CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 02 - in effect as of: 1 July 2004)

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Annexes

SECTION A. General description of project activity

A.1 Title of the project activity:

CECL's Natural Gas based Engine Fired Captive Power plant in Tamilnadu, India

A.2. Description of the project activity:

The purpose of the project activity is to set up a Natural Gas based Engine fired captive Power Plant at Ramanathapuram and export power to the cement plants of The India Cements Ltd, a cement manufacturer in southern India, utilising Tamilnadu state power grid. This power plant, operating on cleaner fuel viz. Natural Gas will lead to lower Carbon Dioxide (GHG) emissions, producing equivalent amount of power as compared to the other power plants operating on other fuels such as coal/ oil/ naphtha. The project will increase the installed electricity generating capacity of Tamilnadu State, thereby helping in bridging the gap between demand and supply of electrical energy in the state.

The power generated by Coromandel Electric Company Ltd. (CECL) will substitute equivalent quantum of power generated and supplied to the Tamil Nadu Electricity Board (TNEB) grid by other sources; such power is predominantly generated using coal as fuel. This power generated by CECL is wheeled to the cement manufacturing facilities of The India Cements Ltd. (ICL). Since the Carbon Dioxide (CO_2) emission due to combustion of Natural Gas is substantially less as compared to combustion of coal or Naphtha, the project helps in reducing GHG emission.

Power generation in India is highly dependent on "Coal" as fuel. Thermal Power Plants are the major consumers of Coal in India, and yet the basic power needs of a large section of society are not being met. The forecast on power and energy demand (normal and peak) and the energy consumption statistics are routinely based on installed capacity, proposed additions, projected plant availability and PLF, T&D losses as well as estimated energy consumption of various types of consumers. However, in the actual scenario the situation is ever changing and past records show that there has always been a deficit in availability of energy at the consumer end throughout the year.

The power sector in India is going through a transition phase involving reorganization and restructuring of the Electricity Boards, formulation of policies to encourage private sector investment in generation, transmissions and distributions, creation of state Energy Regulatory Commissions (ERCs), enactment of Indian Electricity Act 2003 to replace the old Indian electricity acts etc. In such a state of transition, a realistic assessment of the power and energy demand to arrive at new investment decisions on large power projects is of paramount importance. The present laws and regulations covering electricity sector permit electricity generators to wheel the power for captive use through existing grid transmission infrastructure. This offers wide variety of choices for captive power plant location, choice of technology and fuel.

The proposed power plant at Ramanthapuram is intended for captive generation that is intended to meet the power requirement of The Indian Cements Ltd.

Coromandel Electric Company Ltd. (CECL), is a Special Purpose Vehicle of The India Cements Ltd. and KSK Energy Ventures Ltd. CECL is setting up a 25MW, Natural Gas based power plant. The company has a natural gas allocation from GAIL India Ltd. to the tune of 120,000 SCM/day. The project will use

Gas Engine Technology to generate power. The entire power from the project shall be consumed by the cement plants of The India Cements Ltd. The power plant is located at Valantharavai village of Ramanathapuram District in Tamilnadu. The company has purchased 9 acres of land in the village. The company has also conducted an Environmental Impact Assessment study, to identify the effects of the project on the surrounding environment. All the project clearances, including necessary clearance from Tamilnadu Pollution Control Board, have been obtained. The company has placed orders for 3 x 20V 34SG engines to Wartsila Oy, Finland. **The first phase of 17.46 MW has entered into commercial operations is November 2004**. CECL has executed a power purchase agreement with The India Cements Ltd., for a period of 10 years from the date of entry into commercial operations.

The project activity meets several objectives including:

- Contribution towards marginally meeting the electricity supply deficit in Tamil Nadu;
- Reduction of GhG emissions and effluent generation during power generation, and avoid solid waste (fly ash) generation (if coal was used instead);
- Avoiding use of higher GHG intensive fuel such as coal; and
- Encouraging developments in the local economy

A.3. Project participants:

KSK is a project developer and Asset Management Company located at Hyderabad, in India. It has specialized in project development and implementation, mainly in the power sector. The company has also promoted the country's first private power equity fund which has at present a corpus of about Rs. 231.00 crores subscribed to by financial institutions and banks. KSK has promoted both as strategic investor and project developer, three power projects viz., Kasargod Power Corporation Limited (KGPCL-21.178 MW) in Kerala, MMS Power Private Limited (MMS11.9MW) in Tamil Nadu and RVK Energy Private Limited (RVK-20MW) in Andhra Pradesh.

Coromandal Electricty Company Ltd. (CECL) is a company promoted by KSK Energy Ventures Ltd. (KSK) and The India Cements Ltd. (ICL) as a special purpose vehicle (SPV) to set up 25MW gross capacity Natural Gas based Captive Power Plant. ICL acquired a license in the name of CECL under section 44 of Electricity Supply Act, 1948 for the above power plant for generation of power for captive use by any of its group companies. CECL is acting as a captive power plant and supplying the electricity through TNEB grid to the three plants of ICL located at Sankamagar, near Tirunelveli, Dalavoi, near Vridhachalam and Sankari near Salem, all in Tamilnadu. Depending on demand and supply, CECL may also supply power to other users connected to the Tamilnadu Grid.

The plant is located in village Valantharavai, Ramanathapuram district, in the state of Tamilnadu. CECL has already entered into a gas supply contract with GAIL India Ltd for the supply of natural gas to the extent of 120,000 SCMD. The natural gas is being supplied from ONGC's (Oil and Natural Gas Corporation of India) Perumgulam gas field in Ramanathapuram district.

PricewaterhouseCoopers (P) Ltd. (PwC) is assisting the project sponsor in developing the Project Design Document (PDD) and will also assist in the defence of the PDD during Host Government Approval and validation procedure. PwC, formed by the global merger of Price Waterhouse and Coopers & Lybrand in 1998, is the world's largest financial and professional services organisation with 125,000 people in 142 countries and 867 offices worldwide. The contact information of project participants has been provided in Annex 1.

Many other entities from Parties included in Annex I countries can join as project participants. However, no public funding from such Parties or entities will be involved in the project activity. The list of such participants will be provided before the project is submitted for registration.

KSK Energy Ventures Ltd. shall be the principal contact for the CDM project activity.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

Government of India.

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

Tamil Nadu.

