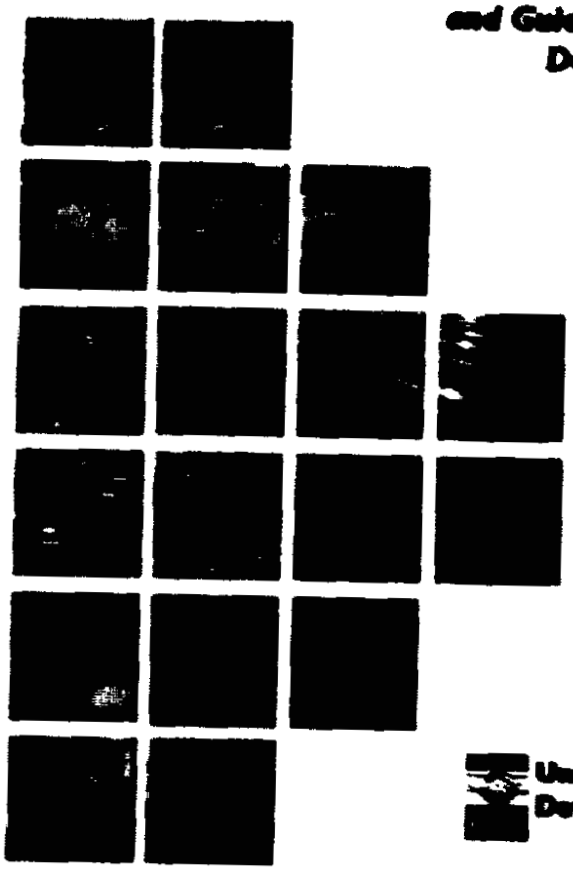
PN-ACY-743

CLIN 3: Project Development and Financing

Subtask 3.C 10 Projects Identified and Guidance given to Fund Managers: Detail Project Reports prepared and submitted



United States Agency for International Development / India Mission

Greenhouse Gas Pollution Prevention Project - Climate Change Supplement

Implemented by:

The Global Environment Team
The Louis Berger Group

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THE Louis Berger Group, INC.
2300 N Street, NW
Washington, DC 20037 USA

The Louis Berger Group, Inc.
Contract No. 386-C-00-00-00058-00
Sandeep Tandon, CTO

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CLIN 3: Project Development and Financing
Task 3.C: Identification of GHG reduction projects

Background

A focal activity under USAID/India's Greenhouse Gas Pollution Prevention Project (GEP) Climate Change Supplement (CCS) is development of GHG mitigating projects in key sectors of industry, power and urban transport. The Louis Berger Group, Inc. and Development Alternatives have worked jointly to complete this activity under GEP-CCS. The cooperation between LBG and DA has worked in two ways: (a) in building capacity of DA as a working Climate Change Center and (b) in providing inputs to DA on the GHG mitigation projects developed by them. DA staff received on-the-job-training while working with the projects that they identified. LBG facilitated the process by providing technical assistance via in-house finance experts and by facilitating interactions with US project development consultants. As a result DA was able to offer technical assistance to five project developers. To illustrate the project development efforts by CCC at DA, five of the projects developed by DA have been included in this deliverable.

The Louis Berger Group, Inc. GEP team has been actively pursuing projects in India that would help mitigate the climate change impact of industry, energy generation and usage and urban development projects. Over the last 1½ years since the inception of GEP-CCS LBG has conducted several activities and programs and has interacted with numerous organizations and individuals to develop a pipeline of such projects. This note describes the overall strategy, selection criteria, approach and methodology of project development, philosophy of short listing the first ten projects under this activity and describes possible next steps.

Project Development Strategy

GEP-CCS started with the project concepts developed under the Climate Change Outreach & Awareness (CCOA) program of USAID/India. These project ideas identified by climate change centers (CCC) at Confederation of Indian Industry (CII) and Development Alternatives (DA) were a preliminary stage, when the interested industries had envisaged developing GHG reduction projects. While DA has continued to be a partner in the GEP-CCS project especially in this activity, CII considered it out of their policy focus to concentrate on micro activity such as project development. GEP-CCS expanded the project development avenues by contacting other important stakeholders like the renewable energy development nodal agencies in selected proactive states, financial institutions like ICICI, IDFC, SIDBI, IREDA, key ministries like MNES, MOEF, MOP and many engineering and financial consultancy firms. GEP-CCS staff held one on one meetings, policy round tables, participated in numerous conferences, organized focused interactive meets in cooperation with DA and ICICI in order to propagate the message of technical assistance being offered.

GEP-CCS developed a list of criteria for short-listing of projects (See Box 1) that mainly categorized projects depending on their use of renewable resources, conservation potential, size and credit rating of the promoters. These criteria helped in

weeding out projects that are not sustainable environmentally and techno economically. Since most of the GHG emissions result from use of energy generated by burning fossil fuels rich in carbon content, the choice of projects includes mainly, non-fossil fuel based renewable energy sources, technologies reducing energy consumption through process and end-use efficiency improvement and projects capturing/reducing GHG emissions from urban activities like solid waste management and transportation. These projects can broadly be classified as Clean Energy Projects. At the outset it was decided to diversify the portfolio of projects so as to cover as many sectors and types of projects as possible. Given the time constraints under GEP-CCS, other facets that were considered important were: advanced stage of development, projects that meet fast tracking criteria being developed under the climate negotiations, the clarity in deciding the origin of the GHG abatement, and least risk to the investors. It was decided that the projects in the transport sector shall be identified and short listed after the demo project under that activity is finalized.

Interactions with Fund Managers

GEP-CCS is interacting very closely with several financial institutions in India under the capacity building activities. These cover providing training to the FI officials for analyzing clean energy projects and also reviewing the portfolios of major Indian FIs. In addition, GEP-CCS staff has been interacting closely with some of the FIs, which have been financing energy efficiency and renewable energy projects. In particular, GEP-CCS has had several interactions with ICICI, IDFC, IREDA, SIDBI, IL&FS and banks like State Bank of India. In cooperation with ICICI, GEP-CCS organized a workshop with key industrial clients of ICICI to provide them more information on climate change mitigation potential of CEPs and about TA that GEP-CCS can offer them. GEP-CCS has also been providing guidance to FIs for understanding critical aspects of CEPs while they appraise such projects.

GEP-CCS has also established contacts with key international funding agencies that could be prospective sources of funding the identified projects. This is crucial since, GEP-CCS project does not have an internal funding source to seed finance the selected projects. Beside the conventional banking finance bodies, these include funds/organizations that may be interested in environmentally sustainable investment projects either as pure return yield or in the form of emission reductions.

Approach / Methodology for Project Development

The GEP-CCS RFP states that selected projects should be at an advanced stage of development, where the promoters are most likely to be committed to the project. It was, therefore, decided to interact with promoters whose projects have reached the stage of detailed project report (DPR) preparation. GEP-CCS technical assistance (TA) would concentrate on identifying the GHG reduction potential and advising on structuring of the projects so as to strengthen them for enhanced finance potential from domestic or international sources. In consultation with USAID it was agreed that

two of the projects would receive detailed analysis to identify potential value of carbon offsets that they generate.

The DPRs or Techno Economic Feasibility Reports (TEFR) are documents that describe the technical, financial, market and contractual parameters of the proposed project. The elaborateness of the document depends mainly upon the size of project and its technical dimensions. This document is very essential for approaching the funding institutions and even strategic investors as they evaluate their investment risks and returns on the basis of the information contained in DPR. Typically, the quality and size of DPRs is variable from project to project. In order to make concise quality information on the projects available to FIs and investors a Worksheet was developed. The worksheet essentially synthesizes crucial project information in a form digestible by domestic and international finance and investment interests. As a marketing tool the worksheet helps stimulate initial interest on the part of prospective funding and investment institutions, while bringing out the GHG mitigating nature of the projects. Investment in projects can also be in the form of Equipment Finance like leasing or lines of credit, for which an elaborate DPR is seldom prepared. Therefore, the worksheet also contains information needed for equipment finance or leasing interests to analyze project feasibility.

The worksheet was prepared with inputs from and consultation with domestic/international financial institutions, US consulting firms, an emission brokerage firm and USAID. The DPR worksheet covers all the major points in a DPR, the financials and profitability analysis, risk analysis and the assessment of GHG emission reductions from the project. The ten initial projects are presented in the form of this worksheet.

BOX1: GEP-CCS CRITERIA FOR DEVELOPMENT OF CLEAN ENERGY PROJECTS (CEP)

GEP-CCS provides Technical Assistance to clean energy projects to identify their GHG emission reduction potential and to position them to domestic/international investors. GEP-CCS projects should have measurable and clearly identifiable GHG emissions reduction or should lead to avoidance of GHG emissions. It should employ a technology option that is better than the business as usual options in terms of GHG emissions (i.e. specific energy consumption) employed in India. Broad criteria of identifying clean energy projects are illustrated below.

A. Categories of CEPs

Renewable energy technologies for grid feeding/replacing:

Biomass-combustion, gasification, bio-methanation power and thermal applications, Cogeneration of power/steam from bagasse or other agri residues;

Solar Thermal- medium temperature applications;

Solar PV-small /medium size systems;

Mini hydro-power generation from small dams/run of the river type;

Waste to Energy-MSW methane generation from landfill/bio-methanation, sewerage based biogas plants for power generation or other applications, industrial waste to power/thermal applications

Energy Efficiency Improvement technologies:

Waste heat recovery-WHR from industrial flue gases or wastewater for power generation or thermal applications,

Renovation and modernization (R&M) of the old power plants to improve efficiency, industrial process efficiency improvements mainly in the utility system but also in process in the key GEP-CCS sectors-cement, steel etc.

Fuel switching:

Switching from a GHG emission intensive fuel such as coal to a lesser GHG intensive one like natural gas, replacement of fossil based fuels with renewable fuels like oils from plants.

B. Size of the Project

Small and Medium size i.e. non-utility projects (distributed generation preferred), Individual criteria Mini hydro ≤ 25 MW, bagasse based cogeneration with steam pressure > 65 Bar. The minimum investment in project is flexible. [However, this is subject to the needs of funding sources] Additional set of criteria in this respect is the size defined for fast track projects at Bonn:

Renewable Energy projects ≤ 15 MW

Energy Efficiency projects with equivalent savings ≤ 15 GWh

Other mitigation projects with carbon potential ≤15 Kilotonne CO_2/year

C. Technology Source

Prefer US technology. However, there is no restriction. Innovative technological approaches are preferred. However, unproven technologies would not be considered due to higher technology risk. Clear cut licensing with the technology providers required.

D. Promoters

Should be genuinely interested in the project, resourceful and have good track record with existing lenders/bankers. Should possess or be ready to acquire the necessary experience and expertise for undertaking the proposed project. Should be open to share data with due precautions with GEP-CCS and the funding agencies.

