Voluntary Carbon Standard 2007.1
Project Description

VCS PD Version 2.0
Date of the VCS PD:11th November 2009

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1 Description of Project:

1.1 Project title

Chemical Recovery project at Satia Industries Ltd. (SIL) formerly known as Satia Paper Mills Limited village Rupana, Punjab.

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1.2 Type/Category of the project

- The project activity falls under the category 5: Chemical Industry.
- The project activity is an isolated activity and not a grouped activity.

1.3 Estimated amount of emission reductions over the crediting period including project size:

The project activity is a Chemical Recovery Project activity with an estimated **21906 tonnes of CO_2** equivalent emissions reductions per year. It is neither a micro project nor a mega project activity.

1.4 A brief description of the project:

SIL is one of the leading integrated paper manufacturing unit in Punjab with daily production in the range 130 Tons per day (TPD) of paper inclusive of recycled paper and fresh agro raw material based pulp production capacities. SIL, being an environmentally concerned organization has always been on the look out for protecting the environment from degradation. Thus the proponent commissioned a chemical recovery plant in SIL's plant premises at Muktsar, Punjab with the ultimate objective to reduce the Green House Gases emissions in the atmosphere.

The purpose of the project activity is to recover the caustic soda from waste liquor generated at the pulping stage of the paper manufacturing process. Since the electricity consumption for the process of recovery of 1 tonne of soda is lesser than that consumed in the production of fresh stock of soda.

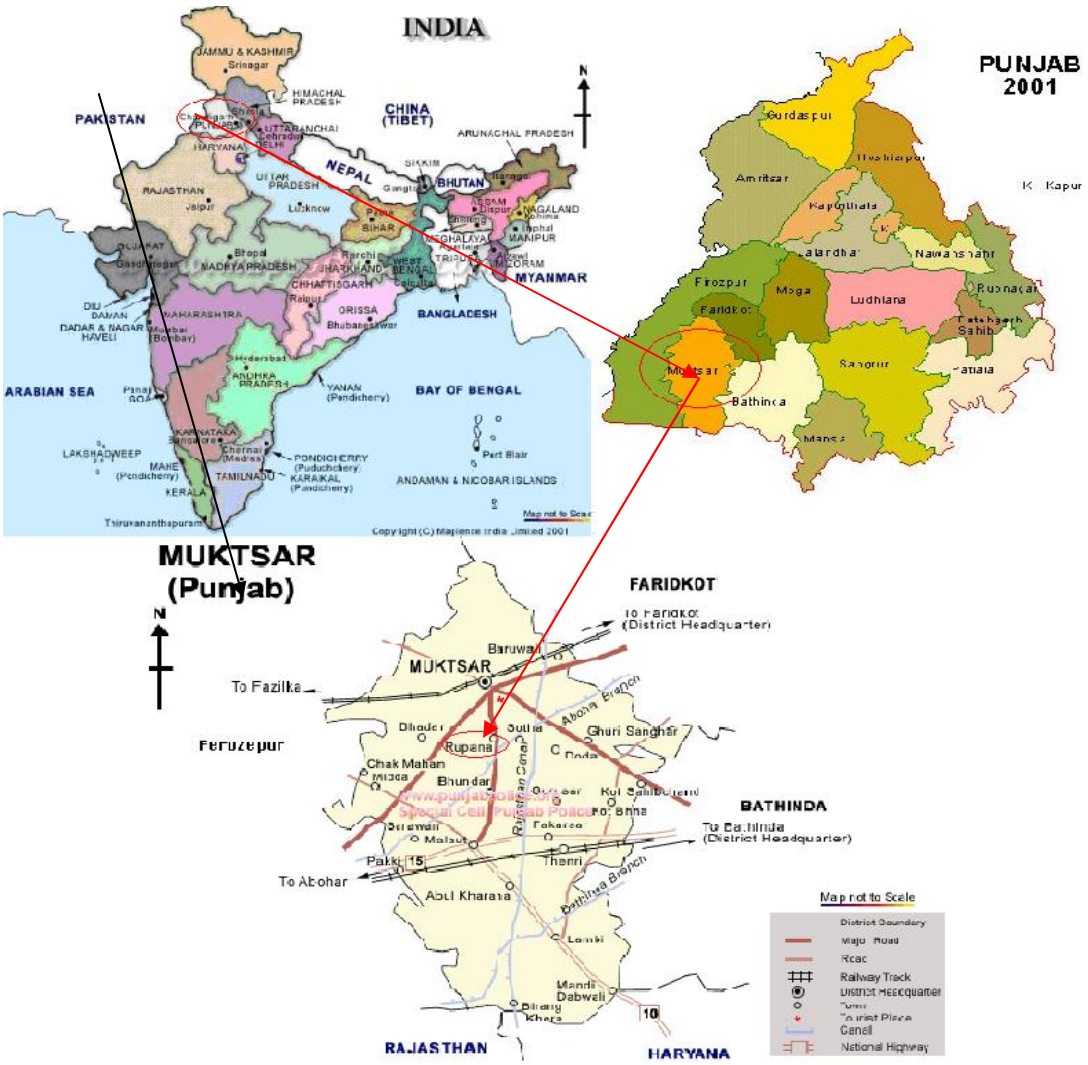
The project would help curb the green house gases emissions into the atmosphere. The electricity consumed at project activity is generated inhouse from biomass based power project.

1.5 Project location including geographic and physical information allowing the unique identification and delineation of the specific extent of the project:

The project activity is located within premises of paper manufacturing unit of SIL at Rupana village in Muktsar district in Punjab. The nearest railway station is located at Muktsar which is around 8 km from the plant site. Following map shows the exact location of project plant in state map.

	CRP Site location
LATITUDE (N)	30^0 28'43'' North
LONGITUDE (E)	74^0 31'22''East

Table 1: Latitude & Longitude of Plant location



1.6 Duration of the project activity/crediting period:

- Project Start date: 02nd March 2006

  The project start date has been taken as the actual commissioning date of the recovery plant when it first started operations.

  Commissioning date: 02nd March 2006

- Start date of crediting period: 28th March 2006
- VCS project crediting period : 10 years Fixed (28/03/2006-27/03/2016)

- The Operational lifetime of the Recovery plant is 25 years[1] and covers the entire VCS crediting period.

1.7 Conditions prior to project initiation:

Pre Project Scenario –

Prior to the setting up of the chemical recovery plant by SIL, the complete caustic soda requirements were being met by the soda purchased from the prevailing manufacturers in the market.

The three conventional caustic soda manufacturing processes[2] being practised in India with their respective power consumption figures are listed below.

S.No.	Process	Average Power Consumption (KWh/MT)
1.	Diaphragm Process	3500
2.	Mercury Cell	3300
3.	Membrane Cell	2900

Table 2: Power Consumption in Soda manufacturing processes

In the pre-project scenario, project proponent was meeting the soda requirement for its paper manufacturing facility by procurement from open market or soda manufacturers / suppliers (listed below in the table [3]).

Year	Manufacturer	Power supplying grid	Power consumption (KWh) / tonnes	Quantity (tonnes)
2004-05	PACL	Northern	2656	9358
	SIEL	Northern	2752	1722
Total				**11080**
2005-06	PACL	Northern	2563	10906
Total				**10906**
2006-07	PACL	Northern	2590	3253
	GACL	Northern	2512	136
Total				**3389**

[1] As per the Technical Specification Certificate provided by the Technology service provider submitted to the DOE.

[2] http://www.myiris.com/shares/sectors/sectorReport.php?secode=CHEMICAL&peercode=&fname=./data/chemical/chemical.htm

3 The quantity of caustic soda consumed at paper manufacturing facility of SIL was manufactured in-country only and there were no imports of caustic soda.