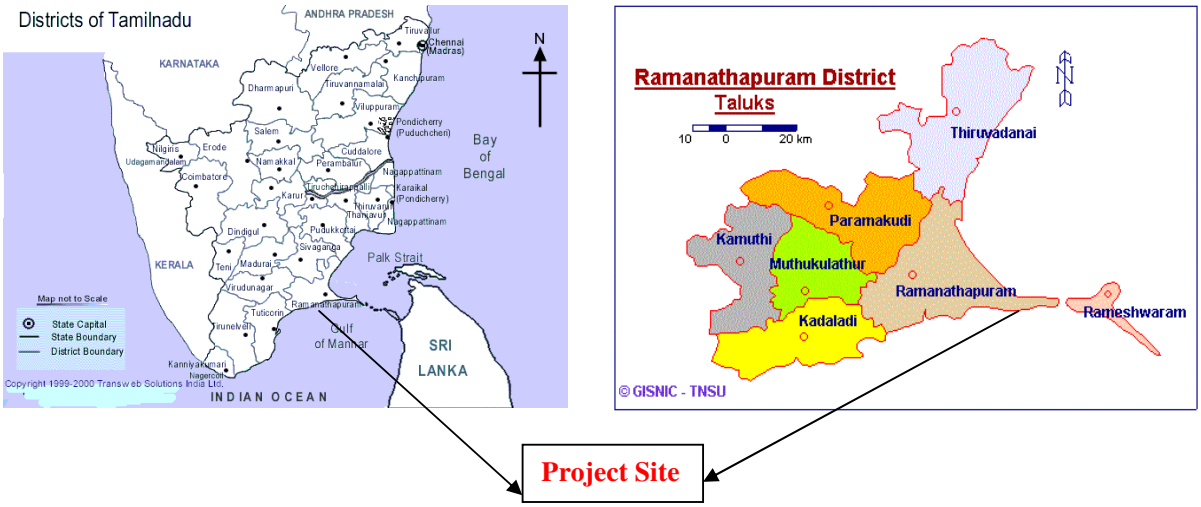
A.4.1.3. City/Town/Community etc:

Valantharavai village; Ramanathapuram District

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity:

The plant is located in village Valantharavai, Ramanathapuram district, in the state of Tamilnadu. CECL has already entered into a gas supply contract with GAIL India Ltd for the supply of natural gas to the extent of 120,000 SCMD. The natural gas is being supplied from ONGC's (Oil and Natural Gas Corporation of India) Perumgulam gas field in Ramanathapuram district. The pipeline length is about 5 km. The power generated by CECL is being evacuated at the TNEB's Perangulam substation.

The site has been selected taking into consideration the geological suitability for setting up a power plant, proximity to rail/road facilities, availability of fuel/water, transmission facility and environmental aspects. The company has conducted geo-technical study of the soil and has found that the site is suitable for proposed construction of the plant. The company has also conducted an Environmental Impact Assessment study to identify the effects of the project on the surrounding environment. It is found that the project does not have any adverse economic impact on the surrounding area as it does not involve any eviction and thus no rehabilitation is required. A location of the proposed project is shown in the accompanying diagram below.



A.4.2. Category (ies) of project activity:

As per the scope of the project activity enlisted in the 'list of sectoral scopes and approved baseline and monitoring methodologies (version 02/28.11.03)', the project activity may principally be categorized in Scope Number 1, Sectoral Scope - Energy industries (renewable/ non-renewable sources).

A.4.3. Technology to be employed by the project activity:

CECL is setting up 25 MW power plant in two phases, using Natural Gas as fuel, based on Reciprocating Engine Mechanism. In the plant, the incoming fuel, Natural gas supplied by GAIL, is burnt and this ignition gives out energy, which drives a piston inside a cylinder, thereby causing a reciprocating motion, which is converted into rotary motion by other mechanical devices. The rotary motion drives a rotor in the alternator, where electric energy is generated. This energy is transferred from 11kV to 110kV by a step up transformer, from where it is transferred to the Tamilnadu electricity grid using the switchyard equipment. A total of two gas fired 4-stroke engine generator sets have been deployed for electricity generation in Phase 1.

CECL power generation plant would be a completely natural gas based engine power plant utilizing approximately 0.12 metric million standard cubic metres per day (MMSCMD) or 37.23 million cubic metres (MCM) per annum. This is based on average gross calorific value (GCV)[1] of the supplied NG that is expected to be 10,000 kCal/SCM (as per project contract documents) at average gross heat rate of 2,038 kCal/kWh.

[1] Range: 9,350 – 10,516 kCal/SM^3.

A.4.4. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed CDM project activity, including why the emission reductions would not occur in the absence of the proposed project activity, taking into account national and/or sectoral policies and circumstances:

The KSK Energy Ventures Ltd. proposed to utilize natural gas, a comparatively less GHG intensive fuel compared to other fossil fuels like coal, etc., resulting in reduction of anthropogenic emission of GHGs. There is no legal requirement for any independent power producer (IPP) in India, to choose natural gas in preference to higher GHG intensive fuels like coal. The KSK Energy Ventures Ltd. has a clear mandate from the Tamilnadu state government to use any fuel including NG, LNG and coal. In the absence of the project activity, the following could have happened:

1. The company would have kept sourcing its requirement from the grid or kept burning Diesel, which is not only costly, but also more polluting than Natural Gas and
2. The Demand-supply gap would have remained and the demand would continue to have been met using small diesel based power generators.
3. The captive plant using coal as fuel could have been set up at the site of India cements
4. The captive plant using coal as fuel could have been set up at the pit head

In all the options mentioned above, the GHG emissions will be more than the project option.

A.4.4.1. Estimated amount of emission reductions over the chosen crediting period:

- Annual emissions reductions will be 62,682 tCO_{2e} for all years except for the year 2005 when it would be 10,447 tCO_{2e}.
- Total emissions reductions for crediting period of project - 5,74,585 tCO_{2e}.

A.4.5. Public funding of the project activity:

The total project cost, adopting an interest rate @ 12% p.a. on loan amount of the cost the capital project cost, works out to Rs. 505.88 million i.e. Rs.28 million /MW for Phase 1. The total project cost is funded through equity investment and debt (long-term) from nationalised banks in India. The funding details for the project are provided below.

- **Equity Investment:** Rs. 150 million by KSK Energy Venture Ltd. and associates (India cements).
- **Debt (LT Loans @ 12% p.a.):** State bank of India (Rs.150 million); India Overseas Bank (Rs.150 million) and Andhra Bank (Rs.50 million)

No public funding is currently planned for the project activity, and if at all required in the future, this will not involve any Official Development Assistance (ODA) or public funding from Parties included in Annex I. Hence, no diversion of ODA will result due to the project activity.

SECTION B. Application of a baseline methodology

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

In the absence of an approved baseline methodology for the project activity, the new methodology is called "CECL methodology for power generation plants for captive use, which is grid connected, using non-renewable and less GHG intensive fuels".

B.1.1. Justification of the choice of the methodology and why it is applicable to the project activity:

The conditions for applicability of methodology and their fulfilment in this proposed activity is as below:

- *power generation is through a non-renewable and less GHG intensive fuel* – the fuel used in the project activity is natural gas;

- *power generation is for captive use and the grid is used for wheeling the power* – the captive user of the electricity generated is The India Cements Ltd., and is being wheeled through the Tamil Nadu Electricity Board (TNEB) grid;

- *the fuel used for generating the power is not the only choice permitted by applicable regulations* – Power sector policies in Tamil Nadu state or in India do not mandate the use natural gas only as the fuel for power generation.

