RANA SUGARS LIMITED
REGD. OFFICE : S.C.O 49-50, SECTOR 8-C, MADHYA MARG, CHANDIGARH 160009 (INDIA)
TEL. : 0172-2540007, 2549217, 2541904, 2779565, 2773422 FAX : 0172 - 2546809
E-MAIL : info@ranagroup.com

July 2, 2006

To,

The Manager
CDM Section
UNFCCC, Bonn
Germany

Subject: ""Bagasse Based cogeneration power project of Rana Sugars Limited, Amritsar District, Punjab;" - Ref No. 00000355

Rana Sugars Limited (RSL) would like to thank the CDM executive board and the secretariat for giving us the opportunity to clarify on the four requests made on our project design document of our 12.0 MW bagasse based cogeneration project.

We clarify and give our responses to each of your requests:

Request for review no. 1 & 3

1. The explanation (of the additionality) demonstrates the existence of prevailing practice barrier, institutional barrier, changes in policy risks and increased fuel prices, and other barriers adequately. Even though this might be correct, the DOE still needs to qualitatively address the additionality.

RSL Response: The various barriers viz. prevailing practice, institutional barriers and increase in fuel prices, etc that the project has faced have been addressed in the PDD. The evidences related to the barriers had been given to the DOE during the site visit. The various documentary evidences related to the barriers given to the DOE are:

- PPA copy evidencing the fixed tariff from the 5th year onwards **(Annexure-1)**
- Bill evidencing the payment of the parallel operating cost **(Annexure-2)**
- Electricity bill evidencing the PSEB payments **(Annexure-3)**

2. On p.16 of the PDD, it is described that in order to calculate the Build margin, the 20% of the most recent plants will be taken in to consideration. On p.30 (step10) it is indicated that the build margin is calculated using the recent 5 plants built. Hence, the calculation of the build margin is not made in a transparent manner. This is not addressed by the DOE.

RSL Response: The build margin has been calculated using the 20% of the most recent plants and not the recent 5 plants built. There has been a typo error on the same and we regret the mistake and it has been accordingly revised in the PDD, version 5.0 dated 24/06/2006 enclosed as **Annexure-4**.

Request for review no. 2 & 4:

1. The additionality analysis studied several existing barriers associated to project implementation. The main arguments, financial in nature, do not have adequate support in the documentation provided and were not well investigated by the DOE. The validation report should better reflect this lack of supporting evidence.

RSL Response: The various barriers that the project has faced has been addressed in the PDD. The evidences related to the financial arguments had been given to the DOE during the site visit. The various documentary evidences related to the financial arguments given to the DOE are:

- PPA copy evidencing the fixed tariff from the 5th year onwards **(Annexure-1)**
- Bill evidencing the payment of the parallel operating cost **(Annexure-2)**
- Electricity bill evidencing the PSEB payments **(Annexure-3)**

2. Page 16 of the PDD describes the build margin as being calculated using 20% of most recent plants but page 30 states that the build margin is calculated using the 5 recent plants built, which contradicts the methodology and leads to a build margin calculation that is not transparent.

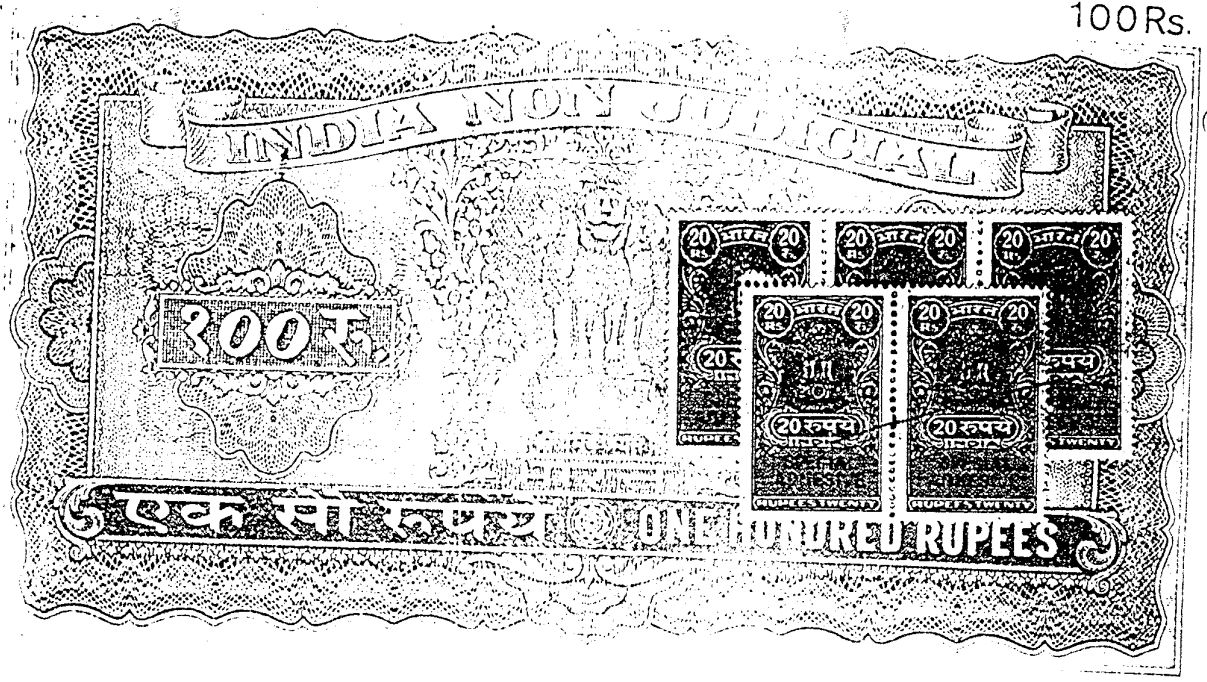
RSL Response: The build margin has been calculated using the 20% of the most recent plants and not the recent 5 plants built. There has been a typo error on the same and we sincerely apologize for the same. The PDD has been accordingly revised in version 5.0 dated 24/06/2006 enclosed as **Annexure-4**.

We hope the above clarifications are in line with your requirements and we sincerely look forward to the registration of our project activity. As desired, in case of any further clarifications, our contact person would be Mr. Inder Rana (Mobile No.+91-9815900907) and Mr. Navin Mathur (91 98670 15373)

Warm Regards

Mr. Inder Rana
Director
Rana Sugars Limited.

100 Rs.



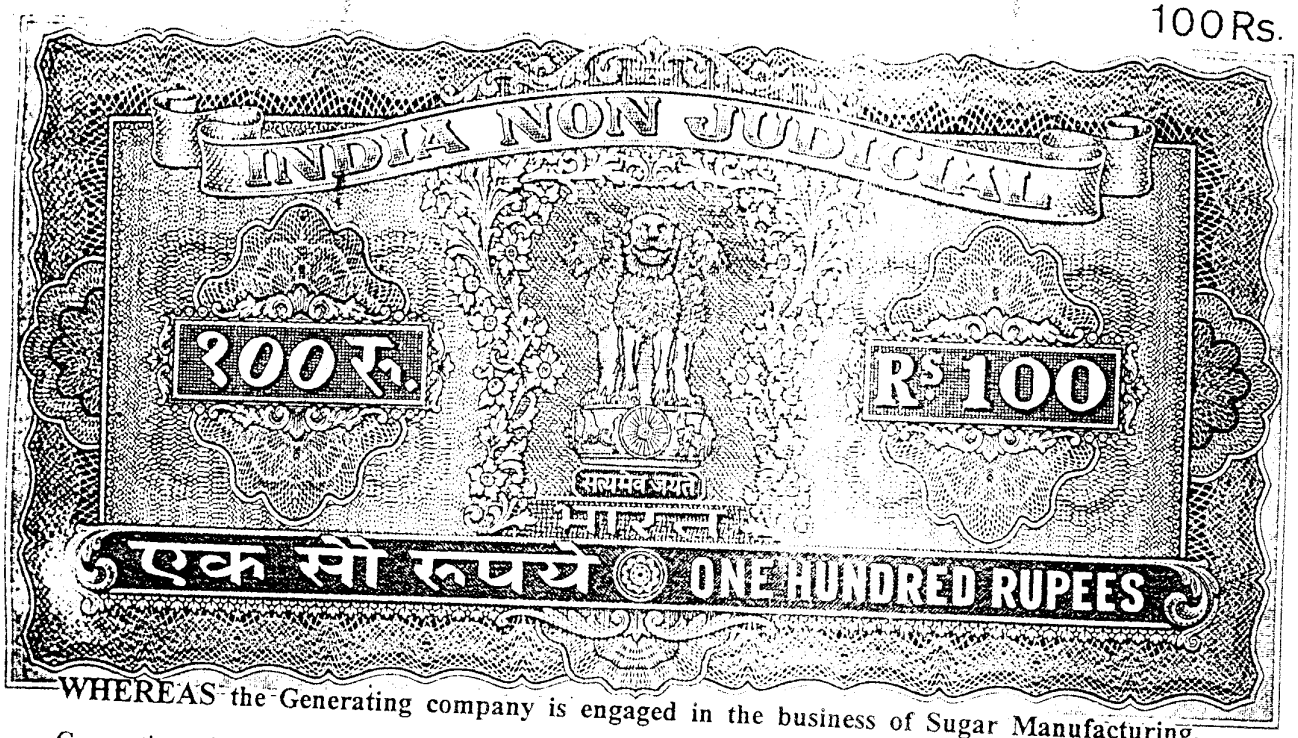
POWER PURCHASE AGREEMENT
BETWEEN
RANA SUGARS LIMITED
AND
PUNJAB STATE ELECTRICITY BOARD

This POWER PURCHASE AGREEMENT (hereinafter referred to as "AGREEMENT") is made on the 4th/5 date of May 2005 at Patiala, Punjab by and between M/s Rana Sugars Limited, a Company incorporated under the Companies Act 1956 and having its registered office at SCO 49-50, Madhya Marg, Sector 8-C, Chandigarh (hereinafter referred as the "Generating Company") which expression shall unless repugnant to the context or meaning thereof include its successors and permitted assigns as party of the first part and the Punjab State Electricity Board, a body constituted under the provisions of the Electricity (Supply) Act-1948 having its Head office at The Mall, Patiala, Punjab (hereinafter referred to as the "BOARD") which expression shall unless repugnant to the context or meaning thereof include its successors and assigns as party of the second part. Each of Board, and the Generating Company shall be referred to herein as a "PARTY" and collectively as "PARTIES".

04/05/05

4/5/05

100Rs.