Table 3: List of caustic soda suppliers

The Soda manufacturers were using the conventional energy intensive manufacturing process for the production of soda. The specific energy consumption (kWh/Ton of Soda- Average consumption of power per tonne of soda manufactured) data for the leading soda manufacturer is given in the table 4.

Year	Average consumption (kwh/Ton of soda)
2004-05	2671
2005-06	2563
2006-07	2587
Average	**2607**

Table 4: Average consumption of power per tonne of soda manufactured

Thus, the average power consumption in producing one tonne of soda is 2607 KWh

1.8 A description of how the project will achieve GHG emission reductions and/or removal enhancements:

This project category comprises of technology/measures for recovering caustic soda from waste black liquor generated in paper manufacturing as **it** involves commissioning of a chemical recovery plant wherein caustic soda will be recovered from waste liquor generated in paper manufacturing.

The total installed capacity of this plant is 35 tonnes per day (11550 tonnes per annum) of recovered soda. the conventional soda manufacturing process is highly energy intensive process, where as energy requirement for per ton of soda recovered in the Chemical Recovery Process is lesser than the conventional plant. The electricity consumed at project is generated in house from biomass based power generation unit.

Therefore, a energy equivalent of approximately 301.1 million kWh for a period of 10 years would be saved by the project activity with CO_2 emission reduction of 219,020tonnes over a 10 year credit period.

1.9 Project technologies, products, services and the expected level of activity:

The project involves evaporation of the black liquor in an evaporator, burning in recovery boiler and recausticizing in causticizing plant. Black liquor obtained from pulp washing normally has dissolved solid content of 8-15 % (weak black liquor) which needs to be increased considerably before the liquor can be burnt. The liquor is concentrated in a seven point multi-effect evaporation plant so as to increase dry solid content upto 60-65% (concentrated black liquor). the resulting strong black liquor reaches the recovery unit (boiler or gasifier).In this unit the black liquor converts some of its chemical energy either by full (recovery boiler) or partial (gasifier) combustion of the liquor which yields an inorganic smelt. The composition of the smelt differs depending on which type of recovery technology

that has been used. Most of the chemicals in the smelt that leaves the recovery unit is then led back into the pulping process as white liquor after a couple of recovery processes (e.g. causticizing).

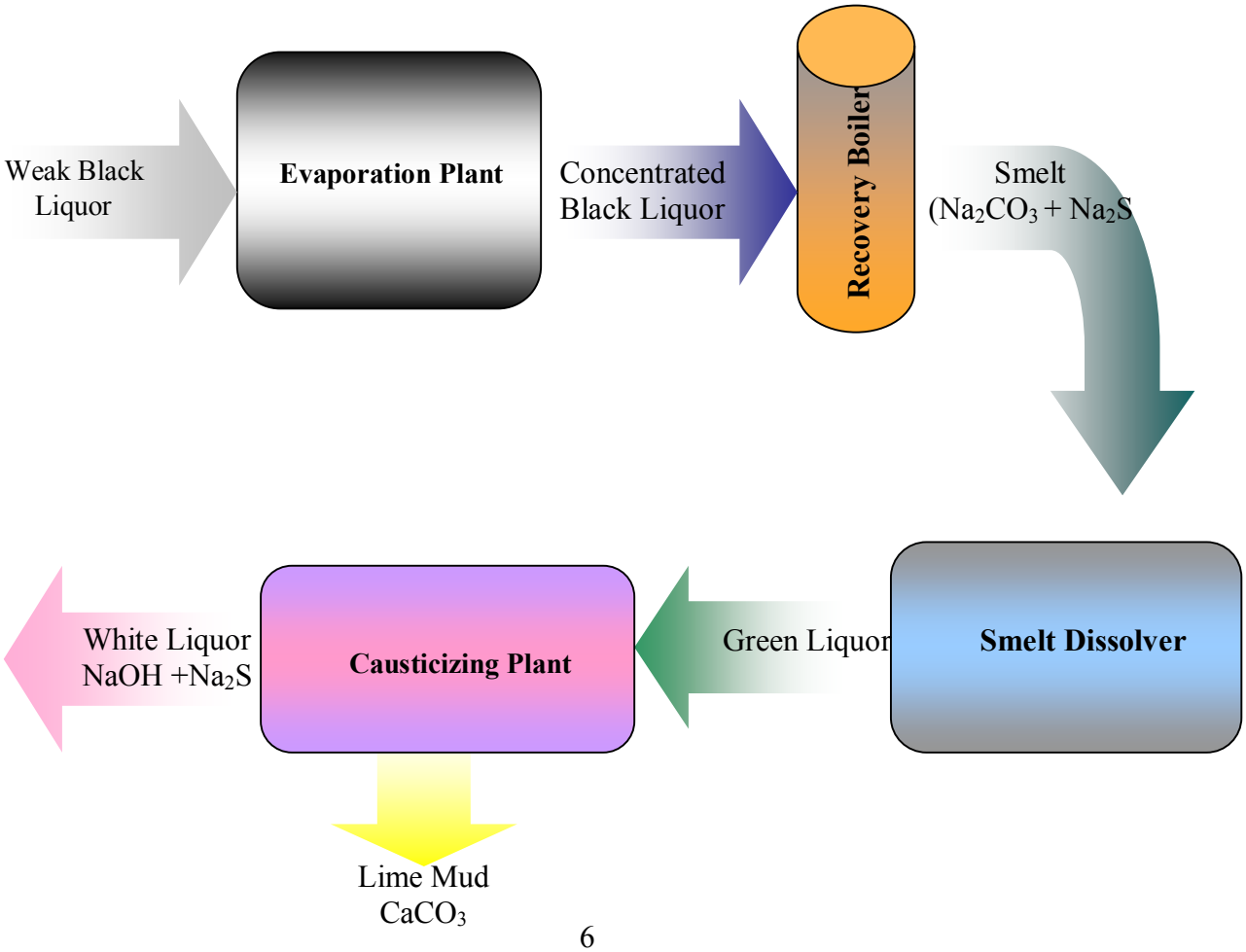
The clean condensate from evaporators is obtained as vapours through the droplet separators. The same condensate can be used as hot water in pulp washing and also sludge washing in causticizing.

The condensate from the black liquor evaporators varies in the degree of contamination according to origin. They are treated in a stripper column that is normally integrated with black liquor evaporation by using steam. Stripping condensate makes it possible to reuse the condensate in washing unbleached pulp and in the causticizing plant.

Thus the level of activity of products or services to the project can be established as the recovery/provision of caustic soda to meet the pulping requirements of the paper manufacturing plant.

The concentrated black liquor is burnt in the recovery boiler, to recover sodium and sulphur in a suitable chemical form, to regenerate the pulping chemicals. The smelt from the boiler is dissolved in water to produce "green liquor" which consists mainly of sodium carbonate. The green liquor is clarified and causticized in a causticizing plant with lime where sodium carbonate is converted to sodium hydroxide for pulping.

As per the total installed capacity of this plant, 35 tonnes of soda is expected to be recovered per day and 11550 tonnes per annum. This is an energy savings equivalent of approximately 301.1 million kWh for a period of 10 years by the project activity with CO_2 emission reduction of 219,010 tonnes over a 10 year period.



1.10 Compliance with relevant local laws and regulations related to the project:

The project is under the compliance of the relevant local laws and regulations and is not prohibited by any of the national/state level sectoral policies. Further, the consent to operate the plant and No objection Certificate has been received from Punjab Pollution Control Board which is the required statutory authority.

