

**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**

| <b>Version Number</b> | <b>Date</b>      | <b>Description and reason of revision</b>  |
|-----------------------|------------------|--|
| 01                    | 21 January 2003  | Initial adoption   |
| 02                    | 8 July 2005      | <ul style="list-style-type: none"><li>• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document.</li><li>• As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <a href="http://cdm.unfccc.int/Reference/Documents">http://cdm.unfccc.int/Reference/Documents</a>.</li></ul> |
| 03                    | 22 December 2006 | <ul style="list-style-type: none"><li>• 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.</li></ul>   |

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

**Fuel switch to a less carbon intensive fuel at SFS Pvt. Ltd. (SFSPL), Pakistan**

Version: 1.0

Date: 03/04/2008

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

The project activity is proposed by S. Fazalilahi & Sons (Pvt.) Ltd., a leading processor and exporter of processed textiles and textile products in Pakistan. SFS Pvt. Ltd. (hereafter referred to as “SFSPL”) operates out of two units, one unit located in Karachi (hereafter referred to as “Unit I”) and the other one at Lahore (hereafter referred to as “Unit II”). The project activity is a fuel switch project (from high carbon intensive fuel to low carbon intensive one) and has been undertaken in both the units of the company. SFSPL has switched from use of diesel to that of natural gas in steam and power generation for meeting the units’ captive demand. Natural gas is a cleaner fuel (IPCC default = 56.1 kg CO<sub>2</sub>/ TJ) as compared to diesel (IPCC default = 74.1 kgCO<sub>2</sub>/ TJ) and so project activity results in lower emissions in energy (steam & power) generation.

*Brief description of switching from diesel to gas based generators:*

SFSPL has installed natural gas based engines for power generation and boilers for steam generation. Steam from boilers is used in various processes at the units. Following are the areas at SFSPL where fuel switching is undertaken –

| Area(s)          | Fuel in Pre-project Scenario | Fuel in Project activity scenario | Location(s) of the unit |
|------------------|------------------------------|-----------------------------------|-------------------------|
| Power Generation | Diesel                       | Natural Gas                       | Karachi and Lahore      |
| Steam Generation | Diesel                       | Natural Gas                       | Lahore                  |

Karachi Factory (Unit-I):

01 No. GE Jenbacher gas engines with power generating capacity of 1064 kW each were installed to meet the requirement of electricity in the manufacturing units.

Lahore Factory (Unit-II):

01 No. GE Jenbacher gas generator with power generating capacity of 1064 MW is installed and 02 Nos. gas fired boilers are retrofitted to accommodate use of gas in steam generation.

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 SFSPL foresee overcoming these hurdles from CDM backed revenue for the project activity.

The project activity is consistent with laws and sustainable policies of Pakistan. The project has following sustainable development aspects and meets the sustainability criteria as defined by the DNA in the country:

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**Environmental Criteria:**

1. The project activity helps in conservation of natural resource i.e. diesel and helps in better utilization of resources in energy generation.
2. 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.
3. The project activity helps in the reduction of GHG emission and mitigates the ill effects of climate change.

**Social Criteria:**

1. It generates employment opportunities during erection & commissioning and later on in the operation stage.
2. The project activity may help in faster penetration of similar activities in the region leading to more economic activity.
3. Any economic activity that takes place would certainly have direct and/ or indirect impact on people in and around the area.

**Economic Criteria:**

1. The project activity is financed through equity only. The project activity would be able to self sustain considering the benefits of CER accruing from it.
2. CER revenue from the project activity would help in financial sustainability of the project activity. SFSPL could take the project activity considering the CER benefits available to the project activity.

**Technological Criteria:**

1. Project activity would help spread awareness about GHG reduction and CDM benefits among the industry and promote its speedy implementation among industrial sectors.
2. Efforts will be renewed in the field of Research & Development of gas based technologies for different application areas.
3. There is no technology transfer in the project activity taking place from Annex 1 countries.

