0.36	0.92
January	246685	93104	0.38	0.98
February	210556	72867	0.35	0.89
March	123161	40785	0.33	0.86
Total	2244143	746885	0.33	0.87

Boiler data (Steam production v/s fuel consumption)

2004-05	Steam Generation(MT)	Fuel consumption (LTR)
April	208	14572
May	132	9208
June	104	7260
July	105	7376
August	212	14827
September	161	11289
October	180	12575
November	193	13487
December	205	14339
January	293	20506
February	359	25114
March	273	19076
Total	2423	169630

2003-04	Steam Generation(MT)	Fuel consumption (LTR)
April	193	13541
May	210	14699
June	251	17537
July	242	16912
August	150	10489
September	171	11986
October	181	12705
November	186	13043
December	288	20193
January	213	14938
February	167	11723
March	261	18263
Total	2515	176028

<u>Annex 4</u>

MONITORING INFORMATION

Please refer section B.7.2 for detailed monitoring plan.

- - - - -