E. Service Off Take and Provisions

Should have sound service off takers (e.g. power purchasers) or should have proper credit enhancement. In case of power generating for grid supply, a Power Purchase Agreement with proper risk mitigation options should be in place. In case of supply of fuels and other services, proper agreements like FSA should be in place.

F. Funding

GEP-CCS can consider projects with recourse to promoters' balance sheet, corporate loans, and project finance on non-recourse basis and equipment finance in the form of lease or asset lines of credit depending on the needs of the project. The projects should be bearing reasonable performance indicators like IRR/payback etc. to merit consideration by lenders/investors.

Selection of Projects

As a result of the promotional and outreach activities undertaken by GEP-CCS in the first year of the project there is now a growing interest among industry and consulting firms in developing and suggesting projects for possible capture of benefits from the GHG reductions. Industry and consulting firms are interested in identifying additional sources of funding in order to improve the project economic feasibility. As discussed earlier, CII had developed about 20 and DA 19 project profiles in the CCOA phase. Many of these proposals were taken up for implementation by the promoters during the time that elapsed after completion of CCOA program. GEP-CCS and DA were able to proceed with few of these ideas. GEP-CCS has received over 20 new enquiries on projects for TA/financial assistance. Besides these DA has identified over 25 additional project ideas that have GHG reduction potential. Of these total 45 project profiles, based on the initiative shown by the promoters, about 15 were selected for more serious consideration and analysis. Of the 15 projects 10 were ultimately identified for development under CLIN 3 Subtask C of the GEP-CCS contract These 10 projects are listed below:

Sr. No.	Promoter	Brief Project Description	Cost of project	Sector	Remarks
1	Ambutirtha Power Pvt. Ltd.	2 X 10 MW hydel project based on river bed fall between two major hydel projects on the river Sharavaty in Karnataka	Rs. 1,077 million	Mini Hydroelectric Power (Renewable Energy)	Tailrace of the MGHE project and other flows to be used in a diversion dam
2	Globe Cogeneration Power Limited	45 MW bagasse based power project with a boiler pressure of 105 ata on a BOOT basis for meeting the needs of the sugar mill and export to grid in Karnataka	Rs. 1,810 million	Bagasse Cogeneration Power (Renewable Energy)	High pressure cogeneration plant
3	Asia Bioenergy India Ltd.	5 MW exportable power and 70 TPD organic compost from treatment of MSW from Lucknow city in Uttar Pradesh through biomethanation	Rs. 736 million	Urban Solid waste Methane capture (Renewable Energy)	Power and manure from biomethanat ion of MSW

Sr. No.	Promoter	Brief Project Description	Cost of project	Sector	Remarks
4	Venkatesh Coke & Power Ltd.	110 MW power from non-recovery coke manufacturing plant in Tamil Nadu. Waste heat recovery based power equivalent to 65 MW.	Rs. 10,869 million	**Industrial** waste heat (Energy Efficiency)	Waste Heat Recovery from flue gases
5	Coastal Agro Industries Ltd.	4 MW rice husk based cogeneration plant for meeting needs of the company and export in Andhra Pradesh (AP)	Rs. 152 million	Biomass Cogeneration **Power** (Renewable Energy)	High pressure FBC boiler for rice husk
6	Bhoruka Power Corporation Ltd.	2 X 2.5 MW mini hydel project on the IRPU fall on the Teertha river in Karnataka	Rs. 170 million	Mini hydroelectric **Power** (Renewable Energy)	Waterfall based power plant
7	Kakatiya Alloys Pvt. Ltd.	6 MW poultry litter based power project in Medak dist. of AP	Rs. 332 million	**Industrial** waste to energy (Renewable Energy)	Poultry litter based power plant
8	Market Dynamics Pvt. Ltd.	Project has two Parts (i) plant for briquetting of jute waste, rice husk, and saw dust for fuel to rice mills and house holds (ii) Home lighting systems based on photovoltaic panels for about 45,000 houses over a period of 10 years	(i) Rs. 7 million (ii) Rs. 590 million	Biomass briquetting **Industrial** fuel & solar PV (Renewable Energy)	Combinatio n of independent business plans for sustainable developmen t projects in rural area
9	RR Bio Energies Ltd.	12 MW exportable biomass integrated gasification combined cycle power plant using agro residues like coconut husk/leaves, sugarcane trash available locally in Eluru Dist. Andhra Pradesh	Rs. 68 million	Biomass IGCC **Power** (Renewable Energy)	Advanced biomass conversion technology
10	Polyene Film Industries Ltd.	Installation of 200 DC floating pumps using 900 Wp thin film amorphous silicon film PV cell modules.	Rs. 54 million	**Solar PV** based pumps (Renewable Energy)	Innovative structuring of high cost sustainable product

At the outset, GEP-CCS and DA conveyed the uncertainties and the limitations in providing TA to the developers of these and all the other projects under consideration due to the uncertainties and changing rules of market for carbon investments. The project developers expressed their plans to take up the projects irrespective of the potential for obtaining carbon investments. The DPR worksheets and DPR documents for these projects are enclosed. GEP-CCS conducted basic GHG analyses of eight of the abovementioned projects. More rigorous GHG analyses were conducted for two projects. A note on the basis of GHG Analysis is given in Box 2.

Developments on Market Based Mechanisms Under UNFCCC

There have been mixed developments on the international climate change scene. While the successive meetings of Conference of Parties (COP) in Bonn and Marrakech have resulted in a broad agreement over rules for and operationalization of the market based mechanisms for qualifying and trading GHG emission reductions, due to the US decision not supporting Kyoto mechanisms and the allowance of sinks and pollution rights for the "hot air" from former Soviet Union countries, the potential market for and hence the value of emission reductions has been drastically reduced. Therefore, the investment potential in GHG mitigation projects in developing countries has dropped significantly. In addition, as a project of USAID, GEP-CCS is not in a position to offer TA for preparing projects for benefits under Kyoto mechanisms. In view of this, the main avenue for funding for the projects could be conventional domestic and international funds, and socially and environmentally responsible investors.

Capacity Building

Apart from identification of projects and providing them technical assistance, the other major objective of GEP-CCS is to build capacity of the climate change centers. Guidance was provided to DA for this purpose. CII has expressed that it is not interested in participating in the project development component of GEP-CCS. DA being a non-governmental organization does not have project development background. GEP-CCS provided vital inputs to the staff of DA to assess project promoter capabilities, credit worthiness and to analyze projects from a techno-financial feasibility stand point. Each of the projects identified and developed by them has passed through three main stages including initial screening, pre-feasibility and detailed project review. Thus, DA as a climate change center is in a better position to identify sustainable GHG mitigating projects, rate the project promoters' capabilities and assess the GHG reduction potential of such projects. The capacity building has helped DA build its project development capacity, which will be key to its long term sustainability.

This capacity building activity included:

- Numerous one to one discussions with the DA staff
- Written technical comments on projects

- Use of international consultants to provide guidance
- Supporting the project developers' workshop organized by DA
- Guiding in selected meetings with the project developers
- Guidance in analysis of the company financials
- Guidance in analysis of the crucial project agreements such as power purchase agreements, fuel supply agreements
- Guidance in the process of preparation of business plans
- Assistance using computational tools developed under GEP-CCS
- Assistance in identification of major data sources, web sites and GOI documents. Analysis and modeling of the GHG assessment based on documents such as IPCC guide book; and
- Training to DA staff at the Financial Institutions training program

Next Steps

The project development activity has achieved a significant milestone in that it has been able to generate a wide spread interest among the industry, consulting organizations, financial institutions and GOI in promoting clean energy projects. The steady stream of enquiries that GEP-CCS has been receiving off late is an indication that the stakeholders in the process do see value in developing GHG emission reduction projects. The need for funding these projects would keep increasing. As the availability of financing is becoming difficult there would be need for additional mechanisms for financing these projects. In view of this, GEP-CCS shall:

- Discuss the funding aspects with several Indian and US based institutions that invest in clean energy projects for pure returns
- Continue with TA to the project developers as interface between them and the funding institutions to facilitate finance
- Identify new funding sources as they emerge (interested in Indian projects)
- Follow up with GOI institutions (MNES/MOEF) to market project portfolio for visibility
- Document experiences in GHG mitigation project development process to disseminate them to other developers for replication
- Continue working with DA to help facilitate their interactions with FIs and investors
- Monitor international climate change regime developments

BOX 2: BASIS OF THE GHG ANALYSIS

GEP-CCS has used the understanding of baseline as it prevails in the international climate change arena. For projects that sell power to the state utilities, the composition of power available in the grid has provided a benchmark for the baseline. Based on the power received by a consumer in the state where the project feeds power emission factors have been determined. The calculations of the baseline emission factors have been carried out based on data on power supply available in the common domain like CEA, Annual Report of SEBs published every year by the Planning Commission and that from the Powergrid.

It is worth to note that interregional power transfers among the five geographical regions of India excepting transfer for the Eastern to Northern region are negligible. Thus, the regional grid becomes the project boundary for the projects feeding power to grid. The power received by consumers in a state comprises that generated in their own state, that purchased from other states in the same region and that imported from contiguous regions, which also includes power generated by public sector power generating companies, mainly National Thermal Power Corporation Ltd., National Hydroelectric Power Corporation Ltd., and Nuclear Power Corporation Ltd. The "Annual Report on Working of SEBs" published by the Planning Commission, GOI gives details of each of these. GEP-CCS analyzed the data on generation by various state and central generating units for the last two years and arrived at the composition of power in the respective states.

The Intergovernmental Panel on Climate Change (IPCC) constituted by parties under UNFCCC had published reports on emission factors from all member countries for various fuel feed stocks in those countries. GEP-CCS used these base values expressed in tons of Carbon Trillion Joules (tC/TJ). For Indian non-coking coals used for power generation the emission factor as quoted in UNEP/OECD/IEA/IPCC 1995 is 26.2 tC/TJ. To simplify calculations, it was assumed that sources other than thermal power, i.e. hydroelectric and nuclear do not contribute to GHG emission. Thus, the weighted average emission factors for various states in which the GEP-CCS projects are located were calculated. Since baseline methodologies consider business as usual situation as currently prevailing projects condition, these are adequate to judge the emission reductions that the proposed project would achieve. It would be possible to forecast emission factors for these states based on existing capacities as well as planned capacity additions in thermal, hydel, nuclear and other sources and projections of availability of these new plants.

For projects that replace services of an off grid operations like PV based lighting system replacing kerosene the calculations are straightforward.

Detailed Project Report (DPR) Worksheet

For GHG mitigating projects under
USAID's Greenhouse Gas Pollution Prevention Project – Climate Change Supplement

Managed by The Louis Berger Group, Inc.

Ambuthirtha Power Private Limited,
MGHE Tailrace Hydro Scheme
Karnataka
(Project Finance)

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SECTION A: CLEAN ENERGY AND GHG MITIGATION EQUIPMENT FINANCE

1. Contact Information for the Prospective Borrower

	Name of Company	
	Address	
	City, State, Province	
	Contact Name	
	Contact Phone	
	Contact FAX	
	Contact EMAIL	

2. Availability of Financial Information on Borrower

		Yes	No
	Audited financial statements available for last 3 fiscal years?		
	Audited financials being provided to LBG Washington?		
	Was firm in same general line of business for last 3 years?		
	Has firm reported operating profits AND net income during each of last 2 years?		