- *the user of power is clearly identified throughout the crediting period* – The India Cements Ltd. will be the sole consumer of the power generated in the project activity, throughout the crediting period;

- *the user of power was drawing electricity from the grid before the CDM project activity* – prior to the project activity, The India Cements Ltd., had been using power from the grid;

- *the capacity of captive power generation plant is less than 60MW altogether* – the power plant capacity is 25 MW only; and

- *the power produced by the CDM project activity has an insignificant impact on the supply deficit of the grid* - At present, the firm power availability form all sources in TN is only 5,702.5MW whereas estimated peak demand is 7,573 MW as per 16th Power Survey, leaving a gap of more than 1870.5MW between peak demand and firm supply. Part of the gap is met by importing power from Eastern States or if and when power is available from Hydel Projects and windmill projects.
  The estimated additional availability of power to TNEB from all ongoing projects in TN listed is 993MW, after deducing auxiliary consumption. The total firm power availability in 2006-07 from all ongoing projects and presently installed capacity is expected to be 6,695.5MW.

  The estimated power demand in 2006-07 is 8,847MW. This would mean that in the year 2006-07 there would be a shortfall of 2,151.5MW of firm power, even if all the projects presently under execution or planned are commissioned in 10th Five Year plan. To meet this demand of 2,151.5 MW additional power generation capacity of over 2733MW is required to be installed or power has to be imported from other states.

B.2. Description of how the methodology is applied in the context of the project activity:

A. Did the project activity start after 1 January, 2000 and before 31December, 2005?

The construction for project activity started in April 2004 and power production of first phase started from November 2004. The expansion phase of 8.73 MW will be commissioned by May 2005. The documents providing evidence of the same will be shared with the Designated Operating Entity (DOE). In a board resolution, CECL referred to availing the benefits of Clean Development Mechanism (CDM) to overcome the disadvantages of generation cost of electricity using natural gas, which is Rs.2.54 per KWH, and which is marginally higher than cost of power using coal and locating power plant at the pit head. The resolution is supported by an internal assessment of all fuel/ locational options.

Hence, the project activity internalised the CDM benefits in its project decision.

B. Is this Project not mandated under law?

The selection of natural gas as fuel for the power plant is an internal decision by the board members of CECL and the KSK (project proponent). The Electricity Act 2003 does not restrict or empower any other authority to restrict the fuel choice for power generation. The draft National Electricity Policy (revised in August 2004) asserts 'coal would necessarily continue to remain the major fuel' and 'use of gas as a fuel for generation would depend upon its availability at reasonable prices' The applicable environmental regulations do not restrict the choice of fuel for generation units located anywhere in the state of Tamil Nadu or any other part of India. CECL had an allotment of 120,000 scm/day of natural gas from GAIL.

The project activity is not mandated under the law.

C. Determine IRR of the project or cost comparison of power with at least one (or more, if applicable) plausible alternatives for the project

The chosen alternative to the project is, generating power using imported coal, as the domestic coal price is much higher than the imported one considering the transport of coal from more than 1,500 km, and also has the low net calorific value and more ash content. Therefore, imported coal is the most challenging alternative option for this project. But, the project proponent opted for the less attractive project option keeping in view the CDM revenue. From the project selection point of view, imported coal based plan was the most attractive.

There is at least one project option permitted by laws/regulations that is more attractive for investment in the project activity.

D. Are there many gas-based projects implemented recently without CDM benefit? (Common practice)

There are some gas-based power plants in India that have been commissioned without CDM benefit. However, these have not been performing profitably and consistently due to high generation costs, which have made such projects uncommon in the current and future perspective. During the last three years 4 new power plants using LNG/ CNG have come into operation accounting for about 400 MW of generation capacity in the state. It is our understanding that many of these have internalised CDM

benefits. In Tamil Nadu, most of the gas-based power plants have run into operational difficulties on account of erratic supply of natural gas in the region.

There are not many successful instances of natural gas based power generation projects for equivalent capacities, in the region.

E. Barriers in the project activity

E.1 Is the project less attractive financially for any other factor besides IRR? e.g. factors contributing to less likely returns on equity?

- The project has adopted some elements of technology, which are for the first time in India for gas-based power projects. Radiator cooling system is one of them, which reduces the water requirement for cooling to the minimum level. Use of radiator cooling system adversely affects the output of the engine; basically it de-rates the performance curve. Therefore, the operating cost becomes high for this type of machines. But the project proponents opt for this option only to reduce the environmental impact of the system and also to qualify for CER generation. Thus the project crosses the financial and investment risk barrier to qualify as a CDM project.

- Also the fuel price variability has resulted in a number of other similar projects to cancel or alter plans/ projects or perform below expectations. The project had to cross the barrier related to perception of risk of price variability and fuel availability.

- The project is primarily going to supply power to India Cements Ltd., which is going through challenging financial period. KSK took the investment risk into the Coromandel Electric Corporation Ltd., considering this major investment hindrance.

- In addition, KSK chose to invest in the project with gas as fuel, considering that the CDM revenues from the projects will make the project more attractive as compared to the cheaper alternative of an Imported Coal based plant. In case, the off-take by India Cements stops, the project shall supply power to the alternate buyers. However till the time KSK can find an alternate buyer, the company will supply power to the grid only at the Fuel Cost, ie the cost of natural gas only.

E.2 Does the project face any technology barrier?

- The project has adopted some elements of technology, which are for the first time in India for gas-based power projects. Due to this, the operation and maintenance availability of spares could be a problem that needs to be resolved.

- The 20V34SG gas engines, supplied by Wartsila Finland, are yet to be tried out in India. Till date only 3 engines have been supplied – one to Chemplast Sanmar Ltd., and two to Coromandel Electric Corporation Ltd. No other data on operations, reliability is available till date, on their operations in India. The life can be prolonged to some extent only by refurbishment, and preventive repairs (which is highly specialised work and requires overseas experts). The refurbishment work also is possible by sending parts outside the country from time to time. The operation and maintenance also requires highly specialised training that has to be taken from the suppliers of the equipment.

E.3 Prevalence

- Use of natural gas in power production is not common.

- Location of captive power plant far away from the location of demand is uncommon.

E.4 Other Barriers

- The gas supply by GAIL India Ltd., the gas marketing agency in India, is a one sided contract, with no commitment on the part of GAIL to make available the contracted capacity of gas.

- As per the recent reports, the gas availability from the Oil & Natural Gas Corporation of India's explorations in the Kuttalam Region of Tamilnadu has substantially come down, putting in dangle the gas supplies to a gas engine based power plant in the region (Source: Infraline News item dt. 26th June 2004).

The project activity has overcome a number of barriers.

The above analysis clearly demonstrates that the project is additional.

Step 2 Selection of baseline grid(s)

The Electricity Act 2003 and Draft National Electricity policy (Revised in 2004) allows for transfer and procurement of power from any two locators in the country. Since at present there are physical, infrastructure and access limitations on transfer of power and also the capacity of the project is very less to impact the national grid, the Tamil Nadu State Grid has been selected as the baseline grid. Also, the state of Tamil Nadu administers the supply and demand situation, within the state and location of generation and use within the state.

Step 3 Calculation of carbon intensity of the selected grid(s)

Carbon intensity of the selected grid is calculated as an average of carbon intensity in the power generators in the operating margin and build margin. Since the size of the project is rather small to have any significant bearing on the load dispatch, an average operating margin has been selected in the combined margin calculations for the baseline. The plants in the operating margin are selected as all the operating plants. The build margin is the cohort of five power plants that have been built most recently (including plants under construction).