WHEREAS the Generating company is engaged in the business of Sugar Manufacturing, Generation of Power and other business incidental thereto in its production facility situated at Village Buttar Seviyan, Tehsil Baba Bakala, Dist. Amritsar in the state of Punjab and has also set up a Cogen Plant of 12 MW Capacity hereinafter referred to as 'CO-GENERATION FACILITY', for which the company has executed and signed a Tripartite Financial Collaboration and Implementing Agreement with PEDA on 28-03-2000

and have a surplus 10.2 MW power for sale to Board as per details contained in Annexure "1" and

WHEREAS, the Generating Company had filed a petition before the Punjab State Electricity Regulatory Commission (PSERC) for approval of tariff and other related terms and conditions for sale of power to the Board from the Project and the Commission has granted approval to the general terms of this Agreement in line with its order dated June 21, 2004, and

WHEREAS, the Generating Company desires to sell to the Board upto 10.2 MW surplus electric energy generated from 12 MW T.G. set at the Co-Generating Facility and the Board agrees to Purchase all such energy offered by the Generating Company for sale, upon the terms and conditions set forth herein.

NOW THEREFORE, in consideration of the mutual covenants and conditions set forth herein, it is hereby agreed by and between the Parties as follows:

1.0.0 DEFINITIONS

1.1.0 In this Agreement unless the context otherwise requires or implies the following expressions shall have the meaning herein respectively assigned to them:

"ACT" means the Electricity Act, 2003 and includes any amendments thereof.

telephone lines, telephone and wireless system, components appurtenants, communications, access road off the Village Road, Footpaths, carriage ways etc located at BUTTAR SEVIYAN.

"PRUDENT UTILITY PRACTICES" means those practices, methods, techniques and standards as adopted from time to time that are generally accepted for use in electric utility industries taking into account applicable law, conditions in India, and commonly used for the designing, construction, testing, operation and maintenance of the Generating Facility, lawfully, safely, efficiently and economically as applicable to generating stations of the size service and type being set up by the Generating Company and those generally conform to the manufacturer's operation and maintenance guidelines.

"SITE" means village Buttar Seviyan where the Project is located.

"EFFECTIVE DATE" means the date on which the Project is synchronized with the Grid for the first time which is 1-03-2002.

"TERM" means the time period set out in Clause 12 of this Agreement.

2.0.0 ENERGY PURCHASE AND SALE

2.1.0 Sale of energy by Generating Company

2.1.1 The board shall purchase and accept all energy made available at the interconnection point from the Generating Company's facility, pursuant to the terms and conditions of this Agreement at the rate approved by the Commission, which is set out below:

PSEB shall continue to purchase electricity at a price of Rs. 3.01 per Unit (base year 2000-2001) with 5% annual escalation upto 2004-05. There after no escalation will be allowed during the pendency of the agreement.

The escalated tariff will be applicable from 1st day of April of each year. The rate would be uniform throughout the day for the entire year. No additional payment shall on any account, be payable by the Board.

2.1.2 The Generating Company shall also generate matching MVARs corresponding to 0.88 PF lagging, so that there is no adverse effect on Board's system. Monthly average PF shall be computed from ratio of KWH to KVAH injected into Board's system during the month.

2.1.3 In order to protect the interest of the Board & Consumers in general, the Generating Company shall continue to supply surplus power of 10.2 MW to the Board at the rate prescribed in Article 2.1.1 above during the Term of the Agreement. Further, the Generating Company will not be allowed to erect radial feeders to any other Distribution Licences/Consumers/Sister concern from its Generation Facility. The Generating

Company will plan its extension/expansion/upgradation of co-gen facility/load in its sugar mill in such a way that the generating company will deliver minimum 80% i.e. 8.16 MW of the capacity of 10.2 MW surplus power during each year operation days. (Both season or off season). Thus during the term of agreement, for each year, minimum no. of units to be supplied by generating company will be calculated for no. of operation days of each year (days following between initial start and final shut down of the generating facility in the season of that year) as under:

0.8 x 10.2x 1000 x 24 x No. of operation days.

The number of operation days shall be worked out from the notices given by the generating company as per clause 8.0.0 and shall be verified from the log sheets being maintained at 66KV Grid Sub Station Sathiala.

Any deficit in a year or a subsequent year etc. will be made good by the company so as to ensure that the cumulative quantum of power in each 5 year cycle will meet the minimum requirement of those 5 years in full till the tenure of this Agreement.

2.2.0 PURCHASE OF ENERGY BY GENERATING COMPANY

2.2.1 If the Generating Company is also a Consumer of the Board, then the agreement setting out the terms and conditions for sale of power by the Board to the Generating Company will be treated as distinct and separate from this Agreement for all intents and purposes i.e. all charges such as Advance Consumption Deposit, Service Connection Charges or any other charges payable by the Generating Company as a Board's Consumer as per relevant tariff will continue to be paid by him without any reference to this Agreement.

2.2.2 The Generating Company would continue to be governed by commercial instructions in respect of their agreement(s) already executed with the Board including payment of minimum monthly consumption charges to the Board. Further, the terms & conditions set forth while granting permission to set up the co-generating plant by the Board shall also continue to apply on the Company separately.

2.2.3 The energy supplied to the Generating Company during shut down/start up and synchronization of plant in any month, as measured on Export Meter of PSEB (Import meter of Generating Company) shall be billed by the Board at the tariff applicable to LS Industrial Consumers (General Category) or sale rate of energy generated from the Project applicable for that period, whichever is higher.

PUNJAB STATE ELECTRICITY BOARD

Large Supply Consumer's Bill Form R O 3-B

All Communications regarding this bill must be addressed to the "OFFICE OF ISSUE" mentioning Account Number
For directions with regard to payment of this bill and important information please see overleaf.

CIRCLE: TARNTARAN | DIVISION: RAYYA | SUB-DIVISION (Office of Issue): MEHTA CHOWK T54 | BILLING MONTH: 5/2006 | BILL ISSUE DATE: 07/06/2006 | BILL NO. 20010363593

DUE DATE OF PAYMENT (By Bank Draft/Banker's Cheque): 19/06/2006
PAYMENT BY LOCAL CHEQUE CAN BE MADE UPTO: 19/06/2006

Admissible Voltage: 11 KV | Supply Voltage: 11KV | Metering Voltage: 11KV

A/C No. T54-LS01-00001

To,
M/s
RANA SUGAR MILLS,
VILL.BUTTAR SEVIYAN,P.O
SATHIALA,BABA BAKALA.

Date of Connection: 08/12/1993
Nature of Industry: SUGAR MILLS
Season On Date
Monthly Minimum Charges: 119595.00
Season Off Date
CONTRACT DEMAND: 1500.000 /KVA
Peak Load Allowed KW From
Date / To

SANCTIONED LOAD	1,004.862	KW
Intensive (ARC FURNACE)		KW
Intensive (IND. FUR. & OTHERS)		KW
General	1004.862	KW
Off Seasonal		KW

Date 08/12/1993
Date
Date
Date
Date 09-6-06
08/12/1993

Reading Dates (New) 02/06/2006 / / (Old) 01/05/2006

Feeder Code :
Name of Feeder : 11KV Feeder

Meter No.	Make		Meter Readings New Status	Old Status	Ind. Factor	Line CTR	MTR Ratio	Metering Voltage Ratio	Net M.F.	MMTS Corr.	Addl. Supply Units	Consumption
SC		MDI	0.60600	0.54000	1000.00	100	200	11 / 11	500.000			A 304.000
st MCO Date / /		KVAH	7655.640	7658.940	1000.00	100	200	11 / 11	500.000			B 98345
T Unit/Make	2311	MAIN KWH	7411.630	7220.280	1000.00	100	200	11 / 11	500.000			C 95,675
SC		COL KWH										D 0
st SJO I 06/12/1993		AUX KWH	82.300	82.300	1000.00	125	150		833.333			E 0

Intensive KWH: 0 | General KWH: 0 | C+D Gross KWH: 95675 | P.F. 0.97
Standard Minimum P.F. 0.90 w.e.f. 01-07-2005

Detail of Current SOP & Rentals Etc.

rgy Charges (Power Intensive)	
rgy Charges (General)	355911
thly Minimum Charges	
Surcharge/Incentive (+/-)	-6228
Rebate (-)	
Surcharge	
and Surcharge	
C.	
ge Surcharge	
et Charges	261360
Charges (SOP) Current Cycle)	611043
Rent	555
o Rent	
e Chr	450
Rentals & S.C.	1005

BILL AMOUNT

	SOP	RENTALS	ED.	OCTROI	TOTALS
Current Cycle Charges (As per detail alongside)	611043	1005	34968		647016
Sundry Charges					
Sundry Allowances	435				
Prev. Balance					
Total Net Amount	610608	1005	34968		646581
Amount Stayed (By Court/Competent Authority)					

Add C/E
Me NV
Diff to mine
One bill is to be deposited
Under Protest

NET AMOUNT PAYABLE By Due Date : Rs. Six Four Six Five Eight Zero Only Rs. ********646580

Checked & Verified R.

SURCHARGE AMOUNT	FOR PAYMENT WITHIN ONE WEEK AFTEH DUE DATE @ 5% Rs.	30581
GROSS AMOUNT PAYABLE	Rs.	677161
	FOR PAYMENT BEYOND ONE WEEK AFTER DUE DATE @ 10% Rs.	61161
	Rs.	707741

Consumption History for the Previous 12 Month Period

	01	02	03	04	05	06	09	10	11	12
2006	532.000	660.000	328.000	270.000	304.000					
2005	647.000	594.000	405.000	273.000	309.000	352.000	323.000	356.000	355.000	491.000	364.000
2006	10225	23695	59820	72590	95675					
2005	32955	29285	16615	43075	83638	78175	82515	73140	69095	69148	3685	13255

Reason for Sundry Charge/Allowance: Overhauling of Accounts due to Dead/Defective Meter

E : You are requested to make payment of this bill by the date shown in this bill failing which, this should be deemed to be a notice under Section 24 of the Indian ty Act 1910, and the supply to your premises shall, without prejudice to the right of the Board to recover such charges as shown in the bill by suit, be disconnected after the DUE DATE mentioned herein without any further notice and shall not be reconnected unless and until the amount shown in this bill is paid with any other expenses ayed without prejudice to PSERC's right to seek appropriate legal remedies against Tariff Order dated 20th May 2004. notice shall remain valid

Variation = + 31.80

AEE (CBC) JALANDHAR

CHECKED & ISSUED
AEE (Comm) / SDO-OP

Kind Attention Mr. Navinjee

Kind Attn Sh. Saini ...

335
7/5/05

Punjab State Elecy. Board

From

Chief Engineer/SO&C,
220 Kv S/Stn. Ablowal,
PSEB, Patiala.