1.11 Identification of risks that may substantially affect the project's GHG emission reductions or removal enhancements:

The project is under successful operation since 2nd March 2006 and thus a significant risk affecting the GHG reduction potential of the project is not anticipated. Further, the project activity has a significant operational lifetime of 25 years.

1.12 Demonstration to confirm that the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

The project was not implemented to create GHG emissions primarily and its subsequent removal or destruction. The project by saving of electricity through chemical recovery of soda from waste black liquor unit displaces higher electricity consumptions in conventional soda manufacturing processes in which higher levels of fossil fuel based electricity is consumed from the Northern grid. In the absence of the project activity GHG emissions would have definitely occurred due to equivalent electricity consumption from the grid.

1.13 Demonstration that the project has not created another form of environmental credit (for example renewable energy certificates).

SIL intends to claim the credits only for the period after the commissioning of the project activity and its subsequent generation. The VCS crediting period starts from 28th March 2006, during this period any other form of environmental credit has not been claimed by the project proponent.

1.14 Project rejected under other GHG programs (if applicable):

The project proponent had applied for CDM (other GHG program) from which it has been withdrawn. The project has not been rejected under any other GHG programs.

1.15 Project proponents roles and responsibilities, including contact information of the project proponent, other project participants:

Satia Industries Limited (SIL) has implemented an operational and management structure in order which has set procedures and systems to monitor emission

reductions and any leakage effects, generated by the project. SIL has formed a team/committee comprising of persons from relevant departments, which will be responsible for monitoring of all the parameters with regard to the project.

Contact information of the project participants

Organization:	Satia Industries Limited
Street/P.O.Box:	Vill. Rupana
Building:	--
City:	District Muktsar
State/Region:	Punjab
Postcode/ZIP:	152026
Country:	India
Telephone:	91-1633-262215
FAX:	91-1633-263499
E-Mail:	satiapaper@gmail.com
URL:	
Represented by:	
Title:	Director
Salutation:	Mr.
Last Name:	Bhandari
Middle Name:	
First Name:	R.K
Department:	-
Mobile:	-
Direct FAX:	91-1633-263499
Direct tel:	91-1633-262215
Personal E-Mail:	rksmile57@gmail.com

Table 5: Contact information of the project participants

1.16 Any information relevant for the eligibility of the project and quantification of emission reductions or removal enhancements, including legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and temporal information.):

Project Activity's contribution to Sustainable Development:

The sustainable development indicators stipulated by the Government of India in the interim approval guidelines for VCS projects are as follows[4,5]:

- ✓ **Environmental well being**
- ✓ **Technological well being**
- ✓ **Economic well being**
- ✓ **Social well being**

The project activity proposed by SIL contributes to the above in following manner:

Environmental well being:

Lesser amount of electricity will be consumed in recycling the caustic soda than in manufacturing the fresh stock. Therefore, there will be reduced GHG emissions after the implementation of the project activity.

Technological well being:

The implementation of technology for soda recovery and recycling will provide a highly replicable model for other industries in this sector.

Economical well being:

The project activity by providing employment opportunities to the local traders, labours, transporters would improve the living standards of the local people. The project would also create a business opportunity for local suppliers, manufacturers, contractors etc. during the various phases of the project construction, operation & maintenance.

Social well being:

Installation of additional equipments in the plant will generate direct and indirect employment opportunities for skilled as well as unskilled labours. This will improve the local standard of living. Project activity will also facilitate capacity building amongst employees of the plant.

1.17 List of commercially sensitive information (if applicable):

There is no commercially sensitive information including the likes of trade secret, financial, commercial, scientific, technical or other information involved in the project activity whose disclosure could reasonably be expected to result in a material financial loss or gain or prejudice the outcome of contractual or other negotiations or otherwise damage or enrich the project proponent or the entity to which the information relates.

[4] http://envfor.nic.in:80/divisions/ccd/cdm_iac.html
[5] http://envfor.nic.in/cdm/host_approval_criteria.htm

2 VCS Methodology:

2.1 Title and reference of the VCS methodology applied to the project activity and explanation of methodology choices:

Title: Reduction in Consumption of Electricity by Recovering Soda from Paper Manufacturing Process

Reference: Approved Small Scale methodology AMS III.M., Version02 EB-33,

Sectoral Scope: 05.

The emission factor for the project activity has been estimated on the basis of the small scale methodology AMS.I.D (Version 13) titled *'Grid connected renewable electricity generation'*.

2.2 Justification of the choice of the methodology and why it is applicable to the project activity:

According to the methodology category III.M. is applicable under the following conditions;

Sl. No.	Applicability Conditions	Project Activity
1.	***This project category comprises of technology/measures for recovering caustic soda from waste black liquor generated in paper manufacturing. Production of caustic soda in traditional soda manufacturing processes requires more energy in comparison to recovery of equivalent amount of caustic soda.***	Project activity involves commissioning of a chemical recovery plant wherein caustic soda will be recovered from waste liquor generated in paper manufacturing. The total installed capacity of this plant is 150 tonnes per day of concentrated black liquor solids. Energy requirement per ton of soda recovered in chemical recovery is in the range of 600-800 kWh/tonne which is much lesser than what is required for manufacturing soda in a conventional plant where the specific energy consumption is in the range 2500-2800 kWh/ tonne. Design Specifications: Installed capacity- Conc. black liquor: 150 TDS/day Weak Black liquor received: 1189MT/day (as per monitoring data) Causticizing Plant Recovery capacity: 35 Tons/day Black Liquor Dry Solids Content : 60-65%
2.	**Measures are limited to those that result in emission reduction of less than or equal to 60 ktCO2e annually.**	The project activity results in the emission reduction of 21906 tCO_2e per annum which is less than 60 $ktCO_2e$ annually which can be substantiated by the CER calculations shown in the PD.

Table 6: Applicability Conditions & qualifications

2.3 Identifying GHG sources, sinks and reservoirs for the baseline scenario and for the project:

The project is a chemical recovery project and has no GHG (CO_2) sources, sinks and reservoirs controlled, related to, or affected by the project proponent or the GHG project. In the project scenario the power consumed in the CRP unit is from the in-house biomass power generation with zero emissions to the atmosphere. Also the black liquor being a non-fossil fraction of an **industrial** waste comes under the biomass category as per the guidelines given in UNFCCC EB 23 Annex 18 definition of biomass and also as per a WWF study of environmental reporting which clearly stated black liquor as Biomass. Therefore, the project activity will lead to zero CO_2 on-site emissions and hence would have no sources, sinks or reservoirs of GHG (CO_2).

In the absence of the project the complete caustic soda requirements were being met by the soda purchased from the prevailing manufacturers in the market. Soda production by traditional soda manufacturing process is more energy intensive in comparison to recovery of equivalent amount of caustic soda. Also the local soda manufacturer consume more carbon intensive energy from grid there by leading to higher CO_2 GHG emissions.

The greenhouse gases and emission sources included in or excluded from the project boundary for baseline and for project are shown in Table:

Source		Gas	Included	Justification
Baseline	CO_2 emissions from electricity generation in in country local soda production facility which is supplied from carbon intensive fossil fuel fired power plants connected to the local grid.	CO_2	Yes	Main emission source.

Table 7: GHG Emission Sources

2.4 Description of how the baseline scenario is identified and description of the identified baseline scenario:

The baseline is established by evaluating the various alternatives available and zeroing upon the one which is the most plausible.

The various credible alternatives that were available with the project proponent are as follows:

- Implementation of the similar project activity without considering the VCS credits benefits.