The following steps will be followed for calculating carbon intensity:

- Determine set of plants in the operating and build margins. The set of plants in the operating margin are selected based on ratio of annual despatched power and the design despatch.

- The set of plants in the build margin are either:

  - ✓ Five power plants that have been built most recently [including plants under construction], or

  - ✓ Power plants capacity additions in the electricity system that comprise 20% of the system generation and that have been built most recently [including plants under construction].

- Compute the GHG intensity (tCO_2/GWh) of the power generated by the generators in the operating margin and build margin- which constitutes the baseline.

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 CDM project activity:

The power plant uses natural gas as the fuel for power generation in an engine fired captive power plant. The natural gas is considered as a 'cleaner source' of thermal energy, with low carbon intensity as compared to coal (one of the most commonly used GHG intensive fuel in the power plants in Tamil Nadu) due to the following primary reasons:

- Substantial amount of heat is generated from combustion of hydrogen in natural gas as compared to coal, forming water as combustion product, which is not harmful to the environment.

- The atomization of fuel is better during combustion as compared to coal, as the gas molecules get rigorously mixed with air molecules providing oxygen for combustion. This helps in reduction of the 'flame temperature', consequently reducing the NOx, and reducing flue gas losses.

- The incombustibles (e.g. ash) in natural gas are negligible as compared to coal.

- The emission factors of coal (as lignite) and NG as per the Intergovernmental Panel for Climate Change (IPCC) are 0.1012 and 0.0561 (kTonnes CO_2/ TeraJoules), respectively. It is evident that coal is 80% higher CO2 emitting source than natural gas for the generation of equivalent amount of energy.

Without the proposed project activity, the equivalent measure of electricity would have been generated by the operating power plant in the margin and the recently constructed/ under construction grid connected power plants, and the carbon intensity on the average is higher than that of the proposed project activity. Hence the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the project activity.

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

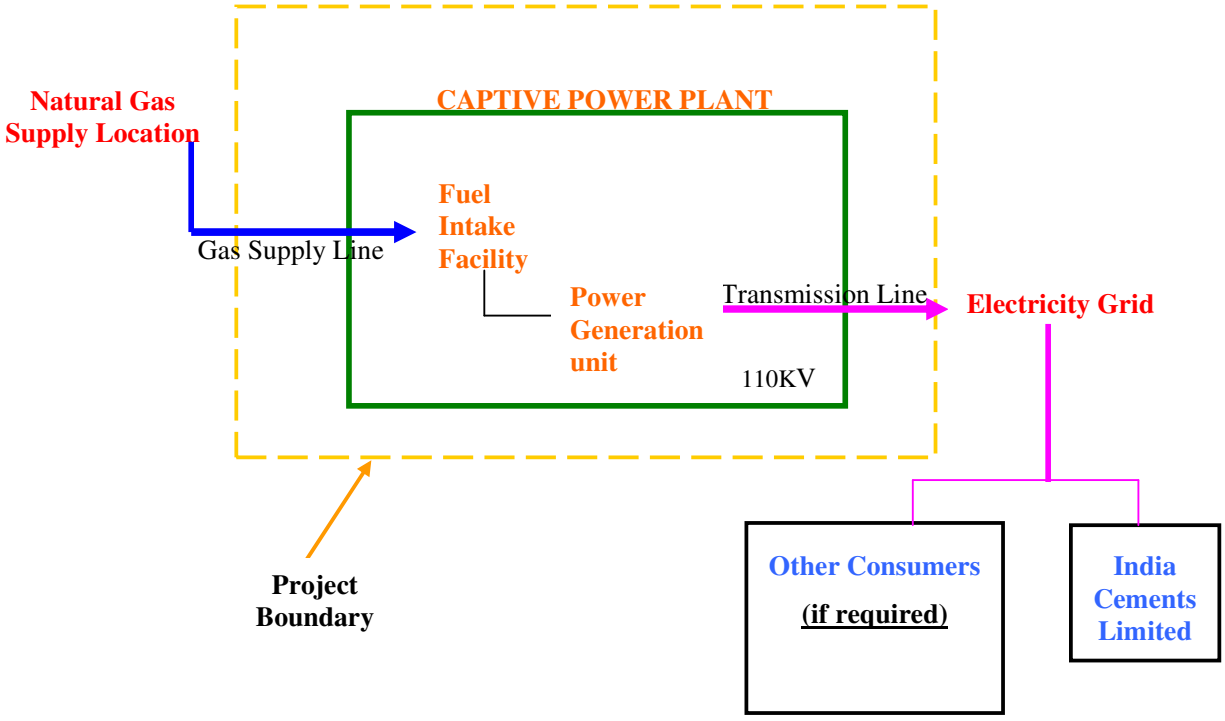
The baseline methodology requires that the following be included. Accordingly, the following project boundary is determined:

- all physical facilities constructed/erected on account of the project activity;

- at least major activities and facilities one step upstream and one step down stream of the facilities set up as part of the project activity; and

- all direct on-site emissions, including emissions from fuel combustion and process emissions on the site of the project activity due to combustion of gas to generate electricity be included in the project boundary; accordingly, the following project boundary is determined.

Schematic Presentation of Project Boundary



B.5. Details of baseline information, including the date of completion of the baseline study and the name of person (s)/entity (ies) determining the baseline:

Dr. P Ram Babu of PricewaterhouseCoopers (P) Limited, whose contact information is set out in Annex 1, has assisted the project proponent in determining the baseline methodology.

The annexed baseline methodology determination is completed on October 25, 2004.

SECTION C. Duration of the project activity / Crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

Start date for project construction- April 2004.

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

The Project is expected to be operational for a period of 20 years from the date of commencement of operations.

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

C.2.1. Renewable crediting period

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

Not applicable.

C.2.1.2. Length of the first crediting period:

Not applicable.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

November 2004.

C.2.2.2. Length:

10 years.

SECTION D. Application of a monitoring methodology and plan

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

"CECL monitoring methodology for power generation for captive use, which is grid connected, using non-renewable and less GHG intensive fuels" (submitted. for approval by the Methodology Panel of CDM Executive Board).

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

The monitoring methodology monitors the parameters, necessary for estimating emissions from the project activity, and the baseline emissions. Since, the parameters suggested to be monitored by the methodology are feasible to be monitored with adequate accuracy within necessary costs in the specific circumstances of the project, the mentioned methodology is adopted.