To

M/s. Rana Sugar Mills Ltd.
Buttar Saviyan,
Tehsil Baba Bakala,
Distt. Amritsar.

Memo. No. 1488 /ISB-239
Date 5-5-05

Sub:- Release of payment for 3/2005.

Enclosed please find herewith cheque No540483 date 5.5.05 for Rs.202,37,482/- on account of energy purchase during3/ 2005 as per detail given below:-

1.	Energy	7815160 units
2.	Less IIF	31513 "
3.	Net energy	7783647 "
4.	Rate	260 P/unit
5.	Amount	202,37,482/-

Please acknowledge its stamped receipt.

DA/As above.

Sr. Accounts Officer,
PSEB, Patiala.

CLEAN DEVELOPMENT MECHANISM
SIMPLIFIED PROJECT DESIGN DOCUMENT
FOR SMALL-SCALE PROJECT ACTIVITIES (SSC-CDM-PDD)
Version 02

CONTENTS

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>.

SECTION A. General description of the small-scale project activity

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

Bagasse Based cogeneration power project of Rana Sugars Limited, Amritsar District, Punjab;

Version 5.0, 24/06/2006

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

Rana Sugars Limited (RSL) is located at Village Buttar Seviyan, Tehsil Baba Bakala District Amritsar. The company is Joint Venture of Punjab Agro Industrial Corporation Limited. The Factory started its crushing operation in December 1993. Initially, the licensed crushing capacity of the plant was 2500 Tonnes/day. Subsequently, RSL was granted permission for expansion of plant from 2500 TCD to 5000 TCD.

RSL has setup a Demonstration Co-generation Project (project activity) to produce extra power from the Bagasse(bye-product) and export it to Punjab State Electricity Board (PSEB), Grid Station, Sathiala. The Co-generation Plant has a 55 Ton Boiler at 65 kg/cm2 pressure and 12 MW extraction cum condensing type turbine. The project activity generates electricity and sells it to the PSEB through Power Purchase Agreement (PPA) contract.

The purpose of the project activity is to utilize surplus bagasse available in the region for effective generation of electricity for supply to state grid to meet the ever-increasing demand for energy in the state. The project activity would reduce the Green House Gas (GHG) emissions produced by the state grid generation mix, which is mainly dominated by fossil fuel based power plants.

Project activity's contribution to sustainable development

Government of India has stipulated social, economic, environmental and technological well-being as indicators for sustainable development in the interim approval guidelines[1] for CDM projects. RSL believes that the project activity has beneficial effect on agriculture, rural industries and employment in the region and has the potential to shape the economic, environmental and social life of the people in the region, specially unemployed educated/uneducated youth with meagre resources.

Social well being

- Since, the project is in a rural area, it has lead to overall development of the region.
- Since, the bagasse during the off season is procured from other sources, employment opportunities are being generated for uneducated people having meager resources like bullock cart only, to collect the material and supply the same.
- Preference was given to employment of local people during construction and operation at project site thereby creating opportunities in the area for skilled and unskilled labour.

Economical well being:

[1] Ministry of Environment and Forest web site: http://envfor.nic.in:80/divisions/ccd/cdm_iac.html

- The project activity helped to create business opportunity for local stakeholders such as suppliers, manufacturers, contractors *etc*.
- Project activity has helped to reduce the demand-supply gap in the power deficit state grid.
- Project activity has helped to reduce transmission losses due to generation of decentralised power close to load points. This has resulted in availability of quality power to nearby villages and industrial units.

Environmental well being

- Since, the project activity uses only Bagasse (carbon neutral fuel) for electricity generation it would eliminate an equivalent carbon dioxide which would have been otherwise generated to produce electricity.
- This electricity generation from the project activity would substitute the power generation by thermal power plants, which supply electricity to the state grid. It would contribute towards the reduction in (demand) use of finite natural resource like coal, natural gas etc. minimizing depletion or else increasing availability to other important processes.

Technological well being

- The technology selected for the power plant is a modern and energy efficient one using a steam turbo generator with matching boiler capable of firing multiple fuels.
- Project activity serves a small demonstrative project for clean renewable energy generation in the state as it is amongst the first sugar mills to set up a cogeneration plant supplying power to grid in the state.

In view of the above arguments, RSL considers that the project activity contributes to the sustainable development.

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)
India	Rana Sugars Limited	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):

India

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

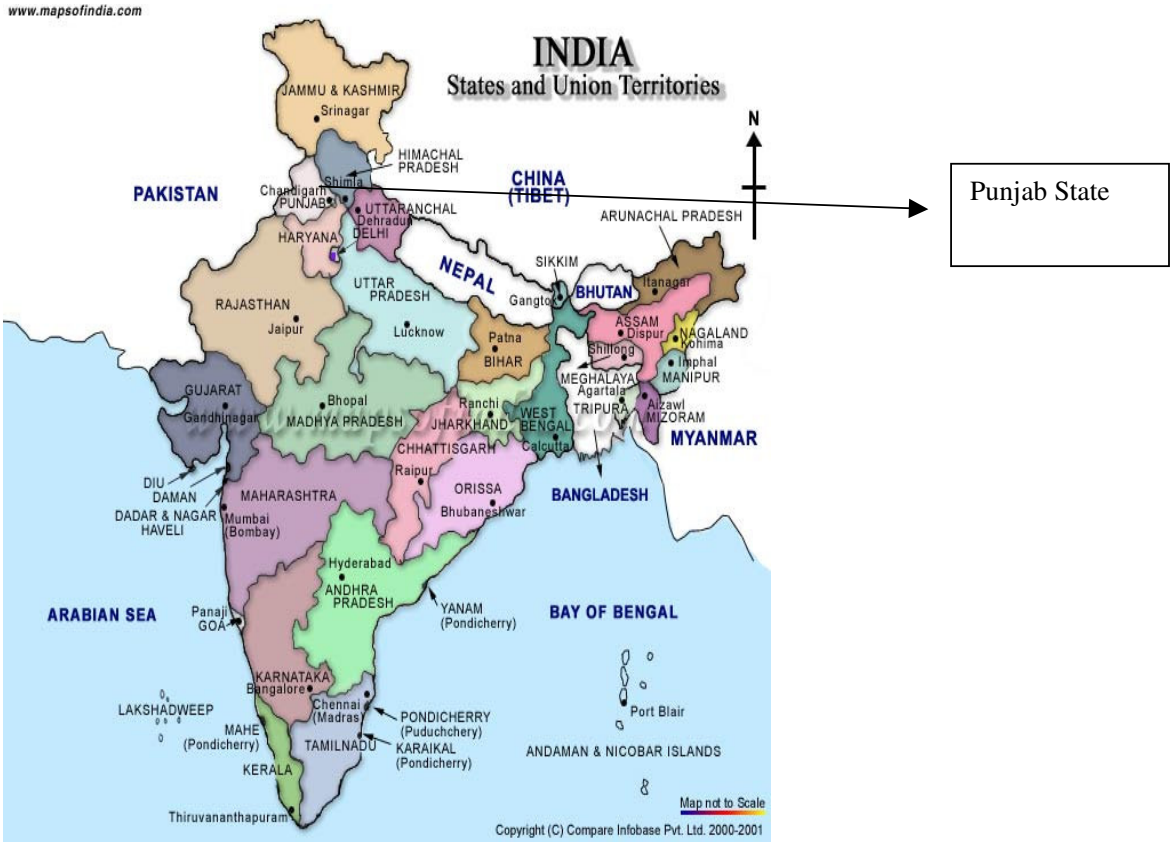
Punjab

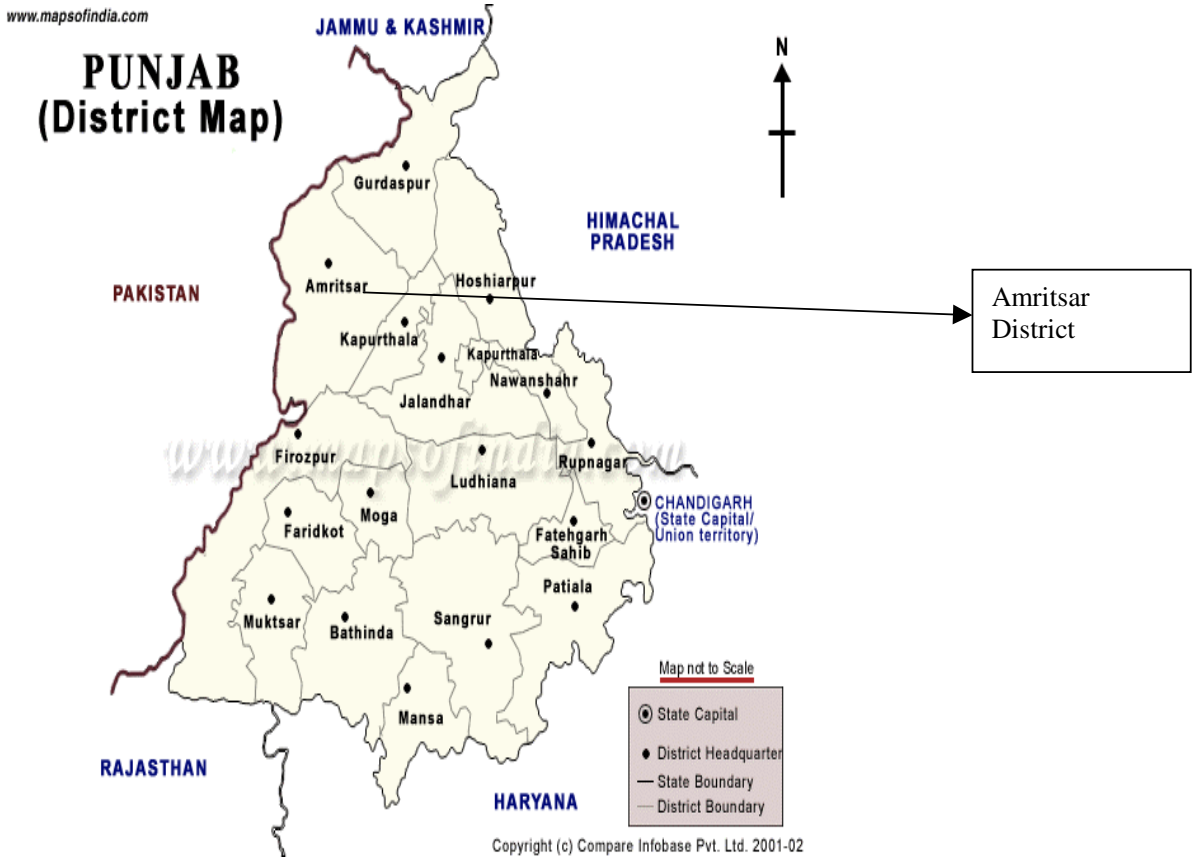
A.4.1.3. City/Town/Community etc:

Village Buttar Seviyan, Tehsil Baba Bakala District Amritsar

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

The project activity is located in the Khasra Nos. 104/9/2/1, 10/2, 86/3/2, 86/4/3, 42/24/1 in Village Buttar Seviyan, Tehsil Baba Bakala District Amritsar, Punjab. The Amritsar district is situated in North West of Punjab. The sugar mill is located on Jalandhar – Batala highway. Buttar Seviyan village is 45 kilometers from Amritsar city. The nearest railway station is at Beas which is 17 kilometers away from the sugar mill. The nearest airport is at Amritsar city . The soil is the district is primarily loamy soil which is very fertile in nature making it suitable for growth of crops. The district is richly endowed with natural and human resources making it suitable for development of agriculture and allied industries. The geographical location of Amritsar is detailed in the maps below.




www.mapsofindia.com
PUNJAB
(District Map)
JAMMU & KASHMIR
HIMACHAL PRADESH
PAKISTAN
RAJASTHAN
HARYANA
N
Gurdaspur
Amritsar
Hoshiarpur
Kapurthala
Jalandhar
Nawanshahr
Firozpur
Ludhiana
Rupnagar
Moga
Faridkot
Fatehgarh Sahib
CHANDIGARH (State Capital/ Union territory)
Patiala
Muktsar
Bathinda
Sangrur
Mansa
Map not to Scale
State Capital
District Headquarter
State Boundary
District Boundary
Copyright (c) Compare Infobase Pvt. Ltd. 2001-02
Amritsar District

Bakala District

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

Type I: Renewable Energy Projects
Category-D: Grid Connected Renewable electricity generation

The project activity is a bagasse based cogeneration power plant. The installed/rated capacity of the turbine is 12 MW, which is less than the limit of 15 MW for renewable energy project activities to qualify under Type I project activities. The heat rating capacity of the boiler is also less than 45 $MW_{thermal}$ to qualify under Type I project activities

As per the provisions of Appendix B of Simplified Modalities and Procedures for Small Scale CDM Project Activities, (Version 08: 3rd March 2006) Type ID "comprises renewables, such as photovoltaics, hydro, tidal/wave, wind, geothermal, and biomass, that supply electricity to an electricity distribution system that is or would have been supplied by at least one fossil fuel fired unit".

Project activity comprises bagasse based power plant supplying electricity to the Punjab state grid. With above considerations, the Type I.D. is the most appropriate category for the project under discussion. The project activity does not comprise any electricity generation from non-renewable energy sources.

Technology of project activity

The power plant has boiler sized to produce a maximum of 55 TPH of steam and 12 MW steam turbine, which is a extraction cum condensing type machine. The steam conditions at the boiler heat outlet are a pressure of 65 ata. and temperature of 480 ^{0}C. All the necessary auxiliary facilities for the power plant have been provided for the power plant. The plant and equipment facilities have been designed to comply with the applicable stipulations / guidelines of statutory authorities such as State Pollution Control Board etc. Power is generated at 11 kV at the plant and is evacuated to grid at 66 kV through a 140% capacity transformer.

There is no transfer of technology to the host country since the technology is available in India from reputed manufacturers.

A.4.3. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed small-scale project activity, including why the emission reductions would not occur in the absence of the proposed small-scale project activity, taking into account national and/or sectoral policies and circumstances:

The project activity leads to GHG on-site emissions in the form CO_2 from combustion of bagasse which will be consumed by plant species, representing a cyclic process of carbon sequestration. Since, the bagasse contains only negligible quantities of other elements like Nitrogen, Sulphur *etc*. release of other GHGs are considered as negligible. Hence energy generation from project activity does not lead to any GHG emissions.

The energy supplied by project activity to the state grid would reduce anthropogenic GHG emissions as per the combined margin carbon intensity of the grid, which is mainly dominated by fossil fuel based power plants as given below.

Percentage generation from grid feeding sources[2] *(Year: 2002-03)*

Coal-55.03 %
Gas-6.98 %
Hydro-33.70 %
Nuclear-1.61 %
Unknown-2.69 %

Project activity would supply energy equivalent of approximately 234.13 million kWh to the grid in a period of 7 years thereby resulting in total CO_2 emission reduction of 171,776 tons. In the absence of the project activity equivalent electricity would have to be supplied to the grid customers from a mix of power plants supplying power to grid and consequent CO_2 emissions would occur.

A.4.3.1 Estimated amount of emission reductions over the chosen crediting period:

Years	**Annual estimation of emission reductions in tonnes of CO_2 e**	**Annual estimation of project emissions in tonnes of CO_2 e**
2002-2003	27972	0
2003-2004	26387	0
2004-2005	23497	0
2005-2006	23497	0
2006-2007	23475	0
2007-2008	23475	0
2008-2009	23475	0
Total CER's	171,776	
Crediting Period	7 years	
Annual average over the crediting period of estimated reductions ((tonnes of CO_2 e)	24,539	

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

Rana Sugars have received financial assistance from the United States Agency for International Development (USAID) under the Green House Gas Pollution Prevention project. This funding does not result in diversion of Official Development Assistance (ODA) and is not counted towards the financial obligations of United States.

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

The project activity is not a debundled component of a large project activity as the project proponents have not registered or applied to register any small scale project activity:

[2] Source: Punjab State Electricity Regulatory Commission (PSERC)-tariff order for PSEB-FY2005-06

- in same category; or
- whose project boundary is within 1 km of project boundary of the small scale project activity

SECTION B. Application of a baseline methodology:

B.1. Title and reference of the approved baseline methodology applied to the small-scale project activity:

Main Category: Type I - Renewable Energy Projects
Sub Category: I.D.-Grid Connected Renewable electricity generation
The reference has been taken from the list of the small-scale CDM project activity categories contained in 'Appendix B of the simplified M&P for small-scale CDM project activities-Version 8, 3rd March 2006'

B.2 Project category applicable to the small-scale project activity:

Appendix B of the simplified M&P for small-scale CDM project activities (Version 8) provides indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories. As per this document the project activity falls under Category I.D.-Grid Connected Renewable electricity generation.

Baseline for projects under Type I.D has been detailed in paragraph 9 of Type I.D. described in Annex B of the simplified modalities and procedures for small-scale CDM project activities. It states that the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in $kgCO_2/kWh$) calculated in a transparent and conservative manner as:

a) The average of the "approximate operating margin" and the "build margin", where:
   i. The "approximate operating margin" is the weighted average emissions (in $kgCO_2equ/kWh$) of all generating sources surviving the system, excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation;
   ii. The "build margin" is the weighted average emissions (in $kgCO_2equ/kWh$) of recent capacity additions to the system, defined as the higher (in MWh) of most recent 20% of plants built or the 5 most recent plants;

   OR

b) The weighted average emissions (in $kgCO_2equ/kWh$) of current generation mix.

Considering the available guidelines and the present project scenario, Northern grid has been chosen for baseline analysis by selecting "The average of the approximate operating margin and the build margin (combined margin)" for baseline calculations. Further details of the baseline are given in section B.5.

B.3. 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 implementation of the biomass based project activity is a voluntary step undertaken by RSL with no direct or indirect mandate by law. The main driving forces to this 'Climate change initiative' have been:

- GHG reduction and subsequent carbon financing against sale consideration of carbon credits.
- Rural Development of the region by creating job opportunities for the local people.

- Demonstration of developing such projects to the other entrepreneurs.

However, the project proponent was aware of the various barriers associated to project implementation. But it was felt that the availability of carbon financing against a sale consideration of carbon credits generated due to project activity would help to overcome these barriers.

The barriers faced by the project activity are discussed below:

Prevailing practice barrier:

The prevailing and the common practice in the Indian power sector have been investments in the fossil fuel based power plants. This is mainly due to assured return on investments, economies of scale and easy availability of finances.

The Department of Science, Technology, Environment and Non-conventional Energy of Punjab Government had announced the New and Renewable Sources of Energy (NRSE) Policy in July 2001. This policy was formulated for promotion of energy generation through non-conventional sources of energy. The main objectives of the policy are to enhance the contribution of renewable energy, create conditions conducive for involvement of private investors in NRSE projects and create direct and indirect employment opportunities. Although progressive policy for promoting renewable energy power sources and potential for generating decentralized power of about 1500 MW[3] from biomass sources exists in Punjab, biomass based power plants supplying power to grid are still uncommon in the state of Punjab. Out of total generation mix of Punjab of 28,857 million kWh for year 2002-03, only 775 million kWH accounting for about 2.7% was from renewable sources. This illustrates that practice of generating power from the biomass has not penetrated in the region and entrepreneurs are not willing to change the current operating practices in the region.

However, RSL decided to go ahead with the implementation of the project activity taking CDM funding into consideration. RSL is the **first Independent Power Producer** in the state to implement a bagasse based cogeneration power project supplying power to grid. The practice of generating power from the bagasse has not penetrated in the region due to prohibitive barriers to project implementation discussed in this section.

Institutional barriers:

RSL is selling power to PSEB through a 20 year Power Purchase Agreement (PPA) contract. As per the data available till 2001-02, PSEB has been incurring heavy commercial losses since last one decade. The commercial loss (with subsidy) for PSEB (off-taker) in the year 2000-01 was INR 1476.65 billion[4]. For their cash in-flows the project proponent depends on the payments from PSEB against the sale of electricity to the grid and it is very likely that there could be problems with the cash inflows of project. However RSL signed a PPA with PSEB in hoping that CDM funding would help to off-set the anticipated losses.

As per the NRSE Policy of 2001 by Government of Punjab, PSEB was supposed to purchase power from renewable power projects in the state @ INR 3.01 per kWh (base year 2000-01) with a 5 % annual increment upto 5 years. In the meantime Punjab State Electricity Regulatory Commission (PSERC) became functional and all the project developers of the renewable power projects were supposed to get the tariffs approved from PSERC. Taking this into deliberation, in the year 2002 PSEB filed a petition

[3] Notification No. 10/85/2000-STE(3)/1476-NRSE Policy, July 2001 of Govt. of Punjab

[4] http://powermin.nic.in/indian_electricity_scenario/pdf/NR0105.pdf

with the PSERC for revising the tariff to lower rates for purchase of power from these projects. Although the judgment has gone in the favour of developers of such renewable power projects, in line with NRSE Policy-2001, but likelihood of the PPA being renegotiated at later stage cannot be ruled out in the future due to precarious situation of PSEB. These revisions are bound to severely affect the sustainability of the project activity.