The given alternatives faces several prohibitive barriers like technical barriers related to high silica content in black liquor, investment barriers like loan rejection etc. the barriers associated with its implementation are discussed in the detail in section 2.5 (assessment & demonstration of additionality) of this document.

Thus this alternative cannot be considered as a plausible baseline scenario because of the above mentioned barriers which can only be elevated from additional carbon financing from VCS.

- Procuring the soda required for the paper plant form the available chemical manufacturers.

  .This can be considered as the baseline scenario as this has been the usual practice as detailed out in common practice analyis and does not have any above mentioned barriers associated with it.

  Thus from the above discussion it is established that that meeting the soda requirements of the paper plant from the purchase of soda from local manufacturers from the market is the only plausible baseline for this project.

2.5 Description of how the emissions of GHG by source in baseline scenario are reduced below those that would have occurred in the absence of the project activity (assessment and demonstration of additionality):

In the absence of the project activity caustic soda would have been procured from local suppliers using conventional energy intensive manufacturing process for the production of soda thus the electricity consumption would have been higher from the fossil fuel based NEWNE grid. Also the project activity is using the electricity produced from project proponent's own biomass based power project. Thus the emissions of GHG from baseline scenario would be totally reduced with project activity. The following steps/tests i.e. The Project Test from the *VCS 2007.1 Guidelines* is taken to demonstrate the additionality of the proposed project.

Test 1 - The project test:

Step 1: Regulatory Surplus

Pulp & Paper industrial facility is required to meet the stipulated pollution standards set by pollution control board. Prior to the project activity SIL was treating black liquor in a biomethanation plant, and effluent discharge was meeting the prescribed standards.

SIL also regularly submit the waste air/water pollution control statements to state pollution control board.

The time targeted action plan under "Corporate Responsibility for Environmental Protection" CREP for Pulp & Paper Industry is as below:

For Small Scale Pulp & Paper units recovery of chemicals by installation of chemical recovery plant or utilization of black liquor with no discharge from pulp mill within 3 years

OR

Shift to waste paper for compliance of standards for BOD, COD, AOX. (as per steering committee decision, paper mill with pulping capacity upto **50 TPD** may install lignin recovery plants (LRP) by December 31, 2006 and chemical recovery plants (CRPs) by March 31, 2007.

Thus as SIL's paper unit has an agro based raw material pulping capacity of 40 TPD[6] thus it had an option[7] for either going for a Chemical Recovery Unit or a Lignin Recovery Unit. Also while the last date of installation of an LRP was December 31st 2006, SIL had voluntarily decided to go for a chemical reovery plant during their board meeting in September 2003 and purchase orders placed by November 2003. Thus SIL's initiative to recover caustic soda from waste liquor was a voluntary initiative to save energy and is not mandated by any enforced law, statute or other regulatory framework in India. The project proponent would go for registration to VCS board and the financial benefits accrued due to registration of the project under VCS, would hedge barriers elaborated in the following paragraphs:

Step 2: Implementation Barriers

Technical Barriers:

SIL is an agro based integrated paper manufacturing unit wherein wheat straw is being used as raw material for pulping and paper manufacturing and thus faces the following obstacles in soda recovery.

1. Silica is present in wheat straw. When wheat straw is pulped, the silica is dissolved into the black liquor. As the black liquor is concentrated in a evaporation system, some of the silica precipitates and deposits onto the evaporator heating surfaces, rapidly decreasing their capacity. The presence of silica in black liquor can also cause high black liquor viscosity, which limits the solids concentration that can be achieved during evaporation. High content of silica in raw material and thus in black liquor, results in frequent scaling of evaporator, and boiler.
2. The recovery boiler produces green liquor, a solution of sodium carbonate in water which is causticized with fresh lime (CaO) to produce white liquor, a solution of sodium hydroxide in water. In the causticizing process, the fresh lime is converted to lime mud (CaCO3). The presence of silica in the green liquor causes "settling" problems within the causticizing plant.
3. The lime which has been converted to lime mud ($CaCO_3$) would normally be reprocessed into fresh lime by "reburning" it in a lime kiln. At a wheat straw

[6] As mentioned in Consent of water act from Punjab Pollution Control Board, Patiala.
[7] Letter of implementation of charter on CREP to M/s Satia Paper Mills limited from Indian Agro & Recycled paper Mills Association.

mill, the high silica content in the lime mud makes it very difficult, if not possible, to reprocess the lime. The mud is typically taken to landfills and replaced with purchased lime.

4. High content of chloride in raw material and thus in black liquor results in scaling problems in evaporator and boiler. It causes problems in smelt flow in recovery boiler and poor causticizing in causticizing plant.

5. Black liquor of agro based pulp mill is highly viscous in nature which causes poor fluidity at high concentrations. Due to this, high concentration from evaporator can not be achieved; high concentration of black liquor causes frequent choking of flow pipes.

A case study article by the UNEP Working Group on cleaner Production in the Pulp and Paper Industries[8] also discusses the above mentioned technical difficulties associated with chemical recovery plants in pulp and paper mills.

Also a report from Central Pollution Control Board (CPCB) of India[9] states that most of the mills are not having a chemical recovery system, the major constraints being – small scale of operation, high capital investment and nature of black liquor.

Thus it clearly establishes the various technical constraints that the PP faces regarding the Project activity. The proponent could have easily continued with the more economical previous practice (as established below) with no technical difficulties and chose not to invest in the project activity at all. But considering the potential carbon funding revenues from the project the PP decided to go on with the project hoping that the funds would hedge the risk posed by the given technical barriers.

Investment Barrier

SIL was incurring losses in operations in recent years. High debt burden on company forced company to undergo restructuring of its debt under corporate debt restructuring scheme (CDR) and company's operations were reviewed regularly by monitoring committee (MC) which comprised of company bankers and financers. MC restructured existing debts due by the SIL and approved SIL's proposal of installing a chemical recovery plant but did not approve any fresh loans or financial grants to the project plant.

Also when the proponent made an attempt to procure the loans for the project from bank, the proposal was denied on account of the earlier high debt, previous credit defaults and unpromising financial returns from the project[10].

Even after such difficulties in arranging the funds for the project activity SIL gave a nod to this project activity considering the benefits that it may accrue

[8] http://www.p2pays.org/ref/10/09499.htm

[9] http://www.cpcb.nic.in/oldwebsite/New%20Item/images/chapter-1.pdf

[10] Please refer to the letter from Bank indicating the disapproval of the loan. The letter has been attached as enclosure.

upon the successful registration with VCS .Thus, the above discussion clearly illustrates the barriers associated with the project activity.

Comparison of Financial Indicators:

The project proponent has chosen to apply investment comparison analysis in order to establish additionality. In this option PP has chosen to compare levelized unit cost of Caustic Soda Production in terms of Rupees per tonnage of production. This is an appropriate choice as the product or level of service provided by the alternative selected and the project is same i.e. Caustic Soda to meet the requirement of paper plant, Thus a levelised cost comparison analysis would demonstrate the alternative via which cost of caustic soda generation/recovery is minimum. Therefore this option for investment comparison analysis is most suitable for the project type.

Apply investment comparison analysis

The unit cost of production (i.e. Levelized cost of caustic soda production in Rs per tonne) has been identified as the most suitable financial indicator for the project type and decision making context.

Calculation and comparison of financial indicators:

The unit cost of production (e.g. Levelized cost of caustic soda production in Rs per tonne) has been used for the main comparison.