**A.3. Project participants:**

| Name of Party involved (*)<br>(host) indicates a host involved) | Private and/or public entity(ies) Project Participants(*) (as applicable) | Party involved wishes to be considered as project participant (Yes/No) |
|---|---|--|
| Pakistan (Host)   | S. Fazalilahi & Sons (Pvt.) Ltd.<br>(private entity)                      | No   |

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

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

**A.4.1.1. Host Party(ies):**

Country: Pakistan

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

Province:  
Unit-I: Sindh  
Unit-II: punjab

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

City:  
Unit-I: Karachi  
Unit-II: Lahore

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

The physical address of the project site is:

Unit-I: Karachi Unit:  
F-154, Central Avenue, S.I.T.E  
Karachi – 75700, Pakistan

Unit-II: Lahore Unit:  
First Mile, Sunder Road,  
Raiwind -55150, Pakistan



Geographical location of the project

**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:**

*Steam Generation at Lahore Unit*

In the project activity, SFSPL has displaced the use of diesel for steam generation in boiler. Natural gas is used to meet the steam demand. The technical specifications of boilers are as given below:

| Parameter          | Boiler 1                          | Boiler 2                          |
|--------------------|-----------------------------------|-----------------------------------|
| Capacity (TPH)     | 7.5                               | 7.5                               |
| Steam Pr (bar)     | 10                                | 10                                |
| Steam Temp (deg C) | 175                               | 175                               |
| Make               | Thermax Two<br>(Thompson Cochran) | Thermax Two<br>(Thompson Cochran) |

*Power Generation at Lahore and Karachi Units:*

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To meet the in-house power demand of the plant, SFSPL generated captive power in existing diesel based DG sets. Project activity will help displace power from the DG sets. SFSPL have installed 02Nos. Gas Engines in the project activity. The technical specifications of Gas Engines installed are as below:

| Location              | Karachi        | Lahore         |
|-----------------------|----------------|----------------|
| Particular            | Gas Engine     | Gas Engine     |
| Manufacturer – Engine | G-E-Jenbacher  | G-E-Jenbacher  |
| Fuel type             | Natural Gas    | Natural Gas    |
| Engine Type           | JSG-320 GS-N.L | JSG-320 GS-N.L |
| Rated Output (kW)     | 1064           | 1064           |

The technology used in the project activity is environmentally safe and sound.

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

| Years   | Estimation of annual emission reduction in tonnes of CO <sub>2</sub> e |
|---|--|
| 2008-09   | 9455   |
| 2009-10   | 9455   |
| 2010-11   | 9455   |
| 2011-12   | 9455   |
| 2012-13   | 9455   |
| 2013-14   | 9455   |
| 2014-15   | 9455   |
| 2015-16   | 9455   |
| 2016-17   | 9455   |
| 2017-18   | 9455   |
| <b>Total estimated reductions (tonnes of CO<sub>2</sub>e)</b>                                       | <b>94550</b>   |
| <b>Total number of crediting years</b>  | 10 years(fixed crediting period)                                       |
| <b>Annual average of estimated reductions over the crediting period (tonnes of CO<sub>2</sub>e)</b> | 9455   |

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

No public funding as part of project financing from parties included in Annex I of the Convention is involved in the project activity. No ODA funding as part of project financing.

#### 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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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 debundled 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 SFSPL, 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 12, Scope 1; EB 35

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

The project status is in line with the methodology AMS IIIB; specific features of project and applicability of methodology are discussed below-

| Category                                | Applicability Criteria   | Project Status   |
|---|--|--|
| <b>IIIB:<br/>Switching fossil fuels</b> | <i>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 focused primarily on energy efficiency, the project activity falls in category II.D or II.E.</i> | The project is primarily one of switching of fossil fuel in existing industrial and electricity generation applications.<br><br>PP proposes fuel switch in steam generation in boilers and power generation in DG sets at plant site |

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|  |   |   |
|--|---|---|
|  | <i>This category is not applicable to project activities that propose switch from fossil fuel use in the baseline to renewable biomass, biofuel or renewable energy in the project scenario. A relevant type I methodology shall be used for such project activities that generate renewable energy displacing fossil fuel use.</i> | The project activity is one of fossil fuel switch and not of switching from fossil fuel to renewable biomass, biofuels or renewable energy. |
|  | <i>Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO<sub>2</sub> equivalent annually.</i>  | The project activity results in emissions reduction less than or equal to 60 kt CO <sub>2</sub> e 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. It includes steam boilers at Lahore unit & gas engines and allied network of natural gas pipelines in the facility premises at Karachi unit.