It took PSEB almost three years to sign PPA with RSL and the PPA was signed in May 2005. However, RSL was generating and exporting power to PSEB without an official PPA signed. PSEB was paying an adhoch price of INR 2.60/kWH. There was a huge risk involved, considering the huge losses which PSEB incurred, in exporting power to PSEB without the PPA signed. However, RSL continued to operate and export power.

PSEB purchases power from RSL @ INR 3.01 per kWh (base year 2000-01) with a 5 % annual increment upto 5 years i.e. till 2005. The tariff for the year 2005 has been fixed at INR 3.65 per kWH and would remain for the whole tenure of the PPA i.e. for 20 years. It is envisaged that with the rising prices of fuel, the cost of generation per unit will be more than the tariff in the near future. Though RSL is aware of the fact that this PPA would result in heavy financial losses, it continues to operate the power plant hoping that the CDM funds would off set the losses incurred.

As RSL generates power parallelly to PSEB, it pays a parallel operating charges to PSEB at the rate of INR 10.0 per KVA per month of the installed capacity. RSL since its commissioning has already paid PSEB about INR 10.30 Million (INR Ten Five Million only) and would continue to do so. This results in a heavy financial burden to RSL.

The frequency of power requirement at PSEB varies with every season. During the peak season where the demand is high, PSEB imports all the power that is exported. However, during the off season, when the requirement of power is not at its peak and PSEB is self sufficient, PSEB pays for the power that is required though it imports all the power generated at RSL. This has resulted in heavy financial losses to RSL in the tune of INR 10 Million (INR Ten Million only). However, RSL continued to operate the plant hoping that the CDM funds would off set the losses incurred.

RSL's success would depend on securing the proposed carbon finance and it would definitely encourage other entrepreneurs to come up with similar project activities contributing further towards GHG emission reduction through the huge untapped biomass based power potential.

Other Barriers

Expected policy effects:

The project will have a major effect of The New Electricity Act-2003. This Act consolidates laws relating to electricity generation, transmission, distribution and trading.

As per this Act, bulk purchase of power by SEB's should be routed through tendering process with selection of power supplier offering lowest rate on competitive basis. Since, this Act supports the power generation with lower tariffs, the power generated by the cheaper but carbon emissive fossil fuels like coal and lignite will be purchased by the SEB's and individual bulk consumers with preference. As a result, the power generated using renewable fuels like biomass will get lower priority from these buyers as its generation cost is higher than the generation cost from conventional fuels like coal and lignite.

Due to this new Electricity Act 2003, promoters of RSL may be required to compromise on the selling price of electricity, which will adversely affect the economics of the project. This is a policy related threat to this project.

In such scenario, where the promoter may get forced to offer much lower tariff than the present PPA, CDM funds will certainly help to reduce the gap between the tariff offered by the project activity and the other power generators/suppliers which generate power with lower cost but high carbon emissive fuels like coal and lignite.

This further justifies the need of CDM funds for the project activity, which will help to improve the project feasibility and financial sustainability if the electricity tariffs reduce in future.

Increased Fuel Prices

RSL had set up the project activity with an intention of procuring bagasse from outside during the off season and operate the plant at its full capacity as it was financially viable for RSL to purchase the fuel. However, with the increasing prices of the fuel for the past few years, it was and is not financially viable for RSL to purchase fuel and operate the plant for the whole year at its 100% capacity. RSL, presently operates the plant at 80% capacity for 240 days, though it could operate at its full capacity for the whole year and export more to the grid thereby replacing more fossil fuel power. The CDM funds, if available, would ensure RSL operates the plant at its full capacity for maximum period and export more green power.

Above barriers are strong enough to affect the decision of project implementation and in case if due to any of the above reason project implementation cancels, the proposed grid to which the project will feed power will alternatively get the power from the project alternatives as discussed above. Since, these alternatives are more GHG emissive, project option only can reduce the GHG emissions. Although there is a good potential for IPP's to implement such power projects in India very few have adopted for the similar project activity due to above strong barriers. Therefore, the proposed renewable energy project is an additional activity as it over comes the above barriers by taking up additional risk of implementation.

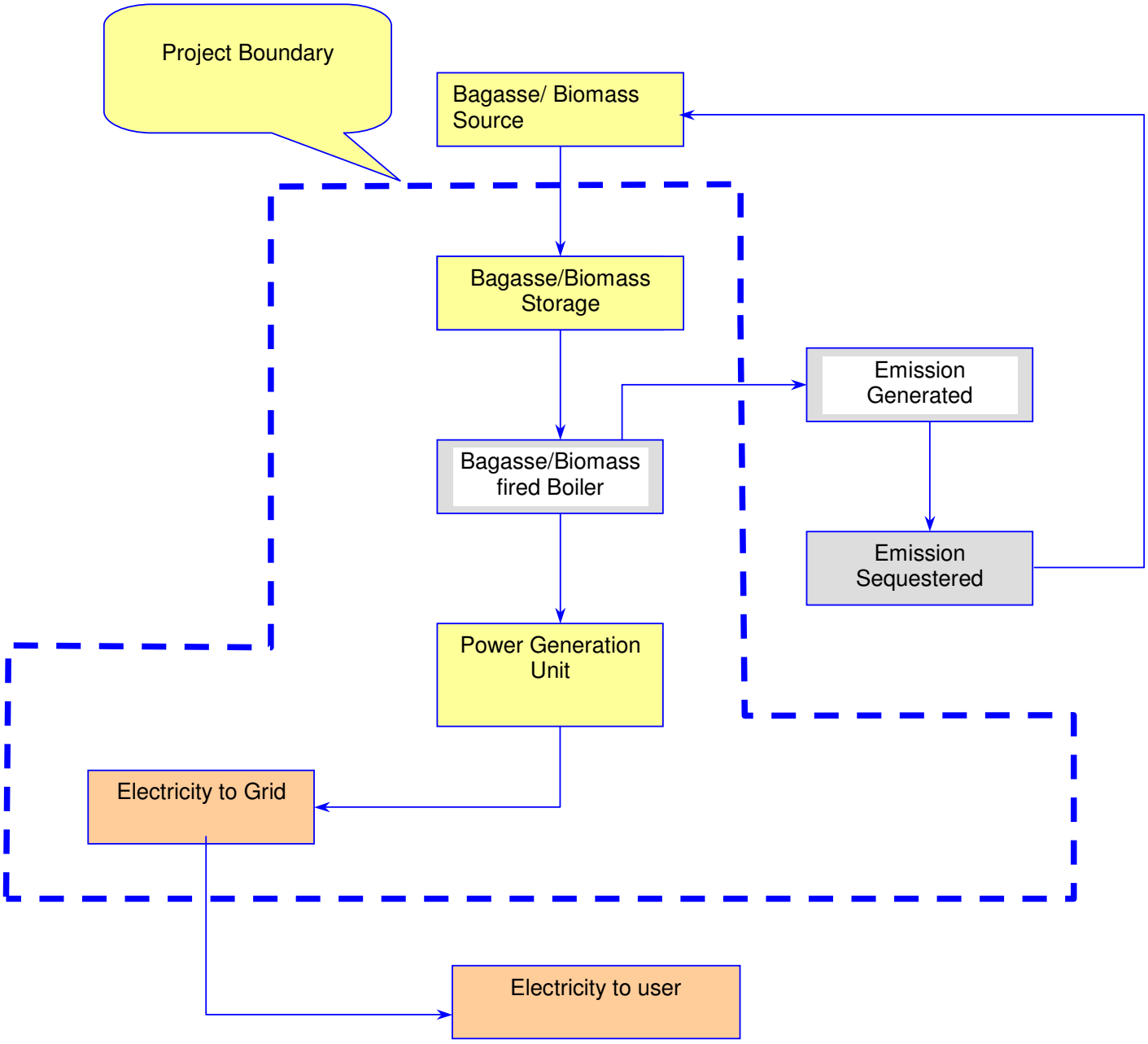
In absence of the project proponent's initiative to implement the project, the equivalent electricity would have been generated by the state grid mix dominated by fossil fuel based power plants.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the small-scale project activity:

As mentioned under paragraph 6 of Type I.D. of '*Annex-B of the simplified modalities and procedures for small-scale CDM project activities'*, project boundary encompasses the physical, geographical site of the renewable generation source. For the project activity the project boundary is from the point of fuel storage to the point of electricity supply to the grid interconnection point where the project proponent has full control.

Thus, project boundary covers fuel storage, boiler, steam turbine generator and all other accessory equipments. However, for the purpose of calculation of baseline emissions, Punjab state electricity grid is also included in the boundary.

Flow chart and project boundary is illustrated in the following diagram:


Project Boundary
Bagasse/ Biomass Source
Bagasse/Biomass Storage
Emission Generated
Bagasse/Biomass fired Boiler
Emission Sequestered
Power Generation Unit
Electricity to Grid
Electricity to user

B.5. Details of the baseline and its development:

Using the methodology available in paragraph 9 of Type I.D. described in Annex B of the simplified modalities and procedures for small-scale CDM project activities, **the average of the approximate operating margin and the build margin** (in $kgCO_{2e}qu/kWh$) of current generation mix of Northern Grid is used for the calculation of baseline.

Base line data

Carbon emission factor of grid

The Northern regional grid comprises of Delhi, Punjab, Haryana, Chandigarh, Rajasthan, Himachal Pradesh, Jammu & Kashmir, Uttaranchal and Uttar Pradesh. Northern Grids present generation mix, sector wise installed capacities, thermal efficiency, and emission co-efficient are used to arrive at the net carbon intensity/baseline factor of the chosen grid. As per the provisions of the methodology the emission coefficient for the electricity displaced would be calculated in accordance with provisions of paragraph 9 of Type I.D. mentioned in Appendix B of Draft Simplified Modalities and Procedures for Small Scale CDM Project Activities for grid systems.

The provisions require the emission coefficient (measured in kg CO_2equ/kWh) to be calculated in a transparent and conservative manner as:

(a) The average of the "approximate operating margin" and the "build margin" (or combined margin)

OR

(b) The weighted average emissions (in kg CO_2equ/kWh) of the current generation mix.

Complete analysis of the electricity generation has been carried out for the calculation of the emission coefficient as per paragraph 7 (a) given above.

Combined Margin

The baseline methodology suggests that the project activity will have an effect on both the operating margin (i.e. the present power generation sources of the grid, weighted according to the actual participation in the grid mix) and the build margin (i.e. weighted average emissions of recent capacity additions) of the selected grid and the baseline emission factor would therefore incorporate an average of both these elements.