3. Borrower's Financial History (last three Fiscal Years)

	EBIDT			
	EBIDT/Total Income			
	Operating Profit (OP)			
	OP/TI			
	Net worth			
	Equity			
	EPS			
	Dividend			
	Major Capital Investments			
	Debt:Equity ratio			
	Fixed Asset Coverage Ratio			
	Current Ratio			

	Credit Rating by Lead FI/Bank			
	Depreciation/Amortization Expense			
	Interest Expense			
	Current maturity of LTD			

4. Background information on all used and unused short and long-term debt

NA

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About the Equipment/Technology: Larger clean energy or GHG mitigating projects (Project Finance) may involve more than one type of environmental equipment. Complete sections A 5 through A 10 for each piece of relevant GHG mitigating equipment.

5. Description of technology/service to be purchased

NA

6. Description of the GHG mitigating potential of the technology

The project envisages setting up two sets of mini hydroelectric power plant of 10 MW each. The technology used is primarily based on diversion of tailrace stream of the larger hydroelectric power plant upstream. As such it does not result in submergence and inundation of forestland. This feature helps in generating power in an environmentally friendly manner. In India, a large proportion of power is generated by thermal plants burning the coal available in central India. The proposed project enables switching to renewable energy source in a sustainable way.

7. About the Business Negotiations

	Is the manufacturer of the technology a domestic company?		
	Is the manufacturer located overseas (exporter)?		
	Is the manufacturer a US company?		
	Have any price negotiations occurred?		
	Has a purchase order been submitted?		

How many units are in the Purchase Order? _____
What is the estimated unit cost of technology (US$)? _____
What is the total cost for the Purchase Order? _____

8. Contact Information on the Manufacturer

√	Name of Manufacturer	
	Address	
	City, State, Province	
	Contact Name	
	Contact Phone	
	Contact FAX	
	Contact EMAIL	

9. About the Trade Financing (For Equipment Imported Into India)

Is trade financing being sought for the import of the equipment to India? _____

What type of trade financing is being sought (insurance,guarantees, working capital?

_____

_____

10. Has a domestic or overseas lender been identified? _____

	Name of Lender	
	Address	
	City, State, Province	
	Contact Name	
	Contact Phone	
	Contact FAX	
	Contact EMAIL	

Project Name: Mahatma Gandhi Hydro-Electric Tail Race Scheme, Karnataka

Project Promoter: M/s Suchindra Investments Pvt. Limited

Special Purpose Vehicle: Ambuthirtha Power Private Limited

1. Executive Summary: Project at a Glance

Ambuthirtha Power Private Limited proposes to construct and operate a mini hydro-electric power generating plant of 20 MW capacity (2 – 10 MW units) at the down-stream of the existing 120 MW Mahatma Gandhi Hydro-Electric (MGHE) station, and upstream of the existing 1035 MW Sharavathy Generating Station (SGS).

The river-bed fall between the MGHE generating station and SGS is 69 meters. The MGHE Tailrace Project proposes to be located between these stations, and would utilize the river-bed fall, the tailrace discharge flow from the MGHE station and flows from an independent catchment. It is proposed to construct a diversion dam complex across the Sharavathy River, with a trench weir across the Talakalale Nale, a tributary of the Sharavathy.

The project will have three primary sources of water:

- Discharge from the MGHE Power House (est. 38-42 cumecs)
- Catchment from Talakalale Nale
- Run-off from independent catchments of Sharavathi River below Linganamakki, reservoir up to Jog Falls.

The combined flows would be conducted through the head race tunnel (HRT), surge tank, pressure shaft and penstocks to the MGHE Tail Race Power Generating Plant. The Plant is proposed to be commissioned by October 2004, and the station is anticipated to generate 113 million units (MU) annually.

Approximately 8.75 Hectares of land will be required for locating various components of the project.

Infrastructure Development Finance Company Ltd., (IDFC) is the presumptive debt provider for this activity. Under the renewable framework, the project is under a tax holiday for the first 10 years of its operation. A power purchase agreement with the Karnataka Electricity board has been signed on October 16, 1999. The PPA provides for payment of 2.87 Rs/kWh calculated from the base year 1999-2000, and assuming a 5% annual increase until the 10th year of operation.

2. Project Costs

			US$	%
√	**Plant & Machinery**	2,755.00		25.58
√	**Land & Building**	85.00		0.79
√	**Civil, detailed Eng.**	5,365.00		49.82
√	**Evacuation of Power**	139.00		1.29
√	**Preliminary & Preoperative Expenses**	700.00		6.50
√	**Working Capital Margin**	--		
√	**Escalation during Construction**	--		
√	**Contingencies**	400.00		3.71
√	**Interest during Construction**	1204.00		11.18
√	**Finance Charges**	121.00		1.12
√	**Total Project Cost**	10769.00		

3. Proposed Means of Financing

		Rs	US$	%
√	**Total Debt Portion**	7,538		70%
√	**Total Equity Portion**	3,231		30%
√	**Total Project Cost**	10,769		

4. Committed Financing (if any)

a. Committed Debt Providers

Financial Inst.	Amount of Debt	Rate	Term	Date of Commitment
IDFC		15%		in negotiations
Canara Bank		15%		in negotiations
HUDCO		15%		in negotiations
IDBI		15%		in negotiations

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b. Committed Equity Providers

Investment Institution	Stake (in US$)	Stake (in [illegible])
IDFC		
IDBI		
LIC		
M/S KSK Energy Ventures		

5. (a) Estimates of Profitability (For Generation at 113 MU)

	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10
Revenue from power sale				4135.80	4339.20	4553.90	4779.90	5017.20	5265.80	5525.70
Other revenue				0	0	0	0	0	0	0
Fuel cost				0	0	0	0	0	0	0
O&M Cost				161.53	174.45	188.41	203.48	219.76	237.34	256.33
Administrative cost				53.84	58.15	62.80	67.83	73.25	79.11	85.44
Selling cost				19.74	19.74	19.74	19.74	19.74	19.74	19.74
PBIDT				3900.69	4086.86	4282.95	4488.85	4704.45	4929.61	5164.19
Depreciation				435.63	435.63	435.63	435.63	435.63	435.63	435.63
Interest on Term-loan				1130.71	1049.95	888.42	726.89	565.36	403.83	242.30
PBT				2334.35	2601.28	2958.90	3326.33	3703.46	4090.15	4486.26
Provision for Tax				0	0	0	0	0	0	0
PAT				2334.35	2601.28	2956.90	3326.33	3703.46	4090.15	4486.26
Net Cash Flow Year Wise				2116.71	1929.15	2285.13	2650.95	3026.47	3411.58	3806.14
Net Cash Flow Cum				2116.71	4045.86	6330.99	8981.94	12008.41	15419.99	19226.13

	Yr11	Yr12	Yr13	Yr14	Yr15	Yr16	Yr17	Yr18	Yr19	Yr20
Revenue from power sale	5796.90	6090.7	6395.8	6395.8						
Other revenue	0	0	0	0						
Fuel cost	0	0	0	0						
O&M Cost	276.83	298.98	322.90	348.73						
Administrative Cost	92.28	99.66	107.63	116.24						
Selling Cost	19.74	19.74	19.74	19.74						
PBIDT	5408.05	5672.32	5945.53	5911.08						
Depreciation	435.63	434.51	429.04	429.04						
Interest on Term-loan	80.77	0	0	0						
PBT	4891.65	5237.81	5516.49	5482.04						
Provision for Tax	0	0	0	1918.72						
PAT	4891.65	5237.81	5516.49	3563.32						
Net Cash Flow Year Wise	4210.00	5628.52	59009.26	3998.39						
Net Cash Flow Cum	23436.13	29064.65	34964.91	38963.30						

5. (b) Estimates of Profitability (For Generation at 102.12 MU)

	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10
Revenue from power sale				3737.59	3921.41	4115.44	4319.68	4534.13	4758.79	4993.67
Other revenue				0	0	0	0	0	0	0
Fuel cost				0	0	0	0	0	0	0
O&M Cost				161.53	174.45	188.41	203.48	219.76	237.34	256.33
Administrative cost				53.84	58.15	62.80	67.83	73.25	79.11	85.44
Selling cost				19.74	19.74	19.74	19.74	19.74	19.74	19.74
PBIDT				3502.48	3669.06	3844.48	4028.63	4221.37	4422.60	4632.16
Depreciation				435.63	435.63	435.63	435.63	435.63	435.63	435.63
Interest on Term-loan				1130.71	1049.95	888.42	726.89	565.36	403.83	242.30
PBT				1936.13	2183.48	2520.43	2866.11	3220.38	3583.14	3954.23
Provision for Tax				0	0	0	0	0	0	0
PAT				1936.13	2183.48	2520.43	2866.11	3220.38	3583.14	3954.23
Net Cash Flow Year Wise				1784.87	1514.62	1850.11	2194.34	2547.20	2908.55	3278.27
Net Cash Flow Cum				1784.87	3299.49	5149.60	7343.94	9891.14	12799.69	16077.96

	Yr11	Yr12	Yr13	Yr14	Yr15	Yr16	Yr17	Yr18	Yr19	Yr20
Revenue from power sale	5238.76	5504.27	5779.99	5779.99						
Other revenue	0	0	0	0						
Fuel cost	0	0	0	0						
O&M Cost	276.83	298.98	322.90	348.73						
Administrative Cost	92.28	99.66	107.63	116.24						
Selling Cost	19.74	19.74	19.74	19.74						
PBIDT	4849.90	5085.89	5329.72	5295.28						
Depreciation	435.63	434.51	429.04	429.04						
Interest on Term-loan	80.77	0	0	0						
PBT	4333.50	4651.38	4900.68	4866.24						
Provision for Tax	0	0	0	1703.18						
PAT	4333.50	4651.38	4900.68	3163.06						
Net Cash Flow Year Wise	3656.20	5046.80	5289.34	3598.12						
Net Cash Flow Cum	19734.16	24780.96	30070.30	33668.42						

6. (a) Projected Cash Flow (For Generation at 113 MU)

	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10
Sources of Funds										
PAT				2334.35	2601.28	2958.90	3326.33	3703.46	4090.15	4486.26
Depreciation				435.63	435.63	435.63	435.63	435.63	435.63	435.63
Inc. in Equity capital				0	0	0	0	0	0	0
Inc. in term loans				0	0	0	0	0	0	0
Inc. in bank borrowings				0	0	0	0	0	0	0
Total sources				2769.98	3036.91	3394.53	3761.96	4139.09	4525.78	4921.89
Application of funds										
Capital Expenditure					0	0	0	0	0	0
Inc. in Current Assets				653.25	30.89	32.53	34.15	35.75	37.33	38.89
Term loan repayment					1056.36	1056.36	1056.36	1056.36	1056.36	1056.36
Taxes	-	-	-	-	0	0	0	0	0	0
Dividend					0	0	0	0	0	0
Total Application				653.25	1087.25	1088.89	1090.51	1092.11	1093.69	1095.25
Net Surplus				2116.73	1949.66	2305.64	2671.45	3046.98	3432.09	3826.64
IRR				31.03%						
DSCR					1.92	2.18	2.49	2.86	3.33	3.91
Av DSCR				3.05						