**B.4. Description of baseline and its development:**

As per methodology IIIB “The emission baseline is the current emissions of the facility expressed as emissions per unit of output (e.g., kg CO<sub>2</sub>e/kWh). Emission coefficients for the fuel used by the generating unit before and after the fuel switch are also needed. IPCC default values for emission coefficients may be used.”

**Baseline emission factor for steam generation:**

At the Lahore unit, the baseline scenario for the project activity is the continued use of diesel for producing steam.

Baseline for steam thus is emissions per unit of steam generated in existing boilers.

| Parameter                 | Unit                           | Value |
|---------------------------|--------------------------------|-------|
| Fuel consumption rate     | t LDO/ t steam                 | 0.06  |
| LDO calorific value       | MJ/ kg                         | 43.0  |
| Emission factor - LDO     | tC/ TJ                         | 20.2  |
| Baseline Emissions Factor | tCO <sub>2</sub> e/ t of steam | 0.19  |

**Baseline Emission Factor for Power:**

Baseline emission factor is estimated for per unit of power generation in DG sets. As per AMS ID, emission factor for power generation in DG set has been taken as 0.8 tCO<sub>2</sub>/ MWh.

Name of the person/entity determining the baseline:

Mr. Ikram Ilahi  
Director

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S. Fazalilahi & Sons Pvt. Ltd.

**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:**

SFSPL is a medium size enterprise engaged in the textile manufacturing. The investment in the project activity incurred by SFSPL is ~Rs. 64 million. The project cost includes the cost of building, plant & machinery and gas pipelines. The project is financed only through equity.

Following are financial details of the project activity:

| Parameter          | Details        |
|--------------------|----------------|
| Total project cost | Rs. 64 million |
| Debt               | 0%             |
| Equity             | 100%           |

The investment of this scale in a project activity, which is uncertain and is prone to risk more due to externalities involved beyond SFSPL's control, was a big decision. These uncertainties are due to uncertainty in natural gas prices, unavailability of domestic supply of spare parts of the gas engines, absence of service support from the manufacturer in the region of project activity. 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.

SFSPL in the baseline had been generating power from existing diesel fired DG sets. In the absence of the project activity, SFSPL would have continued with its operation of DG sets with no further investments.

**Other barriers:**

*Difficulty in laying down the gas pipe lines:*

In the project activity SFSPL have introduced infrastructure which includes gas pipe lines by the gas company Sui Northern Gas Pipelines Limited. The company faced a lot of difficulties in laying the pipe lines for the gas supply to the project site. It not only increased the cost of project but also delayed the commissioning of the project. There are evidences available which clearly demonstrate these problems. These problems would have however not been there, had SFSPL decided to continue with the pre-project scenario of power generation in existing diesel fired DG sets.

*Natural Gas Supply & Prices:*

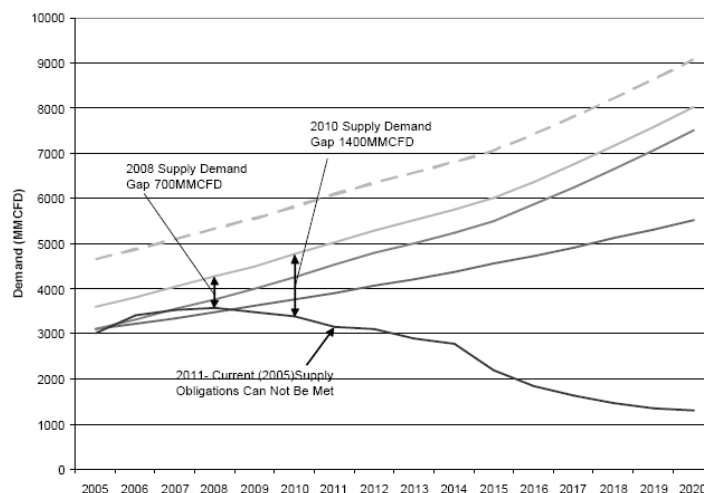
The energy demand of Pakistan is heavily dependent on natural gas with its share being at almost 50% of the total energy requirement. In recent times demand has out-stripped the natural gas supply in the country with manufacturing industries e.g. cement manufacturers being asked to switch to run their operations on coal<sup>1</sup>.