D.2. 1. Option 1: Monitoring of the emissions in the project scenario and the baseline scenario

D.2.1.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:								
ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	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)	Comment
HR_{NG}	Heat Rate of the facility for Natural Gas as fuel	Power plant records	kCal/MWh	c and e	As per plant requirement with respect to fuel purchase needs	Current year + Past 2 years average.	Electronic and Paper	--
PLF	Plant Load Factor (Monitored)	Power plant records	%	c and e	As per plant requirements	Current year + Past 2 years average.	Electronic and Paper	--
PE_{NG}	Annual project emissions	CDM project activity records	tCO_2	c	Annual	Annual	Electronic and Paper	--

D.2.1.2. Description of formulae used to estimate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

This methodology considers solely the main sources of emissions due to fossil fuel consumption during project operation

$PE_{NG} = (PC * PLF * HR_{NG} * EF_{NG} * CF)$……..**(1)**

where:

PE_{NG} = Emissions due to natural gas consumption during operation of the project (tCO2e)
PC = Installed Plant Capacity (MW);
HR_{NG} = Heat Rate of the facility for Natural Gas as fuel (kCal/MWh);
EF_{NG} = Emission factor for natural gas (approved IPCC emission factor) (tCO_2/TJ);
PLF = Plant Load Factor (expected)
CF = Conversion Factor of units ($=365*24*4.18/10^9$)

Any project emission due to transportation of natural gas through pipeline is not anticipated due to safety measures taken in the project. Hence, project emission (PE_Y) would comprise of only those (PE_{NG}) resulting due to combustion of natural gas in the project activity.

D.2.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived :

ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
OPERATING MARGIN								
AG: Electricity dispatched to the grid by power generating units in the operating margin	Annual Dispatch Electricity Generation Data of generation units dispatching to the local grid	Local regulatory authority	GWh	--	At the end of every year.	100%	Electronic/ paper	--

D.2.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived :								
ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
IC_OM: Installed capacity of the above power plants	Design data	Local regulatory authority	MW	--	At the start of the project activity.	100%	Electronic/ paper	--
Representative PLF_Y	PLF of the set of plants depending on capacity group	Local regulatory authority	%	--	At the end of every year.	100%	Electronic/ paper	--
PR: Performance Ratio	For merit order analysis	--	--	C	At the start of the project activity.	100%	Electronic/ paper	--
$EF_{OM,,Y}$	Emission from Operating Margin of the baseline electricity grid	Calculated by the project proponent	tCO_2/GWh	C	At the end of every year.	100%	Electronic	Emission Factor calculation based on Least Merit Order Data Analysis of Operating Margin of selected grid.

D.2.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived :								
ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
BUILD MARGIN								
IC_BM: Installed capacity of the above power plants	Design data	Local regulatory authority	MW	--	At the start of the project activity.	100%	Electronic/ paper	--
Representative PLF_Y	PLF of the set of plants depending on capacity group	Local regulatory authority	%	--	At the end of every year.	100%	Electronic/ paper	--
$EF_{BM,Y}$	Emission Factor of the Build Margin of the baseline electricity system	Calculated by project proponent with requisite evidence for the power plants selected	tCO_2/GWh	C	At the end of every year.	100%	Electronic/ paper	Requisite evidence to be provided by project proponent on selection of the power plant for calculation of BM.

D.2.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived :								
ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
$NETPOWER_Y$	Net power (i.e., the power received by the user industry from the CDM project, as certified by the local transmission utility, after wheeling (transmission) through the local grid) during any year 'Y'	Power used records	GWh	m	Annual	Daily	Electronic/ paper	Monitored by user/ receiving facility after the generated power is wheeled/ transmitted to it using the grid.

D.2.1.4. Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

Baseline emissions in any year 'Y' will be calculated according to the formulae described below.

$BE_Y = E_{CM,Y} * NETPOWER_Y$…….**(2)**

where:

$NETPOWER_Y$ = Net power (i.e., , the power received by the user industry from the CDM project, as certified by the local transmission utility, after wheeling (transmission) through the local grid) during any year 'Y'.

For calculating the Combined Margin (CM), the following equations were used (considering equal weightage to both operating and build margins):

$EF_{CM,Y} = (EF_{OM,Y} + EF_{BM,Y})/ 2$ ……**(3)**

where:

$EF_{CM,Y}$ = Combined Margin Emission Intensity (tCO_2/GWh)
$EF_{OM,Y}$ = Operating margin emission Intensity (tCO_2/GWh)
$EF_{BM,Y}$ = Build Margin emission Intensity (tCO_2/GWh)

Operating Margin calculations
The average OM emission factor ($EF_{OM,average,y}$) is calculated as the generation-weighted average emissions per electricity unit (tCO_2/GWh) of all generating sources serving the system, including low-operating cost and must-run power plants:

Merit Order Data Analysis Operating Margin calculations (based on performance ratio)
The dispatch data OM emission factor ($EF_{OM, DD}$) is calculated as per the following procedure. The performance ratio is calculated for all power plants operating in the selected grid:

Performance Ratio (PR) = (Actual Power Generation) / (Design Capacity* Plant Load Factor) …….**(4)**

The PRs for all plants in the operating margin are analyzed and the ranked in order (0 – 1, including fractional values) to select the worst performers (merit order analysis) who contribute about 10% of the total power generated in the grid.

The total power contributed by these plants will be **EG_{OM}** (in GWh).

The CO_2 emissions from each of these power plants ($EG_{OM,p}$) is multiplied by the IPCC emission factor for the type of fuel used to calculate CO_2 contributed by each plant. The summation of CO_2 contributed by all plants provides the total CO_2 contributed by all the plants in the operating margin.

$E_{OM,Y} = \sum EG_{OM,p} * IPCC_p$……..…..**(5)**

Therefore, the OM emission factor (EF_{OM}) is calculated as:

$EF_{OM,Y} = E_{OM,Y} / EG_{OM}$ .....**(6)**

Build Margin calculations
This is calculated as the likely emissions (tCO_2/GWh) of following sample of power plants, whichever results in greater power generation:

- ✓ Five power plants that have been built most recently [including plants under construction], or
- ✓ Power plants capacity additions in the electricity system that comprise 20% of the system generation and that have been built most recently [including plants under construction].

EG_{BM} = Total power contributed by all the power plants from one of the options as above…**(7)**

To calculate CO_2 emissions from each of power plant in the BM, the installed capacity of individual plants ($EG_{BM,Y}$ in GWh) is multiplied by the IPCC emission factor ($IPCC_p$ in tCO_2/GWh) for the type of fuel used such plant. The summation of CO_2 contributed by all plants provides the total CO_2 contributed by all the plants in the build margin given as following.

$E_{BM,Y} = \sum (EG_{BM,Y} * IPCC_p)$……**(8)**

where:

$EF_{BM,Y} = E_{BM,Y} / EG_{BM}$ ……**(9)**

D. 2.2. Option 2: Direct monitoring of emission reductions from the project activity (values should be consistent with those in section E).

D.2.2.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

D.2.2.2. Description of formulae used to calculate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

D.2.3. Treatment of leakage in the monitoring plan

D.2.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project activity

ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	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)	Comment

The leakage scenario in the project activity may occur during transmission of power from point of generator to point of receipt by user (M/S India Cements Ltd.). However, such losses are already implicitly accounted for in the monitoring of NETPOWER in baseline emission calculations.

D.2.3.2. Description of formulae used to estimate leakage (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

Please refer discussions in D.2.3.

D.2.4. Description of formulae used to estimate emission reductions for the project activity (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

Annual Emission Reductions from the project activity:

$ER_Y = BE_Y - PE_Y$……..……..**(10)**

Where, NETPOWER is the total power despatched to the grid in a year.