	Yr11	Yr12	Yr13	Yr14	Yr15	Yr16	Yr17	Yr18	Yr19	Yr20
Sources of Funds										
PAT	4891.65	5237.81	5516.49	3563.32						
Depreciation	435.63	434.51	429.04	429.04						
Inc. in Equity capital	0	0	0	0						
Inc. in term loans	0	0	0	0						
Inc. in bank borrowings	0	0	0	0						
Total sources	5327.28	5672.32	5945.53	3992.36						
Application of funds										
Capital Expenditure	0	0	0	0						
Inc. in Current Assets	40.41	43.80	45.27	-6.03						

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Term loan repayment	1056.36	0	0	0						
Taxes	0	0	0	1918.72						
Dividend	0	0	0	0						
Total Application	1096.77	43.80	45.27	1912.69						
Net Surplus	4230.51	5628.52	5900.26	2079.67						
IRR										
DSCR										
Av DSCR										

6. (b) Projected Cash Flow (For Generation at 102.12)

	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10
Sources of Funds										
PAT				1936.13	2183.48	2520.43	2866.11	3220.38	3583.14	3954.23
Depreciation				435.63	435.63	435.63	435.63	435.63	435.63	435.63
Inc. in Equity capital				0	0	0	0	0	0	0
Inc. in term loans				0	0	0	0	0	0	0
Inc. in bank borrowings				0	0	0	0	0	0	0
Total sources				2371.76	2619.11	2956.06	3301.74	3656.01	4018.77	4389.86
Application of funds										
Capital Expenditure					0	0	0	0	0	0
Inc. in Current Assets				586.89	27.62	29.08	30.52	31.95	33.34	34.71
Term Loan Repayment					1056.36	1056.36	1056.36	1056.36	1056.36	1056.36
Taxes	-	-	-	-	0	0	0	0	0	0
Dividend					0	0	0	0	0	0
Total Application				586.89	1083.98	1085.44	1086.88	1088.31	1069.70	1091.07
Net Surplus				1784.87	1535.13	1870.62	2214.86	2567.70	2929.07	3298.79
IRR				29.14%						
DSCR					1.73	1.96	2.23	2.57	2.99	3.51
Av DSCR				2.74						

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	Yr11	Yr12	Yr13	Yr14	Yr15	Yr16	Yr17	Yr18	Yr19	Yr20
Sources of Funds										
PAT	4333.50	4651.38	4900.68	3163.06						
Depreciation	435.63	434.51	429.04	429.04						
Inc. in Equity capital	0	0	0	0						
Inc. in term loans	0	0	0	0						
Inc. in bank borrowings	0	0	0	0						
Total sources	4769.13	5085.89	5329.72	3592.10						
Application of funds										
Capital Expenditure	0	0	0	0						
Inc. in Current Assets	36.07	39.08	40.37	-6.02						
Term loan repayment	1056.36	0	0	0						
Taxes	0	0	0	1918.72						
Dividend	0	0	0	0						
Total Application	1092.43	39.08	40.37	1912.7						
Net Surplus	3676.70	5046.81	5289.35	1679.40						
IRR										
DSCR	4.19									
Av DSCR										

7. **Status of Finance Negotiations**

Are you in negotiations with any prospective debt providers? If yes, please specify and elaborate on expected time frame. Project developer is in negotiations with Infrastructure Development Finance Co. Ltd., on the following terms: 3 years moratorium period, interest rate @ 15% p.a. and repayment period of 10 years (including moratorium period).

Do you plan to submit this project to a private venture capital firm or an international equity organization (e.g. REEF)? If yes identify specific fund and elaborate on negotiations. -No-

Do you plan to submit this project to an international tender for carbon emissions reductions (e.g. Oregon Climate Trust)? If yes, please specify tender and closing date for submission. –No-

8. Project Promoter Contact Information

√	Name of Project Promoter	M/S Suchindra Investments (P) Limited
√	Address	II Floor, 21/19, Craig Park Road, M.G. Road Cross
√	City, State, Province	Bangalore, Karnataka, India
√	Contact Name	Mr. K Sadananda Shetty, Chairman Mr. Sanjith Shetty, Managing Director
√	Contact Phone	080-559-7616/559-9654/559-5315
√	Contact FAX	080-559-7617
√	Contact EMAIL	suchind@giasbg01.vsnl.net.in

9. Project Management Team

	Name	Title
√	Mr. K Sadananda Shetty	Chairman
√	Mr. Sanjith S Shetty	Managing Director
√	Mr. K.G. V. Murthy	Chief Engineer - Projects
√	Mr. J. Philomen Raj	Electrical Engineer
√	Mr. D. Nagaraj	Electrical Engineer
√	Mr. K. Vishnu Prasad	Electrical Engineer
√	Mr. K. Kristappa Shetty	Financial Management

10. Project Promoter Financial History

√	What were profitability figures last 3 years?	31/3/1999 = 5,56,161.27 Lakhs 31/3/2000 = 10,70,401.64 Lakhs Profit 31/3/2001 = 9,00,000 Lakhs (subject to audit)
√	Book value of firm?	-
√	EPS reserves and surplus last 3 years?	-
√	What is current business?	Nil
√	What are synergies between business and this project?	-

11. Project Promoter Relevant Experience:

Briefly describe the relevant experience, if any, possessed by the project promoter. Has the promoter developed similar projects?

1. Project promoters are first generation entrepreneurs to the power sector.
2. Chairman Mr. K. Sadanada Shetty – Former Chairman & Managing Director, Vijaya Bank, which according to project promoters is 8th highest profitable Bank in India. According to PD, Mr. Shetty was formerly Deputy Chairman of Indian Banks Association and was on the Boards of Air India, IRBI, AFC.
3. Managing Director Sanjith S. Shetty. According to project promoter, Mr. Shetty holds a degree of Masters in Business Administration from Fuqua School of Business, Duke University.

12. Special Purpose Vehicle Contact Information (If applicable):

√	Name of SPV	M/s Ambuthirtha Power Private limited
√	Address	II Floor, 21/19, Craig Park Road, M.G. Road Cross Bangalore 560 001
√	City, State, Province	Bangalore, Karnataka, India
√	Contact Name	Mr. K. Sadananda Shetty, Chairman Mr. Sanjith S. Shetty, Managing Director
	Contact Phone	080-559-7616/559-9654/559-5315
	Contact FAX	080-559-7617
√	Contact EMAIL	suchind@giasbg01.vsnl.net.in
	Names and shares of the promoters	Suchindra Investments Pvt. Ltd = Total 1000 shares K. Sadananda Shetty = 500 shares Sanjith Shetty = 250 shares Mrs. Sujatha Shetty = 250 shares Mr. Suchindra Shetty = 1 share (cash share of Rs 100)
√	Is a Shareholding agreement in place	In terms of Memorandum & Articles of Association
	Salient terms	--

13. Project Details

√	Greenfield project or involves existing equipment?	Greenfield
√	Is GHG mitigation achieved by Process Improvement or Clean Energy Generation?	Clean Energy Generation
√	Size of Project (MW)?	20 MW
√	Project Location? City, Province	Sharavathy River, near Sharavathy Generating Station in Shimoga District, Sagar Taluk, Karnataka State.
√	Off or on-grid?	On-grid
√	State Electricity Board?	Karnataka Power Transmission Corp, Ltd. (erstwhile Karntaka Electricity Board)
√	Technology?	Mini-hydel
√	Type of Fuel?	Hydro
√	Source of fuel supply?	Sharavathy River

14. Feasibility Details

√	Was Feasibility Study prepared independently?	Yes. Titled "Preliminary Report on Modified Layout and Estimate of Cost", February 2001
√	What firm prepared the Feasibility Study? List address and contact details	Consulting Engineering Services (India) Ltd. 57 Nehru Place (5th Floor) New Delhi, India 110 019

15. Background on the Power Purchase Agreement (if Applicable)

√	Does Project involve PPA (Yes or No) If no, skip to next heading.	Yes
√	Has a PPA been signed? (Yes or No)	Yes
√	Nature of Agreement? Take or Pay? Other?	Take or Pay

√	Name of state electricity board or primary PPA signatory?	Karnataka Power Transmission Corporation Limited (KPTCL)
√	What date was the PPA signed?	16 October 1999
√	When does it enter into force?	Upon commencement of commercial operation of the plant
√	What is the length of the PPA? (Years)	10 years after commencement of commercial operation of the plant
√	What is the initial purchase price?	2.87 Rs/kWH for base year 1999-2000
√	What is the annual % increase in purchase price?	5%
√	Can the project sell power directly to major consumers? (Yes or No)	-No-
√	What are the securities provided for the revenues? Have the domestic lenders approved these mechanisms? Are there any special clauses, or provisions of relevance to the investors?	Letter of Credit from Bank
√	What are the terms of Payment to the project developers? Any special clauses of relevance to the investors/lenders? Have the domestic lenders approved the payment terms?	Within 15 days of receipt of tariff invoice, backed by irrevocable revolving Letter of Credit
√	What are the major provisions (event definitions, treatment of the off time, etc.) of the Force Majeure clauses?	Provided in PPA
√	What is the method of fixation of tariff (two part, availability etc.)? Are there any provisions for deemed generating/penalties? What is the treatment for infirm power?	PPA, provides for fixation of tariff, penalties, etc.
√	Have the provisions for change in law, termination, liquidated damages, etc. been approved by existing lenders/investors?	Still in the process of scrutiny
√	Would the SEB/generating utility want a share in the ownership of carbon offsets?	-No-

16. Other Agreements (where applicable)

√	Fuel supply agreement signed?	n/a
√	Water/utility supply agreement signed?	n/a
√	Shareholder's agreement been entered into between existing equity holders?	n/a
√	Special provisions of above agreements?	n/a

17. Quantify and Describe Risks

√	[redacted]	[redacted]	[redacted]
	Risks	**Low to High**	**Describe**
√	Market?	Low	Entire power generated will be sold to SEB as per terms of PPA.
√	Country/Sovereign?	Low	Project is allotted by the Govt of Karnataka as per agreement.
√	Regulatory?	Low	Construction/Operation through terms of agreements. Power is sold to KPTCL through PPA approved by Regulators (in this case KERC).
√	Contract/counter party?	Low	Insurance Policy to mitigate the construction risk is taken – CAR policy.
√	Construction?	Medium	Yet to commence work to be awarded through competitive tender
√	Technology?		Proven Technology
√	Management?	Medium	Management have no track record in power projects.
√	Enforceability of Contracts?	High	Payment default risk is significant. But defaults are coverd by L.C./Bank Guarantee.
√	Competition?	Low	Power is deficit in State.
	Exit?		