<sup>1</sup> International The News; [http://www.thenews.com.pk/daily\\_detail.asp?id=74433](http://www.thenews.com.pk/daily_detail.asp?id=74433)

### 1. Increasing gap in the demand and supply of natural gas:

The demand is increasing consistently on annual basis. The current demand supply gap is estimated to be at 800 mmcf/d. This demand-supply gap can be filled in only through highly uncertain and unpredictable gas imports. Uncertainty of availability and prices of natural gas makes the project as proposed by SFSPL even more risky. SFSPL have come up with the project activity due to natural gas being clean source of energy and have taken the several risks as discussed above.

A recent report from World Bank suggests that Pakistan's gas demand will increase at 7% annually and considering this, the shortfall between supply and gap will increase up to 20% by 2010<sup>2</sup>. Companies in Pakistan are already facing the heat of increased gap between supply and demand with frequent gas supply cut to their units from the gas supplier. Even the contract with the gas supplying company suggests that gas supplies can be curtailed if the company so feels the need to. Cases of abrupt cut off of gas supply to textile units have happened in the past and it may happen again. The figure below depicts the future demand and supply scenario of natural gas in Pakistan<sup>3</sup>.



### 2. Impact on Weaving and Textile industry:

In the event of wide gap in demand and supply of gas, textile units are the first casualties<sup>4</sup>. The textile industry accounts for more than 70% of the country's export and 38% of the total employment. The Sui Gas Field accounts for about 60% of the Pakistan's gas supply. Below are some of the incidents suggesting severe impact of gas shortage on textile mills:

- December 2005<sup>5</sup>: Sui Northern Gas Pipelines (SNGPL) stopped gas supply to 118 Pakistani textile mills justifying their action by claiming increase in demand beyond their supply capacity.

<sup>2</sup> Khaleej Times News;

[http://www.khaleejtimes.com/DisplayArticleNew.asp?xfile=data/business/2007/November/business\\_November406.xml&section=business&col=](http://www.khaleejtimes.com/DisplayArticleNew.asp?xfile=data/business/2007/November/business_November406.xml&section=business&col=)

<sup>3</sup> LNG-Meeting Pakistan's Energy Gap, Pakistan Oil and Gas Conference 2007, Islamabad, Pakistan.

<sup>4</sup> Textile Intelligence; <http://www.textileintelligence.com/lahore/1444.html?aid=1444>

<sup>5</sup> <http://www.textileintelligence.com/lahore/1444.html?aid=1444>

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- December 2006<sup>6</sup>: Gas supply to export-oriented units was stopped by SNGPL, which included many weaving and textile mills.
- In October 2007<sup>7</sup>, continuous disruption of gas supply lead to temporary shutdown of around 30 textile mills in Karachi.

3. Uncertainty in Natural Gas Prices:

Other uncertainty regarding natural gas is related to its price. As discussed dependence on imported gas may impact the cost of natural gas to SFSPL plant. The contract says that in the event of any hike at any point of time, SFSPL has to abide by it and pay as per the revised rates. In Pakistan, The Oil and Gas Regulatory Authority (OGRA) has recently allowed 6.56 percent increase in the prescribed prices of natural gas for all consumer categories<sup>8</sup>. It may also be noted that energy forms good part of input cost of the textile industry as of SFSPL and any random change would impact the profitability of the entire business.

4. Sabotage of the gas pipelines:

There have been numerous incidents where gas pipelines were targeted. In 2005<sup>9</sup>, bombs ripped open two gas pipelines in south-western Pakistan, disrupting gas supply. Again, in 2006<sup>10</sup>, a gas pipeline in the town of Sui was bombed by local tribesmen as a part of protest against the government. Similarly, there have been similar incidents of gas pipelines being blown up, disrupting gas supply to a great extent<sup>11</sup>.