D.3. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored		
Data *(Indicate table and ID number e.g. 3.-1.; 3.2.)*	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
HR_{NG} (D.2.1)	Low	To be controlled under scheduled QA/QC protocols of the project proponent, and may be covered under the quality management system procedures. Hence, no separate QA/QC checks would be required.
EF_{NG} (D.2.1)	Low	Same as above.
PLF (D.2.1)	Low	Same as above.
$NETPOWER_Y$ (B.2.1.3)	Low	Same as above.

D.4 Operational and management structure that the project operator will implement in order to monitor emission reductions and any leakage effects, generated by the project activity

The project will be operated and managed by CECL and KSK who are also the project proponents. CECL-KSK will ensure safety in operation of the plant; a project manager will be allocated with the responsibility for ensuring that the safety issues are addressed. CECL-KSK can only utilize NG as per the design and the quantum of fuel will be logged in and archived electronically.

The power plant will abide by all regulatory and statutory requirements as prescribed under the state and central laws and regulations. To ensure such performance, CECL-KSK as mentioned above, will monitor all its activities and performance related to emission, discharge and solid waste generation if any. CECL-KSK will install meters and where ever possible online monitoring system to be able to measure and calculate actual creditable emission reduction in most transparent and relevant manner. Installed meters will be calibrated according to the maintenance schedule programmed at the start of the operation and refreshed according to the plants performance requirement. All the monitoring data will be recorded and kept under safe custody of the power plant manager and or the board members. Also any change within the project boundary, such as change in spares and or equipment will be recorded and any change in the emission reduction due to such alteration will also be studied and recorded.

CECL-KSK will generate electricity as mentioned to the capacity and any addition will be informed to the relevant authority and their permission taken prior to execution. Such addition will not be considered as any part of the CDM power project and thus no benefits will be claimed under the same project. Such project can be qualified as another CDM project.

Although it is being anticipated that there won't be any leakage of the CDM power project, however, if any such condition arises, and leakage effect is found due to any of the CDM project activity, such leakage will be accounted accordingly as mentioned in the chosen applied baseline methodology.

The GHG emission reductions estimated herein will be a target in the ISO 14000 standards based Environmental Management System (EMS) that will be put in place at CECL-KSK. Accordingly, the monitoring plan proposed herein will become an integral part of the Environmental Management Programmes and would be constituent of operational and management structure of EMS.

D.5 Name of person/entity determining the monitoring methodology:

Dr. P Ram Babu of PricewaterhouseCoopers (P) Limited, whose contact information is set out at Annex 1 has assisted the Project Proponent in determining the monitoring methodology.

SECTION E. Estimation of GHG emissions by sources

E.1. Estimate of GHG emissions by sources:

The anthropogenic emissions within the project boundary shall be calculated based on the following factors and as per equation (1):

Installed Plant Load Capacity:	25 MW
Plant Load Factor (PLF):	85%
Load Hours per annum:	7,446 hours
Average electricity generation at above PLF:	186 GWh
Heat Rate	2,038 Kcal / KWh
IPCC emission factor for Natural Gas:	0.0561 Ktonnes CO_2/ Tj

Accordingly, the annual emission rate from the project activity has been estimated to be 478 tCO_2/GWh.

E.2. Estimated leakage:

No leakage is expected from this project therefore E2 has been considered as zero.

E.3. The sum of E.1 and E.2 representing the project activity emissions:

Therefore total project emission would be: sum of E.1 and E.2 = 478 equivalent tCO_2/GWh/year

E.4. Estimated anthropogenic emissions by sources of greenhouse gases of the baseline:

Baseline emissions based on combined margin has been calculated through equation (2) through (8), and work out to 815 tCO_2/GWh/year.

E.5. Difference between E.4 and E.3 representing the emission reductions of the project activity:

The annual emission reductions = 815 – 478 = 337 tCO_2/GWh.

E.6. Table providing values obtained when applying formulae above:

Particulars	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project emissions (tCO2/GWh)	478	478	478	478	478	478	478	478	478	478
Baseline emissions (tCO2/GWh)	815	815	815	815	815	815	815	815	815	815
Projected generation (GWh)	31	186	186	186	186	186	186	186	186	186
Annual Emission Reduction (tCO2)	10,447	62,682	62,682	62,682	62,682	62,682	62,682	62,682	62,682	62,682
Total Emission Reduction (tCO2)										**574,585**

SECTION F. Environmental impacts

F.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

CECL has completed a comprehensive EIA for the proposed NG based power plant at Valanatha, Ramanathpuram Dist, Tamil Nadu. The 'Consent to Establish' has been obtained from the Tamil Nadu Pollution Control Board. Based on the EIA report, all constructive stage and operational stage impacts, the salient impacts, mitigation measures, residual impacts or monitoring are mentioned below.

Various Environmental Mitigation Measures

Parameter	Mitigation Measures	Residual Impact/ Monitoring
Land & Water pollution	• Treatment of sewerage and trade effluent • Recycle cooling water • Solar evaporation pan for soften waste water • Storm water drain • Recycling of effluent treatment plant sludge • Hazardous waste oil to be disposed off through	• Insignificant impacts to land and water resources
Air quality (NOx)	• Design only low Nox burner and adequate • Stack emission velocity greater than 25m/s	• NOx emissions should be <50ppm at 15% excess oxygen. • On line stack monitors and continuous monitoring
Noise	• Acoustic measures for control of noise	• To comply with ambient noise level standard.
Fire Hazard and explosion risk	• Maximum credible accident and consequence analysis. Onsite energy plan including that of 2km pipeline.	• Mitigation of all fire and explosion risks through incorporation of safety in design, process control and safety measures

F.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

Mitigating Measures	Overall Impact
• Safe drinking water will be provided to workers. • Toilets will have septic tanks and soak pits. • Sedimentation pit will be made to collect the runoff water and it will be reused for dust suppression.	Short-term, negative impact
• Fire fighting facility • Water reservoir, pumps, and hydrant network • On-site and off-site emergency plan • Active and passive accident control equipment and risk mitigation measures will be implemented.	Long- term negative

Regular monitoring of all significant environmental parameters is essential to check the compliance status vis-à-vis the environmental laws and regulations. The objectives of the monitoring will be as follows:

- To verify the results of the impact assessment study with respect to the proposed project.
- To study the trend of concentration values of the parameters, which have been, identified as critical and planning the mitigative measures.
- To check and assess the efficacy of pollution control equipment.
- To ensure that any additional parameters, other than those identified in the impact, do not become critical after the commissioning of proposed power plant.

All necessary steps will be taken to monitor the efficiency of pollution control equipment on regular basis. Regular monitoring and vigilance of the surrounding environmental quality will be done. All necessary stipulations and legal requirements of Tamil Nadu Pollution Control Board and Ministry of Environment & Forests will be fully complied.

Though this project may have insignificant adverse impact on the biological environment, if all the recommended mitigative measures are followed, then the impacts will be manageable and, affect a very limited area. The adverse impact will greatly offset by the many positive socio-economic impacts that will flow directly from the project.