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18. For risks identified in section 14, discuss Mitigation/Coverage measures

	Risks	Describe Mitigation/Coverage
√	Market?	During the financial year 1999-2000 the total availability of power in the State of Karnataka was 22626 MU against a demand of 26061 MU. Peak demand shortage of 15.5%. Gap between supply and demand widening – Supply is through PPA with KPTCL covered by Revolving L/Cs.
√	Country/Sovereign?	Karnataka Power Transmission Corporation Ltd. Is Govt. of Karnataka undertaking. Moreover, supply to them is covered by PPA with Revolving L/C.
√	Regulatory?	Power Purchase Agreement is recognized by Power Regulatory Authorityof the State , i.e. KERC
√	Contract/counter party	KPTCL has entered into agreement with Ambuthirtha Power Pvt. Ltd, to purchase power at agreed rate through PPA, which is futher strengthened by Revolving L/C – Risks such as non-payment/non-taking of power is mitigated by 3rd party sale/Arbitrator.
√	Construction?	Construction through competitive selective bid route selected through BSES Ltd., reputed EPC contractors. Only very competent contractors are considered for inviting bid.
√	Technology?	Proven Technology: Karnataka's main stay in Hydel.
√	Management?	Competent Management Team. During construction BSES, highly reputed company in Power Generation will attend to the construction management. If successful we even consider giving them O & M contract.
√	Enforceability of Contracts?	Performance guaranteed from Banks are insisted

√	Competition?	Gap between power generation and demand is increasing.
	Exit?	

SECTION C: CARBON COMPONENT.

Checklists were adapted from a variety of sources including Natsource, LLC

1. **GHG Mitigation Applicability Macro Checklist**

		Yes	No
√	Does project generate real, measurable, long-term, additional and verifiable emissions reductions vis-à-vis current baseline alternatives?	√	
√	Are there sustainable development benefits such as increased employment and protecting biodiversity?	√	
√	Is the project sustainable without ODA from Annex B Countries?	√	
√	Has the project received host country approval?		√
√	Does project meet size definition for Bonn Fast Track CDM*? --under 15 MW for renewables projects --under <15 gigawatthours/year savings for energy efficiency projects --under15 kilotonnes CO2E for emissions reductions from process changes	√	

*Fast track is ideal, but non fast-track projects will still be considered.

Describe the baseline scenario: Karnataka has just over 4000 MW of installed generation capacity with a mix of 34:66 thermal/hydro. On the base of actual generation this ratio was 50:50 in the year 2000-01. However, the state is in deficit and imports power from other states in the Southern Regional Load Despatch Center (SRLDC) and from the central power Public Sector Undertakings(PSU), viz. National Thermal Power Corporation Ltd. (NTPC), National Hydroelectric Power Corporation Ltd. (NHPC) and Nuclear Power Corporation Ltd. (NPC) to the extent of about 53% of its consumption. Both of these compose higher thermal power supply CPSUs (86:5:9 including nuclear 9%) and southern states (72:28). With a result the overall mix in the consumption by Karnataka is 63:37 thermal/hydro. The emission intensity of the southern grid at this mix is 17tC/TJ.

2. **Emission Reduction Calculations, Monitoring and Verification Checklist**

√		Yes	No
	Does the project involve a discrete reduction of emissions?	√	
	Have the emissions reductions been estimated with an accepted methodology?	√	
	Has a monitoring methodology been established?		√

	Has a third party verifier been contracted to verify actual emissions reductions and sustainable development gains?		√
	Has clear ownership of emissions reductions been determined and documented?		√

3. Carbon accounting details

	Parameter	Particulars	
1	Baseline methodology	Refer to the note above	
	Generation level	113 MU	102 MU
2	Baseline Emissions TCO2 per annum	95,703	86,489
3	Project Emissions TCO2	0	0
4	Emission reductions TCO2 per annum (2-3)	95,703	86,489

Detailed Project Report (DPR) Worksheet

For GHG mitigating projects under
USAID's Greenhouse Gas Pollution Prevention Project – Climate Change Supplement

Managed by The Louis Berger Group, Inc.

GLOBE COGENERATION POWER LIMITED (GCPL)
Sankewshwar, Balgaum, Karnataka
(Project Finance)

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1. Contact Information for the Prospective Borrower

	Name of Company	Globe Cogeneration Power Limited
	Address	201/202 T. V. Industrial Estate, Worli
	City, State, Province	Mumbai, Maharashtra, India
	Contact Name	Anil Bhattar, Finance Manager
	Contact Phone	+91 22 496 4767
	Contact FAX	498 4154
	Contact EMAIL	trimbak@bom3.vsnl.net.in

2. Availability of Financial Information on Borrower

	Audited financial statements available for last 3 fiscal years?		
	Audited financials being provided to LBG Washington?		
	Was firm in same general line of business for last 3 years?		
	Has firm reported operating profits AND net income during each of last 2 years?		

3. Borrower's Financial History (last three Fiscal Years)

NA Since it is a new company

	EBIDT			
	EBIDT/Total Income			
	Operating Profit (OP)			
	OP/TI			
	Net worth			
	Equity			
	EPS			
	Dividend			
	Major Capital Investments			
	Debt:Equity ratio			
	Fixed Asset Coverage Ratio			
	Current Ratio			
	Credit Rating by Lead FI/Bank			
	Depreciation/Amortization Expense			

	Interest Expense			
	Current maturity of LTD			

4. Background information on all used and unused short and long-term debt

NA

SECTION A: CLEAN ENERGY AND GHG MITIGATION EQUIPMENT FINANCE

About the Equipment/Technology: Larger clean energy or GHG mitigating projects (Project Finance) may involve more than one type of environmental equipment. Complete sections A 5 through A 10 for each piece of relevant GHG mitigating equipment.

5. **Description of technology/service to be purchased**

NA

6. **Description of the GHG mitigating potential of the technology**

The Proposed project would utilize bagasse as fuel for mot part of the year. Bagasse is an agro residue that is generated sustainably in sugar cane production of sugar. Thus, it is a renewable source of energy and does not lead to additional emission of carbon dioxide The Company will procure bagasse from the host sugar mill under the proposed agreement with them during the season. During the off-season period, the company shall utilize bagasse saved by incorporating energy efficiency measures in the mill, procured from other mills nearby and also on other biomass such as cane trash and other crop residues. In other words the company shall make efforts to run the power plant on renewable fuels for most part of the year.

7. About the Business Negotiations

	Is the manufacturer of the technology a domestic company?		
	Is the manufacturer located overseas (exporter)?		
	Is the manufacturer a US company?		
	Have any price negotiations occurred?		
	Has a purchase order been submitted?		

How many units are in the Purchase Order? _____
What is the estimated unit cost of technology (USS)? _____
What is the total cost for the Purchase Order? _____

8. Contact Information on the Manufacturer

√	Name of Manufacturer	
	Address	
	City, State, Province	
	Contact Name	
	Contact Phone	
	Contact FAX	
	Contact EMAIL	

9. About the Trade Financing (For Equipment Imported Into India)

Is trade financing being sought for the import of the equipment to India? _____

What type of trade financing is being sought (insurance,guarantees, working capital?

_____

_____

10. Has a domestic or overseas lender been identified? _____

	Name of Lender	Power Finance Corporation Ltd.
	Address	36, Chandralok, Janpath
	City, State, Province	New Delhi India
	Contact Name	Mr. D. Ravi, AGM
	Contact Phone	+91 11 372 1103
	Contact FAX	331 5822
	Contact EMAIL	dravi@pfc.delhi.nic.in

SECTION B: PROJECT FINANCE FOR CLEAN ENERGY AND GHG MITIGATION

Project Name: 45 MW Bagasse Based Cogeneration Power Project at M/S Shri Hiranyakeshi Sahakari Sakkare Karkhane Niyamit, Sankeshwar, Belgaum, Karnataka

Project Promoter(s): Mr. V.K. Agrawal & Associates

Mr. M.S. Dewan & Associates

Special Purpose Vehicle: Globe Cogeneration Power Limited (GCPL)

Shri Hirenyakeshi Sahakari Sakkare Karkhane Niyamit (SHSSKN) is a sugar mill in Sankeshwar, Belgaum District, at a distance of 45 kms from Belgaum, Karnataka State. The sugar mill, created in 1956, has installed capacity for 5000 Tons Crushed per Day (TCD).

Globe Cogeneration Power Limited (GCPL) proposes to develop a 45MW co-generation plant at the facility. GCPL is a special purpose vehicle established by Mr. V.K. Agrawal (& associates) and Mr. M.S. Dewan (& associates). Mr. Agrawal is the Chairman of the Trimbak Group which was established in 1990 and has operations in the following industries: textiles, power, non-ferrous metals, exports, real estate, finance and investments. The Trimbak Group's net worth is more than US $ 10 million. Mr. Dewan is Chairman of The Globe Group, established in 1962, which has an annual turnover of US$ 100 million. The Globe group's net worth is more than US$ 20 million. GCPL is being promoted by Mssrs. Agrawal and Dewan as individuals, and not through their respective firms.

GCPL has entered into a Power Purchase Agreement (PPA) with Karnataka Power Transmission Corporate Limited (KPTCL) on 7th September 2001. The same is has also been approved by Karnataka Electricity Regulatory Commission (KERC). KPTCL has agreed to pay GCPL a tariff of Rs. 2.25 per kilowatt-hour for the base year 1994-95, with an escalation rate of 5% per annum, for the first 10 years from the date of commencement of commercial operation by the Power Plant. Based on this the tariff applicable to GCPL the financial year 2003-04 is Rs.3.49 per kilowatt-hour.

GCPL has entered into a Project Development Agreement (PDA) with the host sugar mill, on 18 October 2000. In that agreement, GCPL will provide the host sugar mill with free power and steam supply for the sugar mill process. Additionally, the sugar mill will receive a royalty of 6% of energy export revenue during season and 2% of the export during the off-season. GCPL will operate the co-generation plant on a BOOT basis for a period of 20 years, after which it will be transferred to the sugar mill. During the operating phase of the PDA, the sugar mill will provide GCPL with 40 acres of land, all of the mill-generated bagasse, return steam condensate, access to ash and effluent discharge system and water.

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The project developers enlisted a consulting firm to perform a technology feasibility study of the different technology options. The firm advised that "double extraction cum condensing turbine" to provide sugar process steam and "in-house" and "exportable" power during the cane season would be the optimum option for GCPL. The turbine could then be used as "straight through condensing turbine" during the off-season (non-crushing season) and not generate any backpressure steam.

The project developers propose that the 45 MW cogeneration power plant will mainly utilize bagasse, cane trash and other agro residues during the season (approximately 240 days) and for off-season period of 90 days. However, to meet any contingency in meeting availability requirements under the PPA, and/or availability of these residues (possibility of which is very remote), during the 90 days of off-season, they propose to rely on imported coal.