*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. In the absence of CDM, SFSPL would have continued with the earlier practice of diesel based energy generation in DG sets and boiler. However, with CDM in place, SFSPL 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:***Boilers:*

$$BE_{y,1} = Q_{\text{steam},y} \times EF_{\text{BSL},1}$$

Where;

<sup>6</sup> <http://www.brecorder.com/index.php?id=633148&currPageNo=1&query=&search=&term=&supDate>

<sup>7</sup> <http://www.brecorder.com/index.php?id=633148&currPageNo=1&query=&search=&term=&supDate>

<sup>8</sup> Daily Times; [http://www.dailytimes.com.pk/default.asp?page=2007%5C11%5C22%5Cstory\\_22-11-2007\\_pg5\\_4](http://www.dailytimes.com.pk/default.asp?page=2007%5C11%5C22%5Cstory_22-11-2007_pg5_4)

<sup>9</sup> <http://www.rediff.com/news/2005/oct/03pak.htm>  
<http://www.hindu.com/2005/01/13/stories/2005011301311400.htm>

<sup>10</sup> <http://english.pravda.ru/news/world/17-05-2006/80447-Pakistan-0>

<sup>11</sup> <http://www.satp.org/satporgrp/countries/pakistan/sindh/timeline/2005.htm>

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$BE_{y,1}$  = Emissions in the baseline in year y, tCO<sub>2</sub>  
 $Q_{\text{steam},y}$  = Quantity of steam generated in year y, tonne  
 $EF_{\text{BSL},1}$  = Baseline emission factor for steam generation, tCO<sub>2</sub>/tonne of steam

$$EF_{\text{BSL},1} = \sum [FF_{i,\text{BSL}} \times \text{COEF}_i] / Q_{\text{steam},\text{BSL}}$$

Where;

$FF_{i,\text{BSL}}$  = Fossil fuel i consumed in baseline, tonne  
 $Q_{\text{steam},\text{BSL}}$  = Quantity of steam generated in baseline, tonne  
 $\text{COEF}_i$  = Coefficient of emission for fossil fuel i, tCO<sub>2</sub>/tonne

$$\text{COEF}_i = \text{NCV}_i \times EF_i / 1000$$

Where;

$\text{NCV}_i$  = Net calorific value of fossil fuel i, TJ / 10<sup>3</sup>T (IPCC default value)  
 $EF_i$  = Emission factor for fossil fuel i, tCO<sub>2</sub> / TJ (IPCC default value)

*DG set:*

$$BE_{y,2} = \text{NET}_y \times EF_{\text{BSL},2}$$

Where;

$BE_{y,2}$  = Emissions in the baseline in year y, tCO<sub>2</sub>  
 $\text{NET}_y$  = Net power generation in gas engine in year y, MWh  
 $EF_{\text{BSL},2}$  = Baseline emission factor for power generation in baseline, tCO<sub>2</sub>/MWh (0.80 tCO<sub>2</sub>/ MWh as per AMS ID)

### **Project Emissions:**

#### **Boilers:**

$$PE_{y,1} = \sum FF_{i,y,1} \times \text{COEF}_i$$

Where;

$PE_{y,1}$  = Emissions in the project activity in year y, tCO<sub>2</sub>  
 $FF_{i,y,1}$  = Fossil fuel i consumed in steam generation in year y, mass or volume unit  
 $\text{COEF}_{i,y}$  = Coefficient of emission for fossil fuel i, tCO<sub>2</sub>/mass or volume unit  
 $Q_{\text{steam},y}$  = Quantity of steam generated in year y, tonne

#### **Gas engine:**

$$PE_{y,2} = \sum FF_{i,y,2} \times \text{COEF}_i$$

Where;

$PE_{y,2}$  = Emissions in the project activity in year y, tCO<sub>2</sub>  
 $FF_{i,y,2}$  = Fossil fuel i consumed in power generation in project activity in year y, mass or volume unit  
 $\text{COEF}_{i,y}$  = Coefficient of emission for fossil fuel i, tCO<sub>2</sub>/mass or volume unit

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|  |
|--|
| $NET_y =$ Net power generation in gas engine in year $y$ , MWh |
|--|

|                                     |
|-------------------------------------|
| $COEF_i = NCV_i \times EF_i / 1000$ |
|-------------------------------------|

Where;