Information & assumptions for Chemical Recovery levelized cost computation:

1. Capital Cost: Rs 2472 Lacs (Including Plant & machinery and Building & civil works, however Contingency, Margin money and preliminary expenses are not included).
2. Debt/Equity Ratio: 75:25
3. Debt details: loan rate 13.50%, 10 years tenure
4. Caustic soda Generation: 11550 tonnes/year
5. Cost of lime used: 2200 Rs/MT (As per purchase slips)
6. Cost of electricity consumed: 4.04 Rs/KWh
7. Cost of fuel oil consumed: 19.13 Rs/kg (As per purchase slips)

   Fuel oil is required to meet the thermal energy consumption by the recovery process.

Sl no.	Parameter	From Chemical Recovery Plant	Purhase from local Market	Remarks
1.	Levelized cost of	Rs. 17.905/kg	Rs. 17.072/kg	Caustic soda production using Chemical recovery

	Caustic Soda production			plant is not the most economical option available to SPML compared to purchasing from market.

Table 8: Levelised cost comparison

Thus as is clear from the above analysis caustic soda recovery from chemical recovery plant is not the most economical way available to the project proponent. And a levelized cost comparison with the baseline scenario (i.e. purchase from in- country caustic soda producing facilities) establishes that.

Step 3: Common Practice

In the beginning of the next decade (2011-2012) the Indian pulp and paper industry will be completing its two hundred years of its existence in India. Started with imported pulp, bamboo became the main source of paper making fibers subsequently after development of technology of pulp making from bamboo. Since then, the paper industry has made a gradual progress coupled with certain hiccups / setbacks in between as an impact of global & national economic & political conditions.

According to the recent statistics available, today the total number of pulp & paper mills in the country is estimated to be around 625[11] with total installed capacity of over 7.5 million tonnes which is likely to increase to 8.3 million tonnes by 2010 & over 14 million tonnes by the year 2020.

The Indian paper industry is generally classified broadly into following categories

Classification Basis		
Raw material Used	Scale of Operation	End products
Wood based Agro based Recycled Fiber based	Large (Above 24,000 tpa) Medium(Below 24,000 tpa) Small (10-600 tpd)	Writing & Printing, Newsprint, Rayon grade pulp Writing & Printing, Newsprint, Packaging paper etc Writing & Printing, Newsprint, Packaging paper etc

Table 9:Classification of India paper industry

[11] www.cpcb.nic.in/oldwebsite/New%20Item/images/chapter-1.pdf

The state wise distribution of Agro based mills in the country [12] is as indicated below:

State	No. of mills
Andhra Pradesh	18
Bihar	3
Chandigarh	1
Chattisgarh	5
Gujarat	6
Haryana	10
Himachal Pradesh	4
Karnataka	3
Madhya Pradesh	3
Maharashtra	28
Orissa	1
Pondicherry	1
Punjab	21
Rajasthan	1
Tamil Nadu	3
Uttar Pradesh	51
Uttaranchal	12
West Bengal	7

Table 10: Agro Based Paper mills in India

Since 200 years of the inception of the paper industry in the country none amongst these mills in Punjab (the state of project activity)has a similar conventional chemical recovery unit except for Satia. This is mainly due to the constraints like high capital investment, and nature of black liquor (i.e. high silica content, low solid, high viscosity etc).

The above discussion clearly highlights the prevailing practice regarding the provision of chemical recovery units in the region of the project activity. It can be very well deduced that the caustic soda recovery is not a usual practice in the region and thus always has an uncertainty associated with its successful operation.

[12] www.cpcb.nic.in/oldwebsite/New%20Item/images/chapter-1.pdf

3 Monitoring:

3.1 Title and reference of the VCS methodology (which includes the monitoring requirements) applied to the project activity and explanation of methodology choices:

Title: Monitoring Methodology for the category III M – Reduction in consumption of electricity by recovering soda from paper manufacturing *process*

Reference: 'Paragraph 10' as provided in III.M. of Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories.

The monitoring methodology is used in conjunction with the 'Approved Small Scale methodology AMS III.M., Version 02' (Reduction in consumption of electricity by recovering soda from paper manufacturing *process*). The same applicability conditions as in AMS III.M., Version 2 baseline apply.

The monitoring methodology requires monitoring of the following:

(a) Electricity consumption for manufacture of a unit quantity of caustic soda (specific energy consumption) during the crediting period. The monitoring process shall utilize any authentic published data or annual reports of the manufacturer. In case more than one manufacturer is supplying (direct or through dealers), weighted average calculations shall be done and result to be used in the baseline calculation. Ex-ante estimation using the most conservative data from a minimum of three recent historical three years shall be used in the project description;

(b) Quantity of caustic soda recovered per year;

(c) Annual average electricity consumption in the caustic soda recovery plant;

(d) Annual average fossil fuel and any auxiliary fuel used in the caustic soda recovery plant;

(e) The quantity of residues produced, portion of residue used for the production of lime and portion of residue that is disposed in a solid waste disposal site.

3.2 Monitoring, including estimation, modelling, measurement or calculation approaches:

SIL has implemented an operational and management structure in order to monitor emission reductions and any leakage effects, generated by the project. SIL has formed a VCU team/committee comprising of persons from relevant departments, which will be responsible for monitoring of all the parameters with regard to the project activity. The VCU team also comprises of a special group of operators who are assigned the responsibility of monitoring and record keeping of the parameters described in Section 3.3 of the PD. The monitoring reports are checked and discussed by the senior team member- manager of the CRP unit. In case of any irregularity observed by any of the operators, it is informed to the concerned

person for necessary actions. The operators archive the data on a daily basis which is compiled as a monthly report. On monthly basis, these reports are forwarded at the upper management level after a quality review by the CRP manager.

• **Purpose of monitoring:** In order to quantify the total soda recovered and energy consumed in the recovery and thus estimate the GHG emission reduction compared to energy spent in manufacturing soda by local manufacturers.

• **Types of data and information to be reported, including units of measurement:**

Electricity consumption for manufacturing one unit quantity of caustic soda (specific energy consumption) during the crediting period, Quantity of caustic soda recovered, average electricity consumption in the caustic soda recovery plant, Annual average fossil fuel and any auxiliary fuel used in the caustic soda recovery plant and the quantity of residues produced and portion of residue that is disposed in a solid waste disposal site.

• **Origin of the data:** Data is noted from the readings of plant log books.

• **Monitoring, including estimation, modelling, measurement or calculation approaches:** Monitoring includes measurement of total soda recovered by the plant and estimating the total energy reduced in the recovery than production of soda at local manufacturer's site.

• **Monitoring times and periods, considering the needs of intended users:** Daily monitoring of data and compilation in monthly reports

• **Monitoring roles and responsibilities:** As delineated in section 3.4

3.3 Data and parameters monitored / Selecting relevant GHG sources, sinks and reservoirs for monitoring or estimating GHG emissions and removals:

Describe each data and parameter using this table.