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2. Project Costs

√		Rs	US$	%
√	**Land & Building**	40,000,000	$ 869,565	2.2%
√	**Civil Works**	175,000,000	$3,804,347	9.7%
√	**Plant & Machinery**	1,000,000,000	$21,739,130	55.2%
√	**Misc. Fixed Assets**	90,000,000	$1,956,521	4.9%
√	**Preliminary & Preoperative Expenses**	300,000,000	$6,521,739	16.6%
√	**Contingencies**	161,000,000	$3,500,000	8.9%
√	**Working Capital Margin**	44,000,000	$956,521	2.4%
√	**Total Project Cost**	1,810,000,000	$39,347,826	100%

3. Proposed Means of Financing

√		Rs	US$	%
√	**Total Debt Portion**	1,279,000,000	$27,804,347	70.6%
√	**Total Equity Portion**	450,000,000	$9,782,608	24.8%
√	**Total Subsidy**	81,000,000	$1,760,869	4.5%
√	**Total Project Cost**	1,810,000,000	$39,347,826	100%

4. Committed Financing (if any)

a. Committed Debt Providers

Under negotiations

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

b. Committed Equity Providers

[illegible]	[illegible]	[illegible]	[illegible]
V.K. Agrawal and Associates (Trimbak)	119,500,000	$ 2,597,826	26.55%
M.S. Dewan & Associates (Globe)	70,000,000	$ 1,521,739	15.55%
Govt of Karnataka	40,500,000	$ 880,434	9.00%
Subtotal	230,000,000	$ 5,000,000	51.11%
Outsiders	220,000,000	$ 4,782,608	48.89%
Total Equity	450,000,000	$ 9,782,608	100.00%
MNES Capital Subsidy	81,000,000		

Government of Karnataka providing a Rs 405 Lacs grant. GOK has policy that cogeneration power is eligible for RS 25 Lac/MW of exportable surplus. [1]

[1] DPR, Section 14.2.2 Incentives & Grants, Page 123

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5. Estimates of Profitability (rupees lakhs)

	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10
Revenue from power sale	6132.37	6868.25	7662.39	8518.78	8944.72	9391.95	9861.55	10354.63	10872.36	11415.98
Other revenue	0	0	0	0	0	0	0	0	0	0
Fuel (Raw Material) cost	1428.12	1592.06	1768.82	1959.28	2057.25	2160.11	2268.12	2381.52	2500.60	2625.63
O&M Cost	589.94	627.60	667.55	710.00	744.72	782.14	[illegible]	865.92	912.79	963.37
Admin/selling cost	105.38	113.14	121.54	130.63	140.49	151.16	162.73	175.29	188.91	203.70
PBIDT	4008.93	4535.45	5104.49	5718.89	6002.26	6298.54	6608.24	6931.90	7270.06	7623.28
Depreciation	1279.92	1279.92	1279.92	1279.92	1279.92	1279.92	1279.92	1279.92	1279.92	1279.92
Interest Term loan	1790.60	1790.60	1734.64	1510.82	1286.99	1063.17	839.34	615.52	391.69	167.87
Working Capital Loan	209.23	230.60	253.58	278.27	292.07	306.57	321.78	337.76	354.54	372.16
PBT	484.28	960.04	1530.34	2309.68	2786.06	3273.81	3773.37	4285.18	4809.71	5347.43
Provision for Tax	36.32	72.00	114.78	173.23	208.95	245.54	283.00	321.39	360.73	401.06
PAT	447.96	888.04	1415.57	2136.45	2577.11	3028.27	3490.36	3963.79	4448.98	4946.37
Dividend (%)	8%	15%	20%	25%	30%	30%	30%	30%	30%	30%
Dividend (incl.tax at 10%)	371.25	742.50	990.00	1237.50	1485.00	1485.00	1485.00	1485.00	1485.00	1485.00
Net Cash Flow	76.71	145.54	425.57	898.95	1092.11	1543.27	2005.36	2478.79	2963.98	3461.37

6. Projected Cash Flow

	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10
Sources of Funds										
PBT	484.28	960.04	1530.34	2309.68	2786.06	3273.81	3773.37	4285.18	4809.71	5347.43
Depreciation	1279.92	1279.92	1279.92	1279.92	1279.92	1279.92	1279.92	1279.92	1279.92	1279.92
Equity capital	4500									
Term loans	12790.00									
Working Capital	1307.67	133.58	143.62	154.33	86.27	90.58	95.11	99.87	104.86	110.10
Grants/Aid/Assistance	810.00									
Total sources	**21171.88**	**2373.54**	**2953.88**	**3743.93**	**4152.25**	**4644.32**	**5148.40**	**5664.97**	**6194.49**	**6737.45**
Application of funds										
Capital Expenditure	17660.00									
Inc. in Current Assets	1743.56	178.10	191.49	205.77	115.03	120.78	126.82	133.16	139.81	146.80
Term loan repayment	0	0	1598.75	1598.75	1598.75	1598.75	1598.75	1598.75	1598.75	1598.75
Taxes	36.32	72.00	114.78	173.23	208.95	245.54	283.00	321.39	360.73	401.06
Dividend	371.25	742.50	990.00	1237.50	1485.00	1485.00	1485.00	1485.00	1485.00	1485.00
Total Application	**19811.13**	**992.60**	**2895.01**	**3215.25**	**3407.73**	**3450.06**	**3493.57**	**3538.29**	**3584.29**	**3631.61**
Net Surplus	1360.75	1380.94	58.87	528.68	744.52	1194.25	1654.83	2126.67	2610.20	3105.84
IRR (pretax)	15.79%									
IRR (PAT)	33.25%									
DSCR	1.96	2.21	1.33	1.58	1.78	2.02	2.30	2.65	3.07	3.62
Av DSCR	2.14									

7. Status of Finance Negotiations

Are you in negotiations with any prospective debt providers? If yes, please specify and elaborate on expected time frame.

The promoters are in dialogue with few Indian lenders like Power Finance Corporation (PFC), IDFC, Andhra Bank, IREDA etc. the expected timeframe for obtaining commitment would be 2 to 3 months.

Do you plan to submit this project to a private venture capital firm or an international equity organization (e.g. REEF)? If yes identify specific fund and elaborate on negotiations.

The Project promoters are interested in discussing the project with suitable funds including REEF and other renewable energy funds.

Do you plan to submit this project to an international tender for carbon emissions reductions (e.g. Oregon Climate Trust)? If yes, please specify tender and closing date for submission.

No

8. Project Promoter Contact Information (See Section 12 for SPV if applicable)

√	Name of Project Promoter	Mr. V.K. Agrawal & Associates
√	Address	201, T.V. Industrial Estate
√	City, State, Province	Worli, Mumbai – 400 025
√	Contact Name	Mr. V.K. Agrawal, Chairman
√	Contact Phone	91-22-496-4767
√	Contact FAX	91-22-498-4154
√	Contact EMAIL	trimbak@bom3.vsnl.net.in

9. Project Management Team

√	Mr. V.K. Agrawal	Chairman of Trimbak Group
√	Mr. Vineet Agrawal	Director
√	Mr. M.S. Dewan	Director
√	Mr. Sanjay Jain	Director
√	Mr. S.B. Jijina	Director

10. Project Promoter(s) Financial History

√	Project Promoter	Mr. V.K. Agrawal & Associates
√	What were profitability figures last 3 years?	Personal Net worth of Shri V. K. Agrawal is Rs 18.00 Crores, as of 31, March 2001

√	Project Promoter	Mr. M.S. Dewan & Associates
√	What were profitability figures last 3 years?	Personal Net Worth of Mr. Dewan is Rs. 50 crorers.

11. Project Promoter Relevant Experience:

Briefly describe the relevant experience, if any, possessed by the project promoter. Has the promoter developed similar projects?

This is the first tangible investment by both Mssrs. Agrawal and Dewan in the power sector. While both project promoters have other business interests, they do not have a proven track record in energy production in general, or co-generation in specific.

According to the DPR, Globe Cogeneration has signed a Project Development Agreement (PDA) with two other sugar mills for co-generation projects. These include: M/S Ajinkyatara SSKL, Satara, Maharashtra (30MW Plant); and M/S Hirenyakeshi SSKN, Sankeshwar, Karnataka (45 MW Plant).

GCPL has already obtained all the approvals for the project and is engaged in implementation of the same. They have retained service of M/s Development Consulting Ltd., as affiliate of Kuljian Corporation of Philadelphia, US as its engineers cum consultant. DCL possesses experience in power consultancy over 50 years and has a strength of 900 persons in India.

12. Special Purpose Vehicle Contact Information (If applicable):

√	Name of SPV	Globe Co-Generation Power Limited
√	Address	201, T.V. Industrial Estate
√	City, State, Province	Worli, Mumbai – 400 025
√	Contact Name	Mr. V.K. Agrawal, Chairman
√	Contact Phone	91-22-496-4767
√	Contact FAX	91-22-498-4154
√	Contact EMAIL	trimbak@bom3.vsnl.net.in
√	Names and shares of the promoters	V.K. Agrawal & Associates (%) M.S. Dewan & Associates (%)
√	Is a Shareholding agreement in place	Under formulation

13. Project Details

√	Greenfield project or involves existing equipment?	New construction of co-generation plant at existing sugar mill site
√	Is GHG mitigation achieved by Process Improvement or Clean Energy Generation?	Clean Energy Generation and offset of baseline biomass management situation (untreated biomass leaking methane)
√	Size of Project (MW)?	45 MW
√	Project Location? City, Province	Sankeshwar, Belgaum, Karnataka
√	Off or on-grid?	On-grid
√	State Electricity Board?	Karnataka Power Transmission Corporation Limited
√	Technology?	Double extraction, condensing turbine providing both process steam and "in house" and "exportable power."
√	Type of Fuel?	In-season (240 days): Sugar Cane Bagasse Off-season (90 days): Procured bagasse, cane trash, other biomass and imported coal, if required.
√	Source of fuel supply?	In season: SHSSKN will supply all mill-generated bagasse to GCPL co-gen plant. Offseason: Saved bagasse by SHSSKN, bagasse from near by mills and cane trash from SHSSKN farmers.