NCV<sub>*i*</sub> = Net calorific value of fossil fuel *i*, TJ/ mass or volume unitEF<sub>*i*</sub> = Emission factor for fossil fuel *i*, tCO<sub>2</sub>/ TJ (IPCC default value, Natural gas 56.1 tCO<sub>2</sub>/ TJ)

|   |
|---|
| <b>B.6.2. Data and parameters that are available at validation:</b> |
|---|

*(Copy this table for each data and parameter)*

|   |   |
|---|---|
| <b>Data / Parameter:</b>  | EF <sub>BSL2</sub>                                      |
| Data unit:  | tCO <sub>2</sub> / MWh                                  |
| Description:  | Baseline emission factor for power generation in DG set |
| Source of data used:  | Value for DG sets as per AMS ID                         |
| Value applied:  | 0.80  |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | -   |
| Any comment:  | -   |

|   |   |
|---|---|
| <b>Data / Parameter:</b>  | EF <sub><i>i</i></sub>                                  |
| Data unit:  | kg CO <sub>2</sub> /TJ                                  |
| Description:  | Emission factor for the fuel required to run the boiler |
| Source of data used:  | IPCC default value                                      |
| Value applied:  | 56100   |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | -   |
| Any comment:  | -   |

|  |
|--|
| <b>B.6.3 Ex-ante calculation of emission reductions:</b> |
|--|

*Power Gen:*Net power generation =  $1064 \times 2 \times 90\% \times (365 \times 24) \times (1-3\%) / 1000 = 14713$  MWh/annumBaseline emission factor = 0.80 tCO<sub>2</sub>/MWhBaseline emissions=  $14713 \times 0.80 = 11771$  tCO<sub>2</sub>/annumProject emission factor = 0.54 tCO<sub>2</sub>/MWh (at 40% efficiency of gas engine)Project emissions=  $11771 \times 0.54 = 7904$  t CO<sub>2</sub>/annumEmission reduction =  $11771 - 7904 = 3867$  tCO<sub>2</sub>/annum

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*Steam Generation:*

Steam generation capacity = 7.5 TPH (2 Boilers)

Diesel Emission Factor = 74.1 tCO<sub>2</sub>/TJ

Diesel NCV = 43 GJ/ t

Emission factor = 0.19 tCO<sub>2</sub>/ t steamBaseline emissions = 7.5 x 2 x 330 x 24 x 0.19 = 23038 tCO<sub>2</sub>Project emission = 7.5 x 2 x 330 x 24 x 0.15 = 17449 tCO<sub>2</sub>Emission reduction = 5588 tCO<sub>2</sub>/annum**B.6.4 Summary of the ex-ante estimation of emission reductions:**

| Year                                      | Estimation of project activity emissions (tCO <sub>2</sub> e) | Estimation of baseline emissions (tCO <sub>2</sub> e) | Estimation of leakage (tCO <sub>2</sub> e) | Estimation of overall emission reductions (tCO <sub>2</sub> e) |
|---|---|---|--|--|
| 2008-2009                                 | 34808   | 25353   | 0  | 9455   |
| 2009-2010                                 | 34808   | 25353   | 0  | 9455   |
| 2010-2011                                 | 34808   | 25353   | 0  | 9455   |
| 2011-2012                                 | 34808   | 25353   | 0  | 9455   |
| 2012-2013                                 | 34808   | 25353   | 0  | 9455   |
| 2013-2014                                 | 34808   | 25353   | 0  | 9455   |
| 2014-2015                                 | 34808   | 25353   | 0  | 9455   |
| 2015-2016                                 | 34808   | 25353   | 0  | 9455   |
| 2016-2017                                 | 34808   | 25353   | 0  | 9455   |
| 2017-2018                                 | 34808   | 25353   | 0  | 9455   |
| <b>Total (tonnes of CO<sub>2</sub> e)</b> | <b>348080</b>   | <b>253530</b>   | <b>0</b>                                   | <b>94550</b>   |

**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)*

|  |  |
|--|--|
| <b>Data / Parameter:</b>   | FF <sub>i,y</sub>  |
| Data unit:   | Mass or volume unit  |
| Description:   | Fossil fuel i consumed in steam/ power generation in year y  |
| Source of data to be used:                                       | Directly Measured  |
| Value of data  | On site measurement of fuel (natural gas) consumed shall be the basis of the data                    |
| Description of measurement methods and procedures to be applied: | On line gas meters installed at boiler inlet and gas engine inlet shall be used as measurement tool. |