Data / Parameter:	**Quantity of soda**
Data unit:	Tonnes /annum
Description:	Quantity of soda recovered in the process
Source of data to be used:	Plant Records- Data records maintained at plant site
Value of data applied for the purpose of calculating expected emission reductions:	11550/ As per actuals
Description of measurement methods and procedures to be applied:	Data Type: Measured Monitoring Procedure: The volume of the soda recovered per day is measured through flow meter & GPL on daily basis. The strength of the soda recovered GPL) is calculated at the laboratory at the plant site. Monitoring Frequency: The volume of soda recovered are measured & recorded in log books in 8 hours shift basis & 24 hours basis

QA/QC procedures to be applied:	In order to ensure the highest levels of accuracy in the monitoring procedure the monitoring equipments are calibrated annually. Also the observed values are compiled to arrive at a consolidated value reported in the log books on a daily basis by the monitoring supervisors. The log book reported values are used to prepare reports on a monthly basis which are finally reviewed by the top management officials responsible for the monitoring procedures as mentioned in monitoring plan described section 3.3 of this document. The uncertainty level of the equipment used for the monitoring is ± 1%
Any comment:	This is used to calculate baseline as well as project emissions

Data / Parameter:	$\mathbf{E_{PT}}$
Data unit:	KWh/annum
Description:	Annual Electricity consumed to recover soda in recovery plant
Source of data to be used:	Plant Records- Data records maintained at plant site
Value of data applied for the purpose of calculating expected emission reductions:	9240000 kWh[13]
Description of measurement methods and procedures to be applied:	Data Type: Measured Monitoring Procedure: The parameter would be measured using the electronic energy meters installed at the plant location and the observed values are reported on a daily basis in the plant log books. Monitoring Frequency: Readings taken daily and compiled on a monthly basis
QA/QC procedures to be applied:	In order to ensure the highest levels of accuracy in the monitoring procedure the monitoring equipment will be calibrated annually. Also the observed values are compiled to arrive at a consolidated value reported in the log books on a daily basis by the monitoring supervisors. The log book reported values are then used to prepare reports on a monthly basis which are finally reviewed by the top management officials responsible for the monitoring

[13] Annual Electriicty consumed although monitored is not used in project emission calculations as energy requirement of the recovery plant is met by the power produced at the plant site from the renewable biomass fired power generation plant.

	procedures as mentioned in monitoring plan described section 3.4 of this document. The accuracy level of the electronic energy meters used is ±1%
Any comment:	This is used to calculate project emissions

Data / Parameter:	**E_{BT} (ex- post)**
Data unit:	Kwh/tonne
Description:	Annual Electricity consumed in producing 1 tonne of soda by the soda manufacturer during the crediting period.
Source of Data to be used :	Annual reports of the soda manufacturers or any other authentic published data.
Value of data applied for the purpose of calculating expected emission reductions:	2607 kWh/tonne
Description of measurement methods and procedures to be applied:	Data Type: Measured Monitoring Procedure: The details regarding the energy consumption in the production of soda by the chemical manufacturer will be procured from the manufacturer either through the published annual reports of the company or any other authentic published data. Monitoring Frequency: Annually
QA/QC procedures to be applied:	The energy consumption for the production of one tonne of soda would be procured directly form the manufacturer's annual report or from the authentic published data available.
Any comment:	The NEWNE grid emission factor has been taken into consideration for the baseline emissions as the NEWNE grid is the supplier of electricity for the soda manufacturers.

Data / Parameter:	**$Q_{ff,y}$**
Data unit:	Tonnes/annum
Description:	Quantity of fossil fuel (furnace oil) consumed for thermal energy in the recovery process
Source of data to be used:	Plant Records- Data records maintained at plant site
Value of data applied for the purpose of calculating expected emission reductions:	730 Tonnes per year
Description of measurement methods and procedures to be applied:	Data Type: Measured Monitoring Procedure: The quantity shall be measured using standard scales and the observed values will be reported in the plant log books on a daily basis and can be cross checked with the purchase records

	of Furnace oil. Monitoring Frequency: Readings taken daily and compiled on a monthly basis.
QA/QC procedures to be applied:	The scale with least count of 1mm is used for the measurement of the quantity would be calibrated annually to ensure the highest levels of accuracy in the monitoring. The quantity of furnace oil consumed can be cross checked with the Purchase orders of Furnace oil. The daily reading recorded by the shift supervisors are reported in the log books. The log book reported values are used to prepare reports on a monthly basis which are thoroughly reviewed by the top management officials responsible for the monitoring procedures as mentioned in monitoring plan described section 3.4 of this document.
Any comment:	To be used for Project emissions related to thermal energy consumption

Data / Parameter:	$\mathbf{EF_{ff,y}}$
Data unit:	Tonne CO_2/ tonne of fossil fuel(furnace oil)
Description:	Emission factor of the fossil fuel used for generating thermal energy
Source of data to be used:	IPCC Guideline 2006
Value of data applied for the purpose of calculating expected emission reductions:	3.13 Tonne CO_2/ tonne of fossil fuel(furnace oil)
Description of measurement methods and procedures to be applied:	Data Type: Estimated Monitoring Procedure: Default value as per IPCC. Value obtained from published sources Monitoring Frequency: Annually Archiving Procedure: Paper / Electronic
QA/QC procedures to be applied:	No QA/QC procedures are required as the data is obtained from published national/ IPCC sources
Any comment:	To be used for Project emissions related to thermal energy consumption

Data / Parameter:	$Q_{residue}$
Data unit:	Tonne
Description:	Quantity of residues produced from the recovery plant
Source of data to be used:	Data records maintained at plant site
Value of data applied for the purpose of calculating expected emission reductions:	As per actuals
Description of measurement	Data Type: Measured

methods and procedures to be applied:	Monitoring Procedure: The quantity of residues generated from the recovery unit would be monitored daily through weighbridge (by accounting for the moisture content) and the observed values would be reported in the log books on daily basis. Monitoring Frequency: Readings taken daily and compiled on a monthly basis
QA/QC procedures to be applied:	The equipment with uncertainty level of 3% used for the measurement of the quantity would be calibrated annually to ensure the highest levels of accuracy in the monitoring. The daily reading recorded by the shift supervisors are reported in the log books. The log book reported values are used to prepare reports on daily and monthly basis which are thoroughly reviewed by the top management officials responsible for the monitoring procedures as mentioned in monitoring plan described section 3.4 of this document.
Any comment:	

Data / Parameter:	**% residue used for the production of lime**
Data unit:	%
Description:	Portion of residue used for the production of lime.
Source of data to be used:	Plant records
Value of data applied for the purpose of calculating expected emission reductions:	Nil
Description of measurement methods and procedures to be applied:	No amount of residue generated from the project activity is used for the production of lime.
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	**% residue disposed off**
Data unit:	-
Description:	Portion of residue that is disposed in a solid waste disposal site
Source of data to be used:	Plant records
Value of data applied for the purpose of calculating expected emission reductions:	100% residue generated
Description of measurement methods and procedures to be applied:	The complete amount of the residue generated from the project plant is disposed off to fill the low lying areas at the project location.
QA/QC procedures to be applied:	The amount of the quantity of the residue disposed off will be

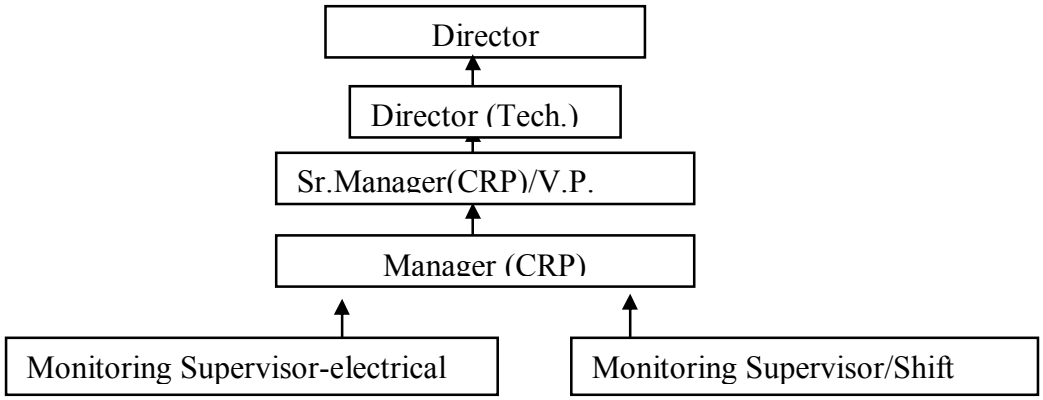
	reported in the daily log books which would be further used to generate the monthly reports and would be reviewed by the top management officials responsible for the monitoring procedures as outlines in section 3.3 of this document.
Any comment:	

3.4 Description of the monitoring plan

The parameters regarding the project activity which need to be monitored accurately are as described below:

- Quantity of Caustic Soda recovered in a year
- Electricity consumed in recovery plant
- Quantity of fossil fuel consumed in the year (if any)
- Emission factor of the fossil fuel used for generating thermal energy (if any)
- Electricity consumed in producing 1 ton of soda by the soda manufacturer annual average.
- Quantity of residues produced form the recovery plant
- Portion of residue used for the production of lime
- Portion of residue that is disposed in a solid waste disposal site.