14. Feasibility Details

√	Was Feasibility Study prepared independently?	Yes
√	What firm prepared the Feasibility Study? List address and contact details	A technical consulting firm

15. Background on the Power Purchase Agreement (if Applicable)

√	Does Project involve PPA (Yes or No) If no, skip to next heading.	Yes
√	Has a PPA been signed? (Yes or No)	Yes
√	Nature of Agreement? Take or Pay? Other?	Take or pay.
√	Name of state electricity board or primary PPA signatory?	Karnataka Power Transmission Corporation Limited
√	What date was the PPA signed?	7 September, 2001
	When does it enter into force?	On completion of Conditions Precedent
√	What is the length of the PPA? (Years)	20 years
√	What is the initial purchase price?	3.49 Rs/kWh
√	What is the annual % increase in purchase price?	5%
√	Can the project sell power directly to major consumers? (Yes or No)	No. However, if KPTCL defaults on payment for a continuous period of 90 days, the third party sale is allowed.
√	What are the securities provided for the revenues? Have the domestic lenders approved these mechanisms? Are there any special clauses, or provisions of relevance to the investors?	Irrevocable, revolving Letter of Credit from KPTCL
√	What are the terms of Payment to the project developers? Any special clauses of relevance to the investors/lenders? Have the domestic lenders approved the payment terms?	Payment in 15 days against invoice (late payment to attract penal interest of SBI PLR + 2% p.a. for the period of delay). Non payment to lead revocation of LC
√	What are the major provisions (event definitions, treatment of the off time, etc.) of the Force Majeure clauses?	Events defined. But obligations during FM not clear.
√	What is the method of fixation of tariff (two part, availability etc.)? Are there any provisions for deemed generating/penalties? What is the treatment for infirm power?	Based on MNES policy as adopted by Karnataka State Govt.
√	Have the provisions for change in law, termination, liquidated damages , etc. been approved by existing lenders/investors?	Provisions incorporated and would be vetted by lenders.
√	Would the SEB/generating utility want a share in the ownership of carbon offsets?	NA

16. Other Agreements (where applicable)

√	Fuel supply agreement signed?	Yes
√	Project Development Agreement with Host Sugar Mill Signed?	Yes
√	Water/utility supply agreement signed?	NA
	Shareholder's agreement been entered into between existing equity holders?	
	Special provisions of above agreements?	

17. Quantify and Describe Risks

	Risks	Low to High	Describe
√	Market?	Low	PPA in place. Power offtake should be of no concern.
√	Country/Sovereign?	Low	India has a stable financial and legal system as well as established market practices/institutions.
√	Regulatory?	Low	Power supply is governed by the Electricity Acts under which regulators are functioning in each state.
√	Contract/counter party	Low	Although power sector utilities in general are not in sound financial health, KPTCL is relatively in sound position. Karnataka Govt. has undertaken a reform based assistance program with IDFC which is spearheaded by KPTCL.
√	Construction?	Low	Standard equipment and availability of suitable workforce make construction easier.
√	Technology?	Low	Co-generation technology is well-known
√	Management?	Medium	Project developers have no previous experience in co-generation/energy development.
√	Enforceability of Contracts?	Low	Not a major area of concern especially in view of the IDFC program.
√	Competition?	Low	Karnataka state needs power to keep the growth rate hence the state is likely to need all the power generated by the RE based projects. In addition the excess power can be easily exported to other states in the common Southern region grid.
√	Exit?	Low	The laws of India like Companies Act, SEBI Act permit various modes of offloading equity stake.

18. For risks identified in section 14, discuss Mitigation/Coverage measures

	Risks	Describe Mitigation/Coverage
√	Market?	–
√	Country/Sovereign?	–
√	Regulatory?	–
√	Contract/counter party	–
√	Construction?	–
√	Technology?	–
√	Management?	Company has appointed experienced firm as project consultant. Further, the Company shall be appointing experienced personnel for operation, and management of the project.
√	Enforceability of Contracts?	–
√	Competition?	–
√	Exit?	–

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SECTION C: CARBON COMPONENT.

Checklists were adapted from a variety of sources including Natsource, LLC:

1. GHG Mitigation Macro Checklist

√		Yes	No
√	Does project generate real, measurable, long-term, additional and verifiable emissions reductions vis-à-vis current baseline alternatives?*		√
√	Are there sustainable development benefits such as increased employment and protecting biodiversity?	√	
√	Does the project rely on ODA from Annex B Countries?		√
√	Has the project received host country approval?		
√	Does project meet size definition for Bonn Fast Track CDM? --under 15 MW for renewables projects --under <15 gigawatthours/year savings for energy efficiency projects --under15 kilotonnes CO2E for emissions reductions from process changes		√

Baseline Scenario: Karnataka has just over 4000 MW of installed generation capacity with a mix of 34:66 thermal/hydro. On the base of actual generation this ratio was 50:50 in the year 2000-01. However, the state is in deficit and imports power from other states in the Southern Grid (SRLDC) and from the central power PSUs, viz. NTPC, NHPC and NPC to the extent of about 53% of its consumption. Both of these compose higher thermal power supply CPSUs (86:5:9 including nuclear 9%) and southern states (72:28). With a result the overall mix in the consumption by Karnataka is 63:37 thermal/hydro. The emission intensity of the southern grid at this mix is 17 tC/TJ.

Assuming that the project uses bagasse for generating entire power in season and purchased bagasse and other agro residues like cane trash to the extent of 90% during off-season, the total export of power attributable to these agro residues, which is the clean (GHG abating) power source this amounts to 222 MU. This power is equivalent to a carbon reduction potential of 150,535 tCO2 per annum at the above emission intensity.

2. Emission Reduction Calculations, Monitoring and Verification Checklist

√		Yes	No
√	Does the project involve a discrete reduction of emissions?	√	
√	Have the emissions reductions been estimated with an accepted methodology?	√	
√	Has a monitoring methodology been established?		√
√	Has a third party verifier been contracted to verify actual emissions reductions and sustainable development gains?		√
√	Has clear ownership of emissions reductions been determined and documented?		√

3. Carbon accounting details

	Parameter	Particulars
1	Baseline methodology	Refer to the note above
2	Baseline Emissions TCO2	150,535
3	Project Emissions TCO2	0
4	Emission reductions TCO2 (2-3)	150,535

Detailed Project Report (DPR) Worksheet

For GHG mitigating projects under
USAID's Greenhouse Gas Pollution Prevention Project – Climate Change Supplement

Managed by The Louis Berger Group, Inc.

Asia Bioenergy (India) Ltd.
(Project Finance)

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1. Contact Information for the Prospective Borrower

	Name of Company	Asia Bioenergy (India) Ltd.
	Address	824 Poonamallee High Road, Kilpauk
	City, State, Province	Chennai, Tamil Nadu
	Contact Name	
	Contact Phone	+91 44 641 1362, 642 8992
	Contact FAX	+91 44 641 1788
	Contact EMAIL	enkem99@md3.vsnl.net.in

2. Availability of Financial Information on Borrower

	Audited financial statements available for last 3 fiscal years?	√	
	Was firm in same general line of business for last 3 years?	√	
	Has firm reported operating profits AND net income during each of last 2 years?	√	

3. Borrower's Financial History (last three Fiscal Years)

	EBIDT			
	EBIDT/Total Income			
	Operating Profit (OP)			
	OP/TI			
	Net worth			
	Equity			
	EPS			
	Dividend			
	Major Capital Investments			
	Debt:Equity ratio			
	Fixed Asset Coverage Ratio			
	Current Ratio			
	Credit Rating by Lead FI/Bank			
	Depreciation/Amortization Expense			

	Interest Expense			
	Current maturity of LTD			

4. Background information on all used and unused short and long-term debt

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SECTION A: CLEAN ENERGY AND GHG MITIGATION EQUIPMENT FINANCE

About the Equipment/Technology: Larger clean energy or GHG mitigating projects (Project Finance) may involve more than one type of environmental equipment. Complete sections A 5 through A 10 for each piece of relevant GHG mitigating equipment.

5. Description of technology/service to be purchased

Not Applicable

6. Description of the GHG mitigating potential of the technology

Not Applicable

7. About the Business Negotiations

	Is the manufacturer of the technology a domestic company?		
	Is the manufacturer located overseas (exporter)?		
	Is the manufacturer a US company?		
	Have any price negotiations occurred?		
	Has a purchase order been submitted?		

How many units are in the Purchase Order? _____
What is the estimated unit cost of technology (US$)? _____
What is the total cost for the Purchase Order? _____

8. Contact Information on the Manufacturer

√	Name of Manufacturer	
	Address	
	City, State, Province	
	Contact Name	
	Contact Phone	
	Contact FAX	
	Contact EMAIL	

9. About the Trade Financing (For Equipment Imported Into India)

Is trade financing being sought for the import of the equipment to India? _____

What type of trade financing is being sought (insurance,guarantees, working capital?

_____

_____

10. Has a domestic or overseas lender been identified?

Yes. _____

	Name of Lender	Infrastructure Development Finance Company Ltd
	Address	ITC Center, 3rd Floor, 760 Anna Salai
	City, State, Province	Chennai, 600 002 Tamil Nadu India
	Contact Name	Mohan Kumar
	Contact Phone	+91 44 855 9440/48/56
	Contact FAX	+91 44 854 7597
	Contact EMAIL	mohan@idfc.com

SECTION B: PROJECT FINANCE FOR CLEAN ENERGY AND GHG MITIGATION

Project Name: Power generation & organic fertilizer production from Lucknow MSW

Project Promoter: Asia Bioenergy India Limited (ABIL)

Special Purpose Vehicle: Yes

1. Executive Summary: Project at a Glance

ABIL, a special purpose vehicle company set up by Enkem Engineers India Ltd., proposes to set up a 5 MW power generation plant using biogas generated by biomethanation of Municipal Solid Waste (MSW) supplied by the Lucknow Nagar Nigam (Lucknow Municipal Corporation). The plant leads to capturing methane that would otherwise have been emitted had the MSW been dumped on open dumpsites as is practiced in all the Indian cities. The project shall serve as a demonstration project to illustrate the use of advanced anaerobic digestion technology to enhance the biodegradation process. The gas after cleaning shall be fired in a gas engine to generate power for export to the UP Power Corporation's grid. The process would also result in production of nutrient rich organic manure, which can substitute chemical fertilizers for horticulture, fruits, plantations and gardens. The project awarded to ABIL under a competitive bidding process, costs about Rs. 740 million. ABIL is a Special Purpose Vehicle company promoted by Enkem Engineers India Ltd. M/s Entec GmbH, Austria, is providing the anaerobic digestion technology. The project is being implemented through EPC contract to several reputed international and Indian companies.

ABIL approached IDFC for loan for the project. IDFC has a mission of encouraging environmentally safer technologies for the projects funded by them. IDFC and The Louis Berger Group, Inc. the contractor for USAID/India GEP-CCS project identified this project as a possible opportunity to demonstrate the identification of GHG emission reduction and its possible use. The project demonstrates environmental and social sustainability as it leads to reduction of a major health and methane (a major GHG) emission hazard. It leads to employment opportunities to the local population. It also helps the local rag pickers (scavengers of valued items like paper, plastics and rags) to collect these items in a safe way that helps in recycling of these items.

The project has three major streams of GHG mitigation (i) Methane captured from the MSW; (ii) reduction in the emission of carbon dioxide from the coal fired power stations in Northern India; and (iii) Partial replacement of use of chemical fertilizers like urea, DAP which are manufactured in GHG intensive processes. The current way of disposal of MSW in India is predominantly dumping in the open.