The project is likely to have slight impacts on the community lifestyle (day to day activity of the people living near the plant). CECL-KSK is committed to develop the surrounding area in a manner that balances consistently while safeguarding the environmental and social features. Implementing a public relations strategy; employing locals; buying local goods and services; encouraging local entrepreneurship, involving women participation in conservation efforts and creating awareness about environmental health and pollution and encouraging respect for local traditions and religious beliefs will offset the negative environmental impacts.

Some of the proposed community development schemes include tree plantation on avenue roads and other open spaces, providing free health check-up facility and medicines to the poor villagers, providing drinking water facility to villages in time of need. The Company proposes to adopt a few villages around

the project site and particularly concentrate on measures to preserve common property resources like village ponds and grasslands. Efforts will be made to involve the community in upgrading the unpaved village roads, planting avenue trees and create more water harvesting structures. The Company will initiate steps to promote the local traditional folk dance and music. Some other manner in which CECL-KSK proposes to contribute positively in community development measures includes the following points:

- CECL will provide direct employment to village people in the project, especially in non-technical jobs (depending upon individual skills).

- CECL will select certain areas of specific concern in the villages, such as education, health, sanitation, roads, common property resources like ponds, grasslands, pastures, recreation centres, vocational training, and give special attention in the affected villages in consultation with the local panchayat.

- CECL will select local youths for self-sufficiency by imparting training on eventual maintenance jobs related to water, electricity, and transport vehicles as per requirement.

The detailed environmental management plan is attached below.

Parameter	Potential Impact (Without Mitigating Measures)	Activities	Mitigating Measures	Overall Impact	Monitoring Requirement	Responsible Entities
Construction Phase						
Land	• Flooding during rainy season • Increase in soil erosion • Loss of trees and habitat • Sediment deposition • Interference with natural drainage pattern • Visual alteration of landscape	• Site clearing • Soil excavation • Mobilization of plant and heavy machinery • Construction of civil structures	• Making garland drain along plant boundary to collect storm water runoff will avoid flooding. • Proper compacting of backfill areas will reduce soil erosion. • Greenbelt and horticulture development will create natural habitat. • Adequate sloping of dumped earthworks and building materials will reduce wind losses and siltation of drains. • Restoring land surface consistent with existing contour conditions will not alter drainage pattern. • Using the excavated soil for greenbelt and horticulture and landscaping purpose will improve the general aesthetics of the landscape.	Long-term positive impact	• CECL will ensure that all the mitigating measures are incorporated in the contract documents. Technical Department/EMU will check that all documented measures are effectively implemented by the contractor. • The supervision will be done daily.	EPC contractor, EMU/Technical Department of CECL will monitor and supervise.

Parameter	Potential Impact (Without Mitigating Measures)	Activities	Mitigating Measures	Overall Impact	Monitoring Requirement	Responsible Entities
Surface water	•Water pollution •Waterborne diseases •Siltation of water course	• Wastewater generated from domestic services and surface runoff	• Safe drinking water will be provided to workers. • Toilets will have septic tanks and soak pits. • Sedimentation pit will be made to collect the runoff water and it will be reused for dust suppression.	Short-term, negative impact	• These clauses are already incorporated in GCC of EPC tender specifications. CECL will ensure that all the mitigating measures are incorporated in the EPC contracts. • Technical Department/EMU of CECL will ensure the quality of drinking water as per contract document.	EPC contractor, EMU of CECL will monitor and supervise.
Air quality	• Dust nuisance from site due to vehicular movement and windborne surface dust	• Vehicular movement, haulage of building materials and earthworks	• Water sprinkling will be done for dust suppression. • Service road will be suitably stabilized for smooth traffic flow. • Road surface will be swept regularly. • Vehicle wheels will be cleaned to dislodge soil prior to entering the public utility road. • Air around the site will be monitored regularly to ensure	Short-term, negative impact	• CECL will ensure that all the mitigating measures are incorporated in the EPC contracts. Technical Department /EMU of CECL will also check the efficacy of water sprinkling measures adopted by the contractor and will ensure that the public	EPC contractor, EMU of CECL will monitor and supervise.

Parameter	Potential Impact (Without Mitigating Measures)	Activities	Mitigating Measures	Overall Impact	Monitoring Requirement	Responsible Entities
			compliance with ambient air quality standard.		roads are not soiled. • By appointing approved lab, the ambient air quality will be monitored at three locations (120^o to each other) at the plant boundary. Level of particulate matter, SO_2 and NO_2 in air will be measured twice a week.	
Solid waste	• Soil contamination and degradation	In appropriate waste disposal	• Empty cement bags will be sold for reuse. • Spent oil will be given to registered recyclers for reprocessing.	Long-term, negative impacts	• CECL will ensure that all the mitigating measures are conveyed in the contract documents.	EPC contractor, EMU of CECL will monitor and supervise.
Noise	• Nuisance to surrounding population due to increased noise level	• Vehicular movement, construction machinery, piling work	• Construction activity will be done only during daytime. • Vehicular movement during night time will be avoided. • Earplugs will be provided to workers exposed to high noise level.	Short-term, negative impact	• CECL will ensure that all the mitigating measures are conveyed in the contract documents. • By appointing an approved lab, the noise quality will be	EPC contractor, EMU of CECL will monitor and supervise.

Parameter	Potential Impact (Without Mitigating Measures)	Activities	Mitigating Measures	Overall Impact	Monitoring Requirement	Responsible Entities
					monitored at three locations (120^{o} to each other) at the plant boundary. Noise level (in dB[A] Leq.) will be measured for day and night time twice a week.	
Socio-economic and cultural environment	• Direct job creation for about 500 people during construction period • Indirect economic development due to market multiplier effect • Creation of infrastructure facilities • Immigration of outside labour force • Friction between	• Deployment of construction workers • Development of infrastructure facilities like roads and residential quarters • Deployment of contract vehicles	• Locals will be deployed during construction to the extent the same are available in line with requirement of skill. • Effective public relations strategy will be maintained and the locals will be allowed to use the developed infrastructure facility. There will be regular interaction with locals to solve their problems.	Long-term, positive impact	• CECL will ensure that locals are deployed during the construction phase. • CECL will interact with the local population.	EPC contractor, PRO of CECL will monitor and supervise.

Parameter	Potential Impact (Without Mitigating Measures)	Activities	Mitigating Measures	Overall Impact	Monitoring Requirement	Responsible Entities
	workers and local population • Development of squatter slums • Stress on natural resources like wood, water, sanitation • Inducement of traffic congestion and road safety hazards.					