Operating Margin

The "approximate operating margin" is defined as the weighted average emissions (in kg CO_2equ/kWh) of all generating sources serving the system, excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation;

The project activity would have some effect on the operating margin of the Northern Regional Grid. The carbon emission factor as per the operating margin takes into consideration the power generation mix of

2004-2005 excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation of the selected grid, thermal efficiency and the default value of emission factors of the fuel used for power generation.

The formulae are presented in Section-E and the calculations are presented in an excel sheet as Enclosure

A. Carbon Emission Factor of grid as per OM is 0.913 kg CO_2/kWh electricity generation.

Build Margin

The "build margin" emission factor is the weighted average emissions (in kg CO_2equ/kWh) of recent capacity additions to the system, which capacity additions are defined as the greater (in MWh) of most recent 20% of existing plants or the 5 most recent plants.

The project activity will have some effect on the build margin of the Northern Grid. The baseline factor as per the build margin takes into consideration the delay effect on the future projects and assumes that the past trend will continue in the future. Capacity additions of 20% most recent plants is greater than (in MWh) most recent 5 plants hence, for our build margin calculation we would take into consideration 20% of most recent plants built in Northern grid given in Table-2. The key parameters for calculating build margin have been assumed same as that for calculating operating margin. Carbon Emission Factor of grid as per build margin is 0.553 kg CO_2/kWh electricity generation.

Net Carbon Emission Factor Grid for 2004-2005 as per combined margin = (OM + BM)/2 = 0.733 kg of CO_2 / kWh generation respectively. (Refer to Excel Sheet Enclosure A and B).

Table-1: Generation and fuel consumption details (2004-2005)

				Generation (million kWh)[5]	Coal Consumption (000' tones)
	Name	**Type**	**Fuel**	**2004-2005**	
1	Badarpur TPS	Thermal	Coal	5462.78	3732
2	Singrauli STPS	Thermal	Coal	15803.34	10336
3	Rihand STPS	Thermal	Coal	7988.06	4768
4	Dadri NCTPS	Thermal	Coal	6842.52	4432
5	Unchahar-I TPS	Thermal	Coal	3342.83	4604
6	Unchahar-II TPS	Thermal	Coal	3438.28	-
7	Tanda TPS	Thermal	Coal	3254.67	2596
8	Anta GPS	Thermal	Gas	2595.77	-
9	Auriya GPS	Thermal	Gas	4119.47	-
10	Dadri GPS	Thermal	Gas	5527.71	-
11	Faridabad GPS	Thermal	Gas	3172.01	-
12	Bairasiul	Hydro	Hydel	689.67	-

[5] Annual reports of Northern region Electricity Board (NREB).

13	Salal	Hydro	Hydel	3443.29	-
14	Tanakpur HPS	Hydro	Hydel	495.17	-
15	Chamera HPS	Hydro	Hydel	3452.25	-
16	Uri HPS	Hydro	Hydel	2206.71	-
17	RAPS-A	Nuclear	Nuclear	1355.20	-
18	RAPS-B	Nuclear	Nuclear	2954.43	-
19	NAPS	Nuclear	Nuclear	2760.01	-
20	Bhakra Complex	Hydro	Hydel	4546.01	-
21	Dehar	Hydro	Hydel	3150.52	-
22	Pong	Hydro	Hydel	882.57	-
23	Delhi	Thermal	Coal	5203.80	1330
24	SJVNL	Hydro	Hydel	1617.45	-
25	Delhi	Thermal	Gas	4091.37	-
26	Haryana	Thermal	Coal	7192.41	5269
27	Haryana	Hydro	Hydel	251.73	-
28	H.P.	Hydro	Hydel	3666.39	-
29	J&K	Hydro	Hydel	851.03	-
30	J&K	Thermal	Gas	23.51	-
31	Punjab	Thermal	Coal	14390.42	9520
32	Punjab	Hydro	Hydel	4420.43	-
33	Rajasthan	Thermal	Coal	17330.79	11133
34	Rajasthan	Thermal	Gas	360.70	-
35	Rajasthan	Hydro	Hydel	494.07	-
36	U.P.	Thermal	Coal	19788.21	15559
37	U.P.	Hydro	Hydel	2063.04	-
38	Uttaranchal	Hydro	Hydel	3452.96	-
	TOTAL			**172681.58**	**73279.00**

TABLE-2 POWER PLANTS CONSIDERED FOR CALCULATING BUILD MARGIN

List of plants supplying power to Northern grid arranged in descending order of date of commissioning[6]

Total generation 172681.58
20 % of total generation 34536.32

	Plant	Date of commissioning	MW	Generation of the unit in 2004-2005 (MU)	Fuel Type
1	Chamera HPS-1	2003-2004	100		Hydro
2	Chamera HPS-2	2003-2004	100		Hydro
3	Chamera HPS-3	2002-2003	100	1344.07	Hydro
4	SJVPNL	2003-2004	1500	5108.77	Hydro
5	Baspa-II (Unit 3)	2003-2004	100	398.94	
6	Suratgarh TH-5	2003-2004	250	1698.37	Coal
7	Kota TH-6	2003-2004	195	1302.49	Coal
8	Baspa-II (Unit 1&2)	2002-2003	200	797.88	Hydro
9	Pragati gas turbine-2	2002-2003	104.6	790.21	Gas
10	Pragati gas turbine-3	2002-2003	121.2	915.61	Gas
11	Ramgarh CCGT Stage _II (GT-2)	2002-2003	37.5	114.19	Gas
12	Ramgarh CCGT Stage _II (GT-2)	2002-2003	37.8	115.11	Gas
13	Upper Sindh Extn (HPS)(1)	2002-2003	35	32.12	Hydro
14	Suratgarh stage-II (4)	2002-2003	250	1698.37	Coal
15	Suratgarh stage-II (3)	2001-2002	250	1698.37	Coal
16	Upper Sindh Stage II (2)	2001-2002	35	32.12	Hydro
17	Malana-2	2001-2002	43		Hydro
18	Malana-1	2001-2002	43	266.08	Hydro
19	Panipat TPS (6)	2000-2001	210	1269.31	Coal
20	Chenani Stage III (1,2,3)	2000-2001	7.5	19.10	Hydro
21	Ghanvi HPS (2)	2000-2001	11.25		Hydro
22	Ghanvi HPS (1)	2000-2001	11.25	74.06	Hydro
23	RAPS-B (2)	2000-2001	220	1309.70	Nuclear
24	Ranjit Sagar HPS (1,2,3&4)	2000-2001	600	1131.37	Hydro
25	Gumma HPS	2000-2001	3	4.35	Hydro
26	Faridabad GPS	2000-2001	144	1030.59	Gas
27	Suratgarh TPS #2	1999-2000	250	1698.37	Coal
28	RAPS-B (2)	1999-2000	220.00	1309.70	Nuclear
29	Uppersindh-2 HPS #1	1999-2000	35	32.12	Hydro
30	Faridabad GPS #1&2 (NTPC)	1999-2000	286	2046.86	Gas
31	Unchahar-II TPS #2	1999-2000	210	1559.75	Coal
32	Unchahar-II TPS #1	1998-1999	210	1559.75	Coal

[6] Reports of Northern region Electricity Board (NREB).

33	Suratgarh TPS #1	1998-1999	250	1698.37	Coal
34	GHGTPLM (Unit 2)	1998-1999	210	1453.23	Coal
35	GHGTPLM (Unit 1)	1997-1998	210	1453.23	Coal
36	Tanda TPS (Unit-4)	1997-1998	110	731.54	Coal
Total				**34694.10**	
20% of Ex-Bus Generation				**34536.32**	%age

B.5.2 Date of completing the final draft of this baseline section *(DD/MM/YYYY)*:

25/10/2005

B.5.3 Name of person/entity determining the baseline:

Rana Sugars Limited has determined the baseline and they are project participant as listed in Annex 1 of this document.

SECTION C. Duration of the project activity / Crediting period:

C.1. Duration of the small-scale project activity:

>>

C.1.1. Starting date of the small-scale project activity:

1/03/2002

C.1.2. Expected operational lifetime of the small-scale project activity:

25y-0m

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

Project activity would use renewable 7 year crediting period

C.2.1. Renewable crediting period:

>>

C.2.1.1. Starting date of the first crediting period:

>>1/03/2002

C.2.1.2. Length of the first crediting period:

>> 7 years 0 months

C.2.2. Fixed crediting period:

>>

C.2.2.1. Starting date:

C.2.2.2. Length:

SECTION D. Application of a monitoring methodology and plan:

>>

D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:

Title: Monitoring Methodology for the category I D – Grid Connected Renewable electricity generation

Reference: 'Paragraph 13' as provided in Type I.D. of 'Appendix B of the simplified M&P for small-scale CDM project activities-Version 8, 3rd March 2006'

D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:

As established in Section A.4.2, the project activity falls under Category I.D and can use the monitoring methodology for type I.D project activities.

The methodology requires the project-monitoring plan to consist of metering the electricity generated by the renewable technology. In order to monitor the mitigation of GHG due to the project activity, the total energy exported needs to be measured. The energy supplied to grid by the project activity multiplied by emission factor for Northern grid, would form the baseline for the project activity.

GHG SOURCES

Direct On-Site Emissions

Direct on-site emissions after implementation of the project arise from the combustion of bagasse in the boiler. These emissions mainly include CO_2. However, CO_2 released is taken up by the Sugar Cane when it grows, therefore no net emissions occur.

Direct Off-Site Emissions

Direct off-site emissions in the project activity arise from the biomass transport. The same type of CO_2 emission occurs during transportation of coal from coal mines to thermal power plants (supplying power to Northern Grid) and distance between the coal mine[7] and power plant is much higher as compared to the average transportation distance considered between project site and biomass collection centres and hence higher CO_2 emissions. No Direct off-site emissions in the project activity are envisaged.

Indirect On-Site Emissions

The indirect on site GHG source is the consumption of energy and the emission of GHGs involved in the construction of bagasse based power plant.

[7] Coal mines situated in Bihar, Madhya Pradesh and West Bengal

Considering the life of the cogeneration plant and the emissions to be avoided in the life span, emissions from the above-mentioned source is too small and hence neglected.

No other indirect on-site emissions are anticipated from the project activity.

Indirect Off-Site Emissions

The indirect off-site emissions include GHG emissions resulting from the erection of the HT lines from the point of generation to the nearest HT lines.

Considering the life of the power plant and the emissions to be avoided in the life span, emissions from this source is also too small and hence neglected.