The above stated parameters would be monitored regularly and the recoded values will be reported in the plant records. In order to ensure systematic and efficient monitoring of the parameters SIL has designed a team which would be responsible for the complete monitoring procedure to be followed.



The monitoring team at the shop floor level records the daily observations and report the same in the plant log books. The field data would be noted by the monitoring supervisors in the log books and then transformed into excel sheets or would be directly reported in the soft format. The daily reports would be sent to

the manager for his review. The manager would generate the monthly reports based on the daily reports received form the supervisors and would forward the monthly report to the senior manager for his perusal. The senior manager would review the report and will send the same to the technical director for his perusal. The technical director will finally send the report to the director of the company.

In order to ensure the highest levels of accuracy in the monitoring process, the instruments (such as energy meters) used for monitoring will be calibrated regularly as per the manufacturers' specifications , regular inspection of the plant reports will be made by the VCU monitoring team. Also regular internal audits would be conducted by teams comprising of technical experts and senior officials to inspect the log books, plant records etc. very critically and in cases of any discrepancies necessary corrective actions would be performed.

4 GHG Emission Reductions:

4.1 Explanation of methodological choice:

According to the methodology category AMS III.M is applicable under the following conditions:

This project category comprises of technology/measures for recovering caustic soda from waste black liquor generated in paper manufacturing. Production of caustic soda in traditional soda manufacturing processes requires more energy in comparison to recovery of equivalent amount of caustic soda.

Project activity involves commissioning of a chemical recovery plant wherein caustic soda will be recovered from waste liquor generated in paper manufacturing. The total installed capacity of this plant is 35 tons per day of recovered soda. Energy requirement for per ton of soda recovered is much lesser than what is required for manufacturing soda in a conventional plant.

Measures are limited to those that result in emission reduction of less than or equal to 60 ktCO2e annually.

The project activity results in the emission reduction of less than 60 ktCO2e annually which can be substantiated by the following emission reduction calculations shown further below in the section.

Also as per the methodology the baseline scenario is the situation where, in the absence of the project activity, caustic soda would be purchased from in-country production facilities or imported from a producing facility located in a Non-Annex 1 country.

This is also the case in the project where in the caustic soda was previously procured from local soda manufacturers (in-country production facilities).

The following Formulas have been used for estimating the Net Emission Reductions arising out of the project activity:

A. Baseline Emission Reductions:

Baseline Emissions

$$BE_y = Q_{rec,y} \times E_{BT} \times E_{FB}$$

where:

BE_y Baseline emissions (CO_2 emissions in absence of the project activity, tonne)

$Q_{rec,y}$ Quantity of soda recovered in the process (tonnes per annum)

E_{BT} Electricity consumed for producing 1 tonne of soda (KWh/tonne)

EF_B Emission factor of the electricity used for soda production (tCO_2/KWh)

E_{FB} = .80317 [14] $kgCO_2/kWh$

Calculating the combined margin emissions factor

It is calculated as the generation-weighted average emission factor (t CO_2/kWh) of a sample of power plants *m* of grid, as follows:

[14] The emission factor for the soda production in the baseline has been arrived at by taking the weighted average of the NEWNE grid emission factors according to the- CEA's Baseline Carbon Dioxide Emission Database Version 4.0 www.cea.nic.in .The calculations have been provided in emission reduction excel sheet.

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

Where:

$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor in year y (tCO_2/kWh)
$EF_{grid,OM,y}$	=	Operating margin CO_2 emission factor in year y (tCO_2/kWh)
w_{OM}	=	Weighting of operating margin emissions factor (%)
w_{BM}	=	Weighting of build margin emissions factor (%)

where the weights **w_{OM}** and **w_{BM}**, by default, are 50% (i.e., W_{OM} = W_{BM} = 0.5)

$$BE_y = EF_y \times EG_y$$

Where

BE_y: Baseline emissions due to displacement of electricity during the year y (tCO_2)

EG_y: Net quantity of electricity generated by the project activity during the year y (kWh)

EF_y: CO_2 baseline emission factor for the electricity displaced due to the project activity (tCO_2/kWh) = $EF_{grid,CM,y}$

The estimation of ex-ante emission factor has been done as per the methodology describe above. As per the Carbon Dioxide Emission Factor database, **version 4.0, given by CEA,** a statutory body under the Ministry of Power, the ex – ante emission factor for the Grid is the following:

Simple Operating Margin (kg CO2 /KWh)	**2005-06**	**2006-07**	**2007-08**	**Weighted Average**
	1.0195	1.0083	0.9992	1.0086
Build Margin (kg CO2 /KWh)	0.5977			
Combined Margin (kg CO2 /KWh)	0.80317			

Table 11: Grid Emission Factor Calculation

$Q_{rec,y}$ = 11550 tonnes

E_{FB} = .0080336 [15] $kgCO_2/kWh$

E_{BT} = (2671+2563+2587)/3 = 2607 KWh/tonne

BE_y = .0080317*11550*2607

= 24184 tCO_2

Project Emissions

$PE_y = PE_{y,electrical} + PE_{y,thermal}$

$PE_{y,electrical} = Q_{rec,y} \times E_{PT} \times E_{FP}$

where

PE_y Project activity emissions in the year "y" (tonnes of CO_2 eq)

$Q_{rec,y}$ Quantity of soda recovered in year "y" (tonnes)

E_{PT} Electricity consumed for recovering 1 tonne of soda (kwh/tonne of NaOH)

EF_P Emission factor of the electricity used for recovering soda (tCO_2/KWh)

The project activity consumes 800 KWh of energy for the recovery of 1 ton of soda. Since this requirement of the recovery plant would be met by the power produced at the plant site from the biomass fired power generation plant. , the emission due to this consumption is not being considered in project emissions.

Thus , $PE_{y,electrical}$ = 0

$PE_{y,thermal} = Q_{ff,y} \times E_{ff,y}$

where

$PE_{y\ thermal}$ Emissions due to thermal energy consumption by the recovery process (tCO2 e)

$Q_{ff,y}$ Quantity of fossil fuel consumed for thermal energy in the recovery process in year "y" (tonnes)

$EF_{ff,y}$ Emission factor for the fossil fuel (furnace oil) used(tCO_2/tonne)

$Q_{ff,,y}$ = 730 tonnes.

$EF_{ff,y}$ = 3.1269[16] tCo2/tonne fuel

The Emission factor of fuel oil has been taken up as per IPCC 2006 database.

$PE_{y,thermal}$ = 730 X 3.13

= 2282 t CO_2

[15] The emission factor for the soda production in the baseline has been arrived at by taking the weighted average of the NEWNE grid emission factors according to the- CEA's Baseline Carbon Dioxide Emission Database Version 4.0 www.cea.nic.in .The calculations have been provided in emission reduction excel sheet.