Parameter	Potential Impact (Without Mitigating Measures)	Activities	Mitigating Measures	Overall Impact	Monitoring Requirement	Responsible Entities
Operation Phase						
Groundwater	• Rainwater harvesting structures and water reservoir will improve the quality and quantity of groundwater.	• No ground water will be used during construction or plant operation.	• Rooftop rainwater harvesting structure will be made. Seepage, if any, from reservoir will improve the quality and quantity of groundwater.	Long-term positive	• The EMD of CECL will test groundwater quality of Akhakhol village every year. Special attention will be given to parameters like oil, suspended solids, dissolved solids, residual chlorine and phosphate.	EMD of CECL
Air quality	• Air emissions in the form of oxides of nitrogen in excess of stipulated limits can cause problems to biological and physical	• Firing of NG	• Regular monitoring of air and ensuring compliance with emission standard will be done.	Insignificant impact on existing ambient air quality	• On-line NOx monitors will be installed in each stack. • The monitors will be capable of giving continuous readings of NOx emissions, which will be recorded by the EMD.	EMD of CECL

Parameter	Potential Impact (Without Mitigating Measures)	Activities	Mitigating Measures	Overall Impact	Monitoring Requirement	Responsible Entities
	environment				• The EMD will develop facilities for ambient air sampling and testing. The air quality will be monitored at three locations (120^{o} to each other) at the plant boundary. Levels of particulate matter, SO_2 and NO_2 in air will be measured twice a week.	
Noise quality	• Increased noise generation due to operating engines. • Increased traffic flow will add to existing noise level.	• Engines	• Low noise engine will be selected for the plant. • Plant vehicles will be maintained and serviced at regular intervals.	Insignificant impact	• The EMD will develop facilities for noise testing. The noise quality will be monitored at three locations (120^{o} to each other) at the plant boundary. Noise level will be measured for day	EMD of CECL

Parameter	Potential Impact (Without Mitigating Measures)	Activities	Mitigating Measures	Overall Impact	Monitoring Requirement	Responsible Entities
					and night time twice a week.	
Solid waste	• Indiscriminate disposal of solid waste will create leaching and affect soil and groundwater quality.	• Water treatment plant sludge, spent oil, and lubricants	• Sludge from water treatment plant is not hazardous or toxic. • It will be dewatered in centrifuge and used as landfill material inside the premises. • Spent oil and lubricants will be collected in drums and given to authorized recyclers for reprocessing as per rules.	Insignificant impact	• The EMD will keep proper records of solid waste generated from the water treatment plant. It will identify low-lying land inside the plant premises for disposal. It will also keep records of quantity of spent oil and lubricants generated from the plant, mode of storage and auction details.	EMD of CECL

Parameter	Potential Impact (Without Mitigating Measures)	Activities	Mitigating Measures	Overall Impact	Monitoring Requirement	Responsible Entities
Biological environment	• There will be insignificant impact because there is no ecologically sensitive area, no forest cover, no national park, no wildlife sanctuaries, no sensitive or endangered species in and around the project area.	• Plant operation	• 100% compliance with applicable discharge standards for air emissions and wastewater quality will be ensured.	Insignificant impact	• The EMD will keep a watch on the general conditions of surrounding flora. It will also obtain records of the crop yield of surrounding villages on yearly basis from the Taluka office.	EMD of CECL
Public health and safety	• Accident and damage to life and property	• NG receipt and use in power	• Fire fighting facility • Water reservoir, pumps, and hydrant network • On-site and off-site emergency plan	Long-term negative	• The EMD of CECL will develop facilities for continuous monitoring of	Safety Department of CECL

Parameter	Potential Impact (Without Mitigating Measures)	Activities	Mitigating Measures	Overall Impact	Monitoring Requirement	Responsible Entities
	due to handling flammable gas	generation	• Active and passive accident control equipment and risk mitigation measures will be implemented.		wind speed and direction at the site.	
Socio-economic and cultural environment	• Pressure on resources from unplanned peripheral development • Increased access of outsiders disturbing traditional beliefs and religion.	• Project development and operation	• Peripheral development will occur due to population influx and increased business opportunities. • Community development plan will be introduced, which will encourage local entrepreneurship, provide employment to locals depending upon their skills. Training programs for developing self-sufficiency among the local youths will be organized. • Public relations strategy will encourage respect for local traditions and religious beliefs. • Community development schemes like tree planting, free health checkup	Long-term, positive	• Public relations officer (PRO) of CECL will ensure that qualified locals are preferred for employment. • He will also interact with the local population and take appropriate steps to solve their problems. • He will implement the community development schemes in surrounding villages.	PRO of CECL

SECTION G. Stakeholders' comments

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

CECL identified local communities, NGOs, state government and governmental agencies, employees, contractors and consultants/ advisors as the most important stakeholders with an interest in the proposed CDM project activity. Accordingly, CECL-KSK sent out a notice to representatives of various stakeholder groups, with a brief on the project, informing them of the proposed meeting on 15th October 2004 at the project site at Ramnathapuram district, Tamilnadu.

There were about 12 participants representing various parties from local communities, contractors, and shareholders. Villagers from the vicinity also showed interest in the project and related social and environmental development activities. The documents related to project activity were also available at the site of the meeting.

The stakeholder meeting process involved:

a) Welcome address to the representatives by Mr. Shishir Kalkonde from KSK Energy Ventures Ltd.
b) Election of a Chairperson for the meeting by the stakeholder group representatives from amongst themselves.
c) Open house discussion on the merits of the project with permission of the Chair.
d) Summation of the concerns expressed by the stakeholder groups and the commitments to address the concerns made by CECL by the Chairperson.
e) Preparation and circulation of draft Minutes of the Meeting and signing of the MOM.

After the meeting, an announcement was made that any concerns can be communicated till 30th October 2004 and diligently such concerns would be addressed.

G.2. Summary of the comments received:

After a brief discussion regarding the pros and cons of this project the chairperson interacted with the participants to clarify their doubts and concerns regarding the likely impacts of the project. The participants sought clarifications on Kyoto Protocol and Clean Development Mechanism processes. Overall there was agreement that the proposed project is a beneficial project.

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

KSK clarified all the stakeholder's concerns by providing relevant evidence of the project claims and answered all question to the satisfaction of the participants. Detailed MOM delineating the above concerns and CECL's responses has been recorded which would be made available to Designated operating entities (DOE).

KSK and CECL also informed the stakeholders that the project activity would contribute to the sustainable development of the region and country by facilitating and catalyzing local and regional opportunities, thereby creating sustainable shareholder, economic, social and environmental value.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Coromandel Electric Company Ltd.
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E-Mail:	
URL:	
Represented by:	KSK Energy Ventures Ltd.
Title:	
Salutation:	
Last Name:	
Middle Name:	
First Name:	
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

Organization:	KSK Energy Ventures Ltd.
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Represented by:	
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The total project cost is funded through equity investment and debt (long-term) from nationalised banks in India.

No public funding is currently envisages for the project, and if at all required in the future, this will not involve any Official Development Assistance (ODA) or public funding from Parties included in Annex I countries. Hence, no diversion of ODA will result due to the project activity.

Annex 3

BASELINE INFORMATION

Combined margin

Combined Margin	
Particulars	**Specific emission (tCO2/GWh)**
Operating Margin	978.32
Build Margin	652.13
Combined Margin	**815.22**

Operating Margin:

Total Emissions = 45658333 tCO_2

Total Power Generation = 46670 GWh

OM = 978 tCO_2 / GWh.

Build Margin:

Total Emissions = 60797122.29 tCO_2

Total Power Generation = 93228.97 GWh

OM = 652.13 tCO_2 / GWh.

Annex 4

MONITORING PLAN

As per section D.4.

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