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|                                 |   |
|---------------------------------|---|
| QA/QC procedures to be applied: | These meters shall be calibrated regularly year. The data can be cross checked with Gas Meters bills from Gas supplier. |
| Any comment:                    | Frequency of measurement: Continuous<br>Frequency of recording: Monthly   |

|  |   |
|--|---|
| <b>Data / Parameter:</b>   | NET <sub>y</sub>  |
| Data unit:   | MWh   |
| Description:   | Net power supplied from the gas engine in year y                        |
| Source of data to be used:                                       | On-site measurements  |
| Value of data  | On site measurement of the net power generated from gas engine          |
| 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 shall be calibrated regularly                                    |
| Any comment:   | Frequency of measurement: Continuous<br>Frequency of recording: Monthly |

|  |   |
|--|---|
| <b>Data / Parameter:</b>   | Q <sub>steam, y</sub>   |
| Data unit:   | tonne   |
| Description:   | Quantity of steam generated in year y                                   |
| Source of data to be used:                                       | On-site measurements  |
| Value of data  | Actual Data from on line steam flow meter shall be used                 |
| Description of measurement methods and procedures to be applied: | Steam flow meter shall be used to monitor the actual steam generation   |
| QA/QC procedures to be applied:                                  | Meters shall be calibrated regularly.                                   |
| Any comment:   | Frequency of measurement: Continuous<br>Frequency of recording: Monthly |

|  |   |
|--|---|
| <b>Data / Parameter:</b>   | NCV <sub>i</sub>  |
| Data unit:   | TJ/ mass or volume unit                                       |
| Description:   | Net calorific value of fossil fuel i                          |
| Source of data to be used:                                       | Lab test on natural gas                                       |
| Value of data  | -   |
| Description of measurement methods and procedures to be applied: | Lab test conducted on fuel or as provided by fuel supplier(s) |
| QA/QC procedures to be applied:                                  | -   |

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|              |   |
|--------------|---|
| Any comment: | - |
|--------------|---|

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|--|
| <b>B.7.2 Description of the monitoring plan:</b> |
|--|

SFSPL 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 a 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 of this document.

*Archiving of data-*

The data is kept for two years after crediting period or from the last issuance (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:**

SFSPL get the meters 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:**

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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)**

Mr. Ikram Illahi  
Director

S. Fazalilahi & Sons Pvt. Ltd.  
F-154, Central Avenue, S.I.T.E  
Karachi-75700, Pakistan  
Tel: + (92-21) 2564450, 2564521, 2564516  
Fax: + (92-21) 2564448

Date of completion: 12/02/2008

**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:**

11/04/2006 (Purchase Order of Gas Engines)

**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:**

01/08/2008 (Not before date of registration)

**C.2.1.2. Length of the first crediting period:**

10 years

**C.2.2. Fixed crediting period:**

**C.2.2.1. Starting date:**

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NA

**C.2.2.2. Length:**

NA

**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 does not require environment impact study to be undertaken as per regulations for pollution control in Pakistan. The project activity envisages the use of natural gas as fuel in steam and power generation and displacement of existing fossil fuel diesel. There is no adverse impact by the project activity on the environment (air, water, soil). It has only positive impacts in the form of emission reduction of GHG.

**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 diesel. 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:**

The following stakeholders were identified for the project activity-

- Local community
- Union Council, Baldia Town, Karachi
- SITE Association of Industry, Karachi

Mode of communication adopted for consultation with stakeholders –

- Advertisement in National Daily News inviting views and suggestions on the project activity.
- Letters were sent to the Union Council, Baldia Town – Karachi and SITE Association of Industry, Karachi inviting their views on the project activity.
- A public meeting was organized on 06/01/2006 where local people were invited to share their views and suggestions about the project activity.

**E.2. Summary of the comments received:**

A meeting was held on 06/01/06 at Unit-I situated at F-154 Central Avenue SITE, Karachi and Unit-II situated at First Mile, Sunder Road, Raiwand for discussion with local community and taking their views.