D.3 Data to be monitored:

1. Parameters affecting the emission reduction potential of the project activity

ID number	Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording Frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data to be kept?	Comment
1	Energy	Energy exported	kWh	M	Monthly	Total	Paper	2 years after end of crediting period	This is monitored at interconnection point
4	Energy	Energy generated	kWh	M	Hourly	Total	Paper	2 years after end of crediting period	This is monitored at generation end

2. Fuel related parameters

ID Number	Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/paper)	For how long is archived data to be kept?	Comment
1	Fuel	Bagasse Quantity	MT	M	Hourly	100 %	Paper	2 years after end of crediting period	-
2	Fuel	Bagasse– Calorific Value	kcal/Kg	M	Once for each type of biomass	Actual sample tested	Paper	2 years after end of crediting period	Through sample testing
3	Fuel	Biomass other than Bagasse Quantity	MT	M	Daily	100 %	Paper	2 years after end of crediting period	-
4	Fuel	Biomass other than Bagasse– Calorific Value	%	M	For each batch of coal	Actual sample tested	Paper	2 years after end of crediting period	Through sample testing

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:

Data	Uncertainty level of data (High Medium/Low)	Are QA/QC procedures planned for these data?	Outline explanation why QA/QC procedures are or are not being planned.
D.3.(a)1	Low	Yes	This data will be used for calculation of emission reductions by project activity.
D.3.(a)2	Low	Yes	This data will be used for calculation of emission reductions by project activity.

Key Project Parameters affecting Emission Reductions

Total Power generated by the project: The power exported by RSL would be monitored to the best accuracy and as per the table given in section D.3.

Auxiliary consumption: No auxiliary consumption is envisaged from the project activity.

Net Power exported to the grid: The project revenue is based on the net units exported by RSL.

The general principles for monitoring above parameters are based on:

- Frequency
- Data recording
- Reliability
- Experience and training

Frequency

Monthly joint meter reading of main meters installed at interconnection point are taken and signed by authorised officials of RSL and PSEB on the first day of every month. Hourly data recording by the shift in-charge of RSL will be there at generation end.

Data recording

Records of this joint meter reading would be maintained by RSL and PSEB. Daily and monthly reports stating the generation and net power export are prepared by the shift in-charge and verified by the plant manager.

Reliability

For measuring the delivery of energy by RSL, one main meter is maintained at interconnection point and one check meter is maintained at grid substation of PSEB. Main meter reading would form the basis of

billing and emission reduction calculations, so long the meter is found to be within prescribed limits of error during half yearly check.

Monthly joint meter reading of main meters installed at interconnection point are taken and signed by authorised officials of RSL and PSEB on the first day of every month. Records of this joint meter reading are maintained by RSL and PSEB.

RSL would keep requisite sets of metering equipment, duly tested/calibrated, as spares, for replacement as and when required. Main or Check meter would be replaced by spare set of meter with, mutual consent of the parties when a faulty meter is required to be removed.

The Main and Check meter installed at interconnection point would be jointly inspected and sealed on behalf of the parties and shall not be interfered with, by either party except in presence of the other party.

The main and check meter would be test checked for accuracy every six months at PSEB's laboratory and sealed by PSEB and RSL jointly.

If during half yearly test check, main meter is found to be within permissible limits of error and check meter is found to be beyond permissible limits, then billing as well as emission reduction calculation would be as per main meter as usual. However, the check meter would be calibrated and replaced with spare tested calibrated meter, as may be necessary.

If during half yearly test check, the main meter is found to be beyond permissible limits of error but check meter is found to be within permissible limits, then billing as well as emission reduction calculation for the month and upto date and time of the calibration/replacement of defective main meter shall be as per check meter. The main meter would be immediately calibrated and replaced with spare tested calibrated meter, as may be necessary where after billing as well as emission reduction calculation would be as per main meter.

If during half yearly test checks, the main meter and check meter are both found to be beyond permissible limits of error, then both meters would be immediately replaced with spare calibrated meters and correction would be applied to data recorded by main meter to arrive at correct energy figures for billing as well as emission reduction calculation purposes for period of the month and upto time of calibration/replacement of defective meter. Corrections in billing whenever necessary shall be applicable to the period between date and time of previous test calibration and date and time of test calibration in current month when error is observed and correction would be for full value of absolute error. For the purpose of correction to be applied the meter shall be tested at 100, 75, 50, 25 and 10 % load at 1.0, 0.85 and 0.75 lag power factors. Of these fifteen values, the error at load and power factor nearest the average monthly load served at the point during the period shall be taken as error to be applied for correction.

In case main meter at interconnection point becomes defective, billing and emission reduction calculation would be based on readings of check meter installed at grid sub-station. The defective equipment would be immediately replaced by RSL.

If both, main and check meters become defective, then emission reduction calculations for the month would be based on hourly generation and auxiliary consumption data recorded by RSL at generation end.

The meter installed at generation end would be test checked for accuracy every six months. If during half yearly test check, meter is found to be beyond permissible limits, then the meter would be calibrated or replaced with spare tested calibrated meter, as may be necessary.

RSL shall archive and preserve all the monthly invoices raised against net saleable energy, for at least two years after end of the crediting period. RSL shall also archive the complete metering data at generation end on paper and all the data would be preserved for at least two years after end of the crediting period.

All the records shall be kept at site itself.

D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

The Chief Engineer and the Deputy Chief Engineer (Electrical) are responsible for the operation and maintenance of the power plant. Four mechanical engineers for the operation and maintenance of the power plant assist the chief engineer. Similarly, four electrical engineers assist the Deputy Chief Engineer – Electrical for the power generation. The Chief Engineer would be a qualified diploma/degree engineer with 5-7 year experience in power industry. The Director would be overall responsible for the operation and maintenance of the power plant.

Deputy Chief Engineer (Electrical) is responsible for the hourly data recording of RSL at generation end. The Daily and monthly reports stating the generation and net power export would be prepared by the Engineer and verified by the Deputy Chief Engineer – Electrical, who would maintain the records. Records of joint meter reading would be maintained at site. The Chief Engineer maintains records with regard to the operation and maintenance of the boiler and turbine.

As and when required and identified, people are sent to short term training courses on operation and maintenance of the power plant. Similarly, in house training is also provided on need basis. The General Manager – Works and the chief engineer are responsible for identifying the training needs and maintaining the undergone training records.

Adequate fire fighting and safety equipment are installed as per the guidelines of the Directorate of Factories. The Assistant Manager - Personnel and Chief engineer are responsible for the upkeep of the safety and fire fighting and maintain necessary records.

Calibration of the main meters recording the power exported is done by PPSEB every year and necessary records are maintained by both PSEB and RSL. Similarly, calibration of the weigh bridge recording the quantity of fuel, is done by department of weights and measures every year and the monitoring is done every month. The Assistant Manger- Personnel department maintains records of the same.

In order to ensure that the project emissions are being regularly monitored and to ensure the function of the monitoring system, the General Manager- Works would carry out an audit every six months and maintain necessary records of the same. Necessary corrective and preventive action based on the audit findings would be carried out.

D.6. Name of person/entity determining the monitoring methodology:

Rana Sugars Limited has determined the monitoring methodology and they are project participant as listed in Annex 1 of this document.

SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

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E.1.1 Selected formulae as provided in appendix B:

Since category I.D. does not indicate a specific formula to calculate the GHG emission reduction by sources, the formula is described below in E.1.2

E.1.2 Description of formulae when not provided in appendix B:

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E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary:

The project activity leads to GHG on-site emissions in the form of CO_2 emissions from combustion of bagasse. The project activity uses an environmentally renewable resource as fuel for power generation. Hence there would be zero emissions from the project activity.

The CO_2 emissions from bagasse combustion process will be consumed by the plantations, representing a cyclic process of carbon sequestration. Since the bagasse contains negligible quantities of other elements like Nitrogen, Sulphur etc. release of other GHG emissions are considered negligible. GHG emissions during on-site construction work are negligible compared to GHG reductions in the project lifetime and are not accounted for. Similarly emissions associated with transportation of construction materials are ignored.

E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities

As prescribed in Appendix B of the Simplified Modalities and Procedure for small-scale CDM project activities, for Category I.D leakage estimation is only required if renewable energy technology is equipment transferred from another activity. This does not apply to the project case. However, the only source of leakage activity identified, which contributes GHG emissions outside the project boundary is transportation of biomass from the areas within a 50 km radius to power plant.

The same type of GHG emissions occur during transportation of coal from coal mines in Bihar, West Bengal and Madhya Pradesh to respective thermal power plants in Northern Grid. Since the distance between the coalmines and power plant (avg. 1500 kms.) is much higher as compared to the transportation distance of biomass, the GHG emissions would be higher in the earlier case. Considering the transportation leakages for the 2 fuels, there is a net positive addition on the baseline emission, which will result in net increase in CO_2 reduction from the project. To be on conservative side, this CO_2

emission due to coal transportation and biomass transportation has not been considered while calculating the baseline emissions and project emissions respectively.

Emissions due to transportation of biomass		
Total biomass required	Ton/year	12500
Biomass transported by tractor trolly	Ton/year	12500
Biomass load per tractor trolly	ton	10
Total no. of trips		1250
Average distance between project site and collection centres	km	50
Consumption of diesel per trip (to and fro)(@5km/lit)	litres	20
Total diesel consumption	litres	25000
Calorific value of diesel	TJ/lit	0.0000283
Emission factor for diesel	t CO_2/TJ	74.1
Emissions due to transportation of biomass	**t CO_2 /year**	**52**

E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the small-scale project activity emissions:

The emissions from the project due to use of coal (if any) would give the project activity emissions.

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHGs in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities:

The Northern Grid, which comprises of the Punjab State Electricity Board (PSEB) grid to which project activity is supplying power, has been considered as the baseline. As per the provisions of the methodology the emission coefficient for the electricity displaced would be calculated in accordance with provisions of paragraph 9 (a) of Type I.D of '*Appendix B of Simplified Modalities and Procedures for Small Scale CDM Project Activities'*.