[16] IPCC 2006 Database

PE_{total} = 0 + 2283

= 2283 tCO_2

Leakage

1) If the caustic soda recovery equipment is transferred from another activity or if the existing equipment is transferred to another activity.
Explanation: The caustic soda recovery equipment is transferred from the ITC Paperboards & Speciality Papers Division where it has been replaced by chemical recovery plant of 600 Tons solids per day. Thus no leakage is applicable in this case.
2) If a quantity of the residue is used in producing lime (CaO) in a facility outside the boundary then CO2 emissions from the production of lime shall be considered as leakage to conservatively estimate emission reductions.
Explanation: The quantity of residues produced would be monitored by the PP and would be disposed off in a solid waste disposal site and thus would not be used for producing lime CaO within the project boundary or outside of it. Thus no leakage calculation is applicable in this case as well.

4.2 Quantifying GHG emissions and/or removals for the baseline scenario:

Crediting Year	Emission Factor tCO2/KWh (A)	Electricity consumed for producing 1 tonne of soda (KWh/tonne) (B)	Quantity of soda recovered in the process (tonnes per annum) (C)	Baseline Emissions tCO2 (D)= (A)*(B)*(C)
2006-2007	0.00080317	2607	11550	24184
2007-2008	0.00080317	2607	11550	24184
2008-2009	0.00080317	2607	11550	24184
2009-2010	0.00080317	2607	11550	24184
2010-2011	0.00080317	2607	11550	24184
2011-2012	0.00080317	2607	11550	24184
2012-2013	0.00080317	2607	11550	24184
2013-2014	0.00080317	2607	11550	24184
2014-2015	0.00080317	2607	11550	24184
2015-2016	0.00080317	2607	11550	24184

Table 12: Table for Baseline Emission

4.3 Quantifying GHG emissions and/or removals for the project:

Project Emissions:

$PE_y = PE_{y,electrical} + PE_{y,thermal}$

As $PE_{y,electrical} = 0$

$PE_y = PE_{y,thermal}$

Crediting Year	Emission Factor tCO2/tonne (A)	Quantity of fossil fuel consumed for thermal energy in the recovery process (tonnes) (B)	Project Emissions tCO2 (D)= (A)*(B)
2006-2007	3.13	730	2282
2007-2008	3.13	730	2282
2008-2009	3.13	730	2282
2009-2010	3.13	730	2282
2010-2011	3.13	730	2282
2011-2012	3.13	730	2282
2012-2013	3.13	730	2282
2013-2014	3.13	730	2282
2014-2015	3.13	730	2282
2015-2016	3.13	730	2282

Table 13:Table for project emissions

4.4 Quantifying GHG emission reductions and removal enhancements for the GHG project:

Year	Baseline Emission factor (kg CO_2/kWh)	Baseline emissions tCO_2 e	Project emissions tCO_2 e	Leakage emissions tCO_2 e	Emission Reductions tCO_2 e
2006-2007	0.00080317	24184	2282	0	21902
2007-2008	0.00080317	24184	2282	0	21902
2008-2009	0.00080317	24184	2282	0	21902
2009-2010	0.00080317	24184	2282	0	21902
2010-2011	0.00080317	24184	2282	0	21902
2011-2012	0.00080317	24184	2282	0	21902
2012-2013	0.00080317	24184	2282	0	21902
2013-2014	0.00080317	24184	2282	0	21902
2014-2015	0.00080317	24184	2282	0	21902
2015-2016	0.00080317	24184	2282	0	21902
TOTAL		241840	22820	0	219020

Table 14: Emission Reduction Calculation

5 Environmental Impact:

The project activity does not fall under the purview of Environment Impact Assessment notification[17] S.O. 60 (E) of the Ministry of Environment and Forest, Government of India since it is not listed in schedule-I of notification.

The project activity has obtained the consent to operate from state pollution control board in form of "No Objection certificate" for establishing the project activity. Following impacts have been identified by SIL on various environmental attributes due to the project plant.

Land

Since the project has been implemented within the premises of SIL no additional land was procured. Therefore, the issues like rehabilitation, change in land use pattern, ecological imbalance were not considered while evaluating impacts of the project on land environment.

Air

During construction phase of the project activity there has been an increase in the concentration of suspended particles in the atmosphere, which is a temporary impact. Overall impact of the project activity on air environment is positive because caustic soda recovery will eventually result in GHG emission reductions.

[17] Environment Impact Assessment Notifications.O.60(E), http://envfor.nic.in/legis/eia/so-60(e).html

6 Stakeholders comments:

The various stakeholders identified for the project activity are as follows:

1. Local Community
2. Employees of the plant.
3. Members of the gram panchayat.
4. State Pollution Control Board.

The SIL convened a formal stakeholder consultation meeting on 06/10/2003 inviting the identified stakeholders of the project activity through a formal invitation. The meeting was attended by 10 individuals.

The meeting started with a welcome note form the director, SIL. Thereafter the representatives from SIL presented the salient features of their project activity, the environmental and social impacts of the project activity on the stakeholders, apprised the stakeholders of the green houses gases, the global warming and the role of VCS to curb the GHG emissions from the environment. In the end, the stakeholders were requested to raise their concerns (if any) regarding the project activity by SIL.

State Pollution Control Board was also informed about the project activity and its consent has been received in the form of "No Objection Certificate".

Summary of the comments received:

The stakeholders were very appreciative about the project activity. Some individuals were particularly quite interested about the benefits that could be reaped out of the project activity in terms of environmental benefits, generation of employment opportunities due to the upcoming project activity. Summing up, no serious comments were received from the stakeholders. The State Pollution Control Board has also given the No Objection Certificate (NOC) for the project activity.

7 Schedule:

Start date of project: **02 March 2006**

Start date of crediting period: 28th March 2006

Monitoring Period: **28th March 2006** to **28th March 2016** (Both days included)

Chronological Plan for the project:

Sr.#	Activity	Date
1.	SPM's letter no.169 to PPCB	20.06.2003

2.	Board Resolution	04.09.2003
3.	First Offer for CRP	30.09.2003
4.	Loan applied with PNB	06.11.2003
5.	Soda Recovery Boiler offer from SPM	13.11.2003
6.	Letter from IFCI imposing condition on procurement of fresh loan	08.12.2003
7.	Loan Refusal Letter from PNB	11.02.2004
8.	Letter to PNB for reconsideration of CDM benefits	13.02.2004
9.	Final Refusal by PNB	16.02.2004
10.	Quotation received for dismantling and loading of 150 TPH CRP	26.06.2004
11.	Work order for dismantling and loading of CRP	28.06.2004
12.	Sale confirmation by ITC	03.06.2004
13.	First offer for Re-Causticizing Plant	22.07.2004
14.	Revised offer for Re-causticizing plant	06.08.2004
15.	Quotation for transportation of materials	14.09.2004
16.	LOI for ESP of CRP boiler	09.10.2004
17.	Final offer for ESP of CRP boiler	29.11.2004
18.	Final offer for Re-Causticizing Plant	23.02.2005
19.	Agreement with E & Y	24.04.2006
20.	Letter for implementation of CREP	20.07.2006
21.	Project Commissioned	02.03.2006

Frequency of monitoring: Daily reporting of data.

Frequency of reporting: Monthly reporting of data.

Reporting period: **28th March 2006** to **28th March 2016**

8 Ownership:

8.1 Proof of Title:

An undertaking by the project proponent as proof of ownership of the plant will be submitted as an evidence of Title of the project activity.

8.2 Projects that reduce GHG emissions from activities that participate in an emissions trading program (if applicable):

Project proponents of projects that reduce GHG emissions from activities are not included in an emissions trading Program; nor are they a part of jurisdiction or sector in which binding limits are established on GHG emissions.