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This was an open house meeting on the subjected project where general public of the area was invited to give them knowledge about the project and get the suggestions to align the project further to the region's priorities.

Mr. Ikram Ilahi, Director of the company gave the history and need to develop this project. He stated that we have replaced the diesel generators, which are the major cause of emission of greenhouse gases, with natural gas generators. We also have converted the diesel boilers to natural gas boilers.

Thereafter, a question answer session was held where all questions and suggestions received were properly answered.

|   |
|---|
| <b>E.3. Report on how due account was taken of any comments received:</b> |
|---|

The project activity received no negative comments.

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

|                  |                                |
|------------------|--------------------------------|
| Organization:    | S. Fazalilahi & Sons Pvt. Ltd. |
| Street/P.O.Box:  | Central Avenue,                |
| Building:        | F-154, S.I.T.E                 |
| City:            | Karachi                        |
| State/Region:    | Sindh                          |
| Postfix/ZIP:     | 75700                          |
| Country:         | Pakistan                       |
| Telephone:       | +92-21-2564450                 |
| FAX:             | +92-21-2564448                 |
| E-Mail:          |                                |
| URL:             |                                |
| Represented by:  |                                |
| Title:           | Director                       |
| Salutation:      | Mr.                            |
| Last Name:       | Ikram                          |
| Middle Name:     |                                |
| First Name:      | Ilahi                          |
| Department:      | -                              |
| Mobile:          | +92-333 212 2223               |
| Direct FAX:      | +92-21-2564448                 |
| Direct tel:      | +92-21-2564450                 |
| Personal E-Mail: | Ikram@sfs.com.pk               |

**Annex 2**

**INFORMATION REGARDING PUBLIC FUNDING**

No public funding or direct funding from Annex-1 countries availed for this project activity.

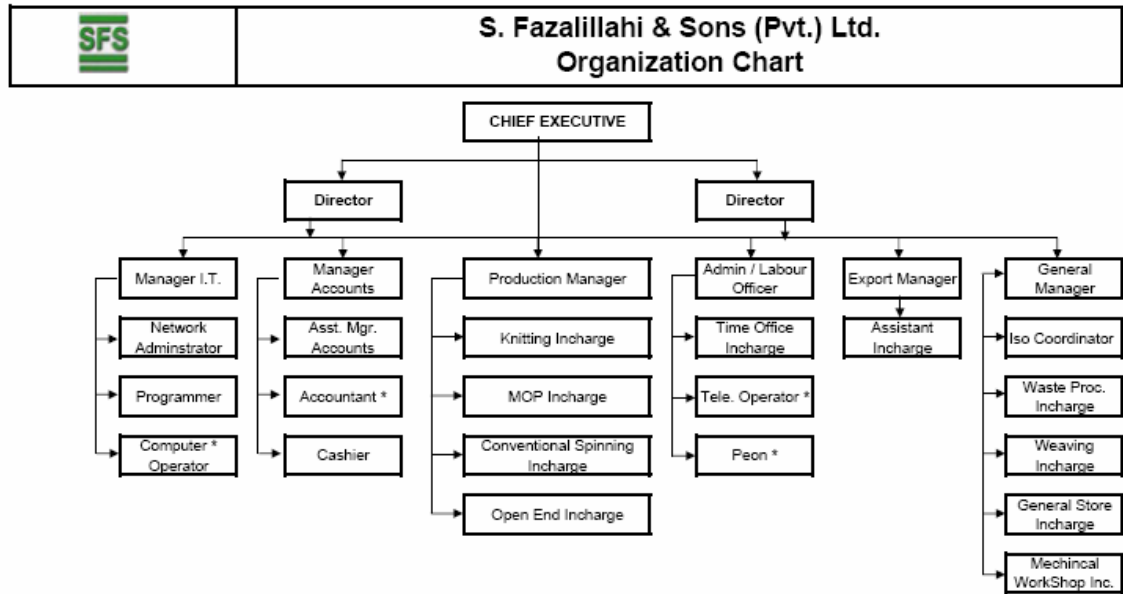
**Annex 3**

**BASELINE INFORMATION**

Please refer section B.4 for details of baseline estimation

**Annex 4**

**MONITORING INFORMATION**



(\* Means Multiple Person at same Designation)