The emission coefficient has been calculated in a transparent and conservative manner as: **'The average of the approximate operating margin and the build margin'.**

The step-by-step calculation of base line emission is as follows:

Step 1	**:**	Thermal efficiency of coal based power plants	=	35.51 %
Step 2	**:**	Thermal efficiency of gas based power plants	=	50 %
Step 3	**:**	CO_2 emission factor for coal	=	96.10 kg CO_2 / GJ

Step 4	**:**	CO_2 emission factor for gas	=	56.10 kg CO_2 / GJ
Step 5	**:**	Actual emission factor for coal	=	CO_2 emission factor for coal/ Thermal efficiency of coal based power plants (kg CO_2/kWh)
Step 6	**:**	Actual emission factor for gas	=	CO_2 emission factor for gas/ Thermal efficiency of gas based power plants (kg CO_2/kWh)
Step 7	**:**	Net emission factor for coal	=	Actual emission factor for coal x % of generation by coal out of total generation excluding renewable, hydel and nuclear power generation. (kg CO_2/kWh)
Step 8	**:**	Net emission factor for gas	=	Actual emission factor for gas x % of generation by gas out of total generation excluding renewable, hydel and nuclear power generation. (kg CO_2/kWh)
Step 9	**:**	Net operating margin factor for grid	=	Net emission factor for coal + Net emission factor for gas (kg CO_2/kWh)
Step 10		Net build margin factor for grid	=	Weighted average emissions of 20% of most recent plants built in Northern grid (kg CO_2/kWh)
Step 11		Combined margin factor	=	(Net operating margin factor for grid + Net build margin factor for grid)/2 (kg CO_2/kWh)
Step 12	**:**	Units supplied to grid	=	Net energy supplied after auxiliary consumption
Step 13	**:**	Baseline emission	=	Combined margin factor x Units supplied to grid

Since there is a gap between demand and supply in the Northern Grid, the power supplied from the project activity would partially fulfil the power requirement for the Northern Grid.

If the state grid mix generates the same amount of electricity, it adds to the emissions that are ultimately getting reduced by the project activity. Hence, the baseline calculated using above methods / scenarios would represent the realistic anthropogenic emissions by sources that would occur in absence of the project activity.

The uncertainties in the baseline, arising out of capacity additions trends are already taken into consideration during calculation of combined margin factor.

Detailed calculation has been shown in Enclosure 1.

E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:

Following formula is used to determine Emission reduction

CO_2 emission reduction due to project activity = Baseline emission – Project Activity emission

E.2 Table providing values obtained when applying formulae above:

Emission reductions by project activity for 7 -year crediting period have been calculated and tabulated below:

Table E.2.1: Emission Reductions

Sr. No.	Operating Years	Net Baseline Emission Factor (kg of CO_2 / kWh)	Baseline Emissions (Tons of CO_2)	Project Emissions (Tons of CO_2)	Emission Reductions, (Tons of CO_2)
1.	2002-2003	0.733	27,972	0	27,972
2.	2003-2004	0.733	26,387	0	26,387
3.	2004-2005	0.733	23,497	0	23,497
4.	2005-2006	0.733	23,497	0	23,497
5.	2006-2007	0.733	23,475	0	23,475
6.	2007-2008	0.733	23,475	0	23,475
7.	2008-2009	0.733	23,475	0	23,475
		Total CERs	**171,776**		**171,776**

Therefore a conventional energy equivalent of 234.135 million kWh for a period of 7 years would be saved by exporting power from the project activity, which in turn would reduce 171,776 tons of CO_2 emissions considering baseline calculations.

SECTION F.: Environmental impacts:

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

A detailed Environmental Impact Assessment report highlighting the impacts arising from the project has been prepared and submitted to the Punjab Pollution Control Board (PPCB). On reviewing the EIA report, the PPCB has accorded the 'Consent to Operate'.

The design philosophy of this project activity is driven by the concept of providing the energy with no impact on the environment. The environmental aspects of the project activity are discussed below.

The pollutants generated from the power plant include:

- Dust and particulate matter in the flue gas
- Fly ash from the hoppers
- Furnace bottom ash
- Effluent from water treatment plant
- Sewage from the plant

Control methods for air pollution

Dust and particulate matters

The pollution control norms stipulate a maximum dust concentration of 115mg//Nm^3. The power plant has an Electrostatic Precipitator, which separates the dust from the flue gas and dust concentration is the flue gas leaving the ESP is kept below 115 mg/Nm^3.

The dust concentration level in the chimney is periodically monitored. Corrective steps are taken, if the concentration is not as per the acceptable limits.

Sulphur-di-oxide and Nitrogen-di-oxide

The main fuel in the power plant is biomass, which does not have significant amount of sulphur in it. Hence, the sulphur dioxide is not produced. However, the stack height is as per the local pollution control board stipulations.

The nitrogen-di-oxides are not produced in firing.

Fly Ash and Bottom Ash

The ash collected from the bottom of furnace (bed ash) and the ash collected in the air heater hoppers and ESP hoppers is taken to an ash silo through a series of conveyors. The ash from the silo is disposed off to farmers, who use the ash as manure for the crops.

Control methods for water pollution

Effluents from Water Treatment Plant

Water drained from the water treatment plant is pumped to a neutralization pit so that the water let out is neutral. The neutralization pit has effluent resistant cement lining.

Boiler Blowdown

In order to maintain the solid concentration in the boiler feed water, two types of blowdown are employed in the boiler. One type is continuous blowdown and the other intermittent blowdown.

The blowdown water is at a temperature of approximately 100 ^{0}C. The quantity of blowdown is around 1.5 TPH. This water is taken to the neutralising pit, where it will get cooled naturally.

Sewage from the Power Plant Buildings

The sewage from the various power plant buildings is taken to a common septic tank through trenches. The sewage from the septic tank is disposed off manually.

Control methods for thermal pollution

The water used in the surface condenser to condense the steam is cooled in a cooling tower. The water let out from the cooling tower has a temperature very close to the ambient conditions.

Control methods for noise pollution

The major source of noise pollution in the power plant power plant is from the following:

- Rotating equipments like ID, FD and SA fans
- Feed pumps
- Boiler and superheater safety valves
- Start up vent
- Steam turbine

As per OSHA standards, the rotating equipments are designed to keep sound level between 85 to 90 dBA. The start up vent, safety valve outlets and the DG sets are provided with silencers to reduce the noise level to the acceptable limits. The power house building has been constructed suitably to keep the noise level within the acceptable limits.

SECTION G. Stakeholders' comments:

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

RSL organised stakeholder consultation meetings with individual village panchayat (elected body of representatives administering the local area) in the area with the objective to inform the interested stakeholders on the environmental and social impacts of the project activity and discuss their concerns regarding the project activity. Invitation for stakeholder consultation meetings were sent out requesting the members of village panchayat to participate and communicate any suggestions/objections regarding the project activity in writing. On the day of meeting, RSL representatives presented the salient features of the company and the project activity to the participants and requested their suggestions/objections. The opinions expressed by them were recorded and are available for validation.

The other stakeholders identified for the project activity are as under:

1. Punjab Energy Development Agency
2. Punjab Pollution Control Board (PPCB)
3. Punjab State Electricity Board
4. Indian Renewable Energy Development Agency (IREDA)
5. Consultants

Stakeholders list includes the government and non-government parties, which were involved in the project activity at various stages. At the appropriate stage of the project development, RSL consulted them to get the comments. The comments received are available on request.

G.2. Summary of the comments received:

Local population comprises of the local people in and around the project area. The roles of the local people are as a beneficiary of the project. The project activity has provided good direct employment opportunities to the local populace which is encouraging the project.

The project does not cause any adverse social impacts on local population. Rather, it would help in improvising their quality of life. RSL has completed the necessary consultation and documented the approval by local population for power plant.

The Government of Punjab, through Chief Executive, Punjab Energy Development Agency (PEDA), under the Department of Science, Technology and Environment of Punjab had accorded the permission for setting up the project through Implementation Agreement.

PPCB has prescribed standards of environmental compliance and monitors the adherence to the standards. PPCB have issued Consent To Establish the power plant under the provisions of Water (Prevention and Control of Pollution) Act, 1974 / Air (Prevention and Control of Pollution) Act, 1981.

As a buyer of the power, the PSEB is a major stakeholder in the project. They hold the key to the commercial success of the project. RSL has already signed Power Purchase Agreement (PPA) with PSEB.

Indian Renewable Energy Development Agency (IREDA) has provided loan assistance for setting up the power plant.

Projects consultants were involved in the project activity to take care of the various pre contract and post contract issues / activities like preparation of basic and detailed engineering documents, preparation of tender documents, selection of vendors / suppliers. They were further involved in supervision of project operation, implementation, successful commissioning and trial run.

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

In view of various direct and indirect benefits (social, economical, environmental), no concerns were raised during the consultation with stakeholders, hence it is not required to take due account of the comments.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Rana Sugars have received financial assistance from the United States Agency for International Development (USAID) under the Green House Gas Pollution Prevention (GEP) project. The review committee included Industrial Development Bank of India, Federal Energy Technology Centre, Winrock International's Renewable Energy Project Support Office and USAID. This funding does not result in diversion of Official Development Assistance (ODA) and is not counted towards the financial obligations of United States.

Under the GEP, it was proposed to assist individual sugar mills/independent power producers by ways of investment support to enable them to generate surplus power for a minimum of 270 days per year using bagasse/biomass as fuels.

ABBREVIATIONS

BAU	Business As Usual
BM	Build Margin
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CO_2	Carbon dioxide
DPR	Detailed Project Report
EIA	Environment Impact Assessment
GHG	Greenhouse gas
Hz	Hertz
IPCC	Inter Governmental Panel On Climate Change
IPP	Independent Power Producer
IREDA	Indian Renewable Energy Development Agency
Kg	Kilogram
Km	Kilometer
kW	Kilo watt
kWh	Kilo watt hour
MW	Mega watt
NRSE	New and Renewable Sources of Energy
OM	Operating Margin
PDD	Project design document
PEDA	Punjab Energy Development Agency
PPA	Power Purchase Agreement
PPCB	Punjab Pollution Control Board
PSEB	Punjab State Electricity Board
RSL	Rana Sugars Limited
SHR	Station Heat Rate
TPH	Tons per hour
UNFCCC	United Nations Framework Convention on Climate Change

LIST OF REFERENCES

Sl. No.	Particulars of the references
1.	United Nations Framework Convention on Climate Change (UNFCCC), http://unfccc.int
2.	UNFCCC document: Clean Development Mechanism, Simplified Project Design Document For Small Scale Project Activities (SSC-PDD), Version 02
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, Version 08
5.	UNFCCC document: Determining the occurrence of debundling
6.	Power sector profile for Northern region-Ministry of Power
7.	Ministry of Power (MoP), Govt. of India, www.powermin.nic.in
8.	Punjab State Electricity Regulatory Commission (PSERC)-tariff order for PSEB-FY2003-04, www.pserc.nic.in
9.	Central Electricity Authority (CEA), Govt. of India, www.cea.nic.in
10.	Emission Baselines-Estimating the Unknown, International Energy Agency
11.	Ministry of Environment and Forest, http://envfor.nic.in/cdm/host_approval_criteria.htm
12.	Detailed Project Report for Rana Sugars Plant,