This leads to methane emissions through the degradation of volatile organics and also to pollution of the ground water by the leachate generated on the dumpsites. The power supply in India in general and in the northern region in particular is dominated by thermal sources mainly coal fired power stations. The output of the project would replace this carbon intensive power source thereby lead to reduction in carbon dioxide emission. Similarly, the organic manure will replace the chemical fertilizers thereby reduce the CO2 that would have been generated in the manufacture.

ABIL shall set up measurement and verification systems to monitor and control the GHG reductions. The project risks have been identified and mechanisms to mitigate/cover them have been set in. Major project agreements like power purchase agreement, waste supply agreement etc. have been signed and approved by the funding agencies. Thus, overall the project offers an attractive opportunity for investment by investors especially the carbon investors.

2. Project Costs

	Plant & Machinery	188.75	6,000,000	61.75
	Land & Building			
	Civil, detailed Eng.	211.53	190,000	29.73
	Erection & Commissioning			
	Preliminary & Preoperative Expenses	63.00		8.52
	Working Capital Margin			
	Contingencies			
	Total Project Cost	463.28	6,190,000*	100

* Equivalent to Rs. 276.32 million @ Rs. 44.66 per US $. Total cost Rs. 739.60 million

3. **Proposed Means of Financing**

	Total Debt Portion	265.00	35.83
	Total Equity Portion#	350.00	47.32
	Total Deferred Credit	114.60	15.50
	Total lease	10.00	1.35
	Total	739.60	100.00

Including MNES subsidy of Rs. 150 Million

4. **Committed Financing**
   a. **Committed Debt Providers**

IDFC	**200.00**	**15.5%**	**10 years, 2 yrs moratorium**	**Under negotiations**
LIC	**65.00**	**15.5%**		
DC-Enkem	**20.00**	**15%**	**Repayable in 3 years from completion**	
DC-JEL	**66.60**	**15%**		
DC-ENTEC	**28.00**	**15%**		

   b. **Committed Equity Providers**

Enkem	50.00	25
JEL	30.00	15
ENTEC	27.00	13.5
IDFC	25.00	12.5
Investment Funds	68.00	34
Total	200.00	100

5. Estimates of Profitability

(Rs. Million)

	2004	2005	2006	2007	2008	2009	2010	2011	20[illegible]	2013
Revenue from power sale	119.16	130.81	137.35	144.22	151.43	159.00	166.95	175.30	184.06	193.26
Other revenue*	51.12	53.68	56.36	59.18	62.14	65.24	68.51	71.93	75.53	79.30
Total Revenue	170.28	184.48	193.71	203.39	213.56	224.24	235.45	247.23	259.59	272.57
Fuel cost										
O&M Cost	9.75	10.05	30.16	11.47	36.7	12.9	12.85	9.68	36.7	13.5
Admn/selling cost										
PBIDT	136.53	148.75	136.07	162.52	145.40	177.68	186.59	199.01	181.65	214.94
Depreciation	32.69	32.69	32.69	32.69	32.69	32.69	32.69	32.69	32.69	32.69
Interest Term loan										
Working cap	59.77	54.46	43.43	32.40	21.37	16.06	10.76	5.46		
PBT	44.08	61.60	59.95	97.44	91.35	128.93	143.14	160.86	148.96	182.25
Provision for Tax	3.31	4.62	4.50	7.31	6.85	9.67	10.74	12.06	11.17	13.67
PAT	40.77	56.98	55.45	90.13	84.50	119.26	132.40	148.80	137.79	168.58
Net Cash Flow	73.46	89.67	88.14	122.82	117.19	151.95	165.09	181.49	170.48	201.27

* Manure price assumed at Rs. 2,200 per ton without escalation each year as against Promoters assumption of Rs. 2,900 per ton with 5% annual escalation

6. Projected Cash Flow

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	201	20	20	201
Sources of Funds															
Inc. in Equity capital	200														
Inc. in term loans	265														
Inc. in Suppliers credit	124.6														
Subsidy	150														
Net Cash Flows		0.00	73.46	89.67	88.14	122.82	117.19	151.95	165.09	181.49	170.48	201.27	211.10	205.63	232.06
Total sources	**739.60**	**0.00**	**73.46**	**89.67**	**88.14**	**122.82**	**117.19**	**151.95**	**165.09**	**181.49**	**170.48**	**201.27**	**211.10**	**205.63**	**232.06**
Application of funds															
Capital Expenditure	739.6														
loan repayment		0	94.02	126.91	115.88	104.85	55.62	50.31	45.01	40.71	0	0			
Total Application	**739.6**	**0**	**94.02**	**126.91**	**115.88**	**104.85**	**55.62**	**50.31**	**45.01**	**40.71**	**0**	**0**			
Net Surplus	0.00	0.00	(20.55)	(37.24)	(27.74)	17.97	61.57	101.64	120.08	140.78	170.48	201.27	211.10	205.63	232.06
IRR*	23%														
DSCR			2.7203	1.6829	1.6461	2.1126	4.4062	5.3842	5.6541	5.8532					
Av DSCR	3.6825														

* IRR with carbon revenue (at $ 3 per tCO2) 27%

7. Status of Finance Negotiations

Are you in negotiations with any prospective debt providers? If yes, please specify and elaborate on expected time frame. Yes. The company is negotiating a loan from IDFC and LIC for a part of the project cost. IDFC is in an advanced stage of appraisal and is likely to approve the project soon. The current thrust is on validating the contracts for sale of organic manure. PPA has been signed with UPSEB as also the contract with Lucknow MC has been signed.

Do you plan to submit this project to a private venture capital firm or an international equity organization (e.g. REEF)? If yes identify specific fund and elaborate on negotiations. No. This has not been planned.

Do you plan to submit this project to an international tender for carbon emissions reductions (e.g. Oregon Climate Trust)? If yes, please specify tender and closing date for submission. Promoters are interested in availing finance/investments in lieu of the carbon offsets from the project. IDFC, the main lender has also evinced interest in structuring this project with carbon offset. It is in contact with PCF and may like to prepare the project for their consideration at an appropriate stage. IDFC in consultation with ABIL has approached LBG for technical assistance on estimating GHG reduction Potential.

8. Project Promoter Contact Information

√		
√	Name of Project Promoter	Enkem Engineers Pvt. Ltd.
√	Address	824 Poonamallee High Road, Kilpauk
√	City, State, Province	Chennai, Tamil Nadu India
√	Contact Name	Mr. Ragurajan, Director
√	Contact Phone	+91 44 641 1362 /91 44 642 8992
√	Contact FAX	+91 44 641 1788
√	Contact EMAIL	enkem99@md3.vsnl.net.in

9. Project Management Team

√	**Mr. Ragurajan**	**Director, ABIL**
√	**Mr. Rajendran**	**Project Engineer**
√	**Mr. Ravi Shankar**	**Electrical Engineer**
√	**Dr. C. A. Sastry**	**Advisor – Microbiology**
√	**Dr. G. Rangaswami**	**Advisor – Organic Fertilizer**
√	**Mr. N. Raghurajan**	**Advisor – Digestor Technology**

10. Project Promoter Financial History

√		
√	What were profitability figures last 3 years?	Rs. 180 Mn (2000-01), Rs. 70 Mn (1999-00), Rs. 21 Mn (1998-99)
	Book value of firm?	
	EPS reserves and surplus last 3 years?	
	What is current business?	Consultancy and Turnkey contracts in the area of sewage and effluent treatment plants. They have so far executed more than 200 industrial effluent treatment plants in India for a variety of industrial effluents like municipal sewage, tannery CETPs, sugar mills, distillery spent wash, textile, coffee, pharma, food industries waste, chemical/petrochemical, tyre, solvent extraction and mechanical engg industries. Enkem has also established municipal water supply plants, pumping stations etc.
	What are synergies between business and this project?	The project is a diversification of their services in the area of solid waste treatment. The technology tie-up with a recognized supplier would be enhancing their capability. Enkem is also executing several orders for biogas plants from effluents from tanneries, poultries etc. This project has good synergies with their overall business plan.

11. Project Promoter Relevant Experience:

Briefly describe the relevant experience, if any, possessed by the project promoter. Has the promoter developed similar projects?

Enkem Engineers Pvt. Ltd.- The company has executed over 200 plants all over India with capacities ranging from 100 to 40, 000 m3/day for a value of US $ 7 – 8 million in the last 5 years.

Entec GmBH, Austria, the technology provider is promoted by Rund Stahl Bau GmbH Austria a manufacturer of chemical reactors. Entec has developed the anaerobic digestion systems for solid and liquid waste capable of handling up to 12% solid content. They have established over 50 plants world over for a variety of substrates.

Innovative Umwelttechnik GesmBH (IUT) have vast experience in design of MSW treatment projects. The major area of their focus is MSW segregation plants. They have designed plants with handling capacity of 300,000 tons/year, which is similar to the proposed plant.

JEL, Singapore shall be the supplier of the entire power plant including the gas engine and waste heat based power plant. JEL has a wide experience in manufacture, erection and operation of these systems and have executed many such projects world over.

CGEA – Onyx France a subsidiary of Vivendi would be the O&M contractor. CGEA's turnover in the waste management business is over US $ 3.6 Bn. They are operating over 50 solid waste management projects of various types world over.

12. Special Purpose Vehicle Contact Information:

	Name of SPV	Asia Bioenergy (India) Ltd.
	Address	824 Poonamallee High Road, Kilpauk
	City, State, Province	Chennai, Tamil Nadu
	Contact Name	Mr. Ragurajan, Director
	Contact Phone	+91 44 641 1362, 642 8992
	Contact FAX	+91 44 641 1788
	Contact EMAIL	enkem99@md3.vsnl.net.in
	Names and shares of the promoters	Enkem Engineers Pvt. Ltd.
	Is a Shareholding agreement in place	Under negotiations
	Salient terms	NA

13. Project Details

	Greenfield project or involves existing equipment?	Greenfield
	Is GHG mitigation achieved by Process Improvement or Clean Energy Generation?	Clean energy generation
	Size of Project (MW)?	5.1 MW
	Project Location? City, Province	Lucknow, Uttar Pradesh, India
	Off or on-grid?	On grid
	State Electricity Board?	UP Power Corporation Ltd.
	Technology?	Biomethanization followed by gas engine and waste heat recovery
	Type of Fuel?	MSW derived methane rich biogas
	Source of fuel supply?	City garbage supplied by Lucknow Municipal Corporation

14. Feasibility Details

	Was Feasibility Study prepared independently?	No. But independent analysis carried out.
	What firm prepared the Feasibility Study? List address and contact details	Independent economic analysis prepared by Madras School of Economics.

15. Background on the Power Purchase Agreement

	Does Project involve PPA (Yes or No) If no, skip to next heading.	Yes
	Has a PPA been signed? (Yes or No)	Yes
	Nature of Agreement? Take or Pay? Other?	Take or pay
	Name of state electricity board or primary PPA signatory?	UP Power Corporation Ltd.
	What date was the PPA signed?	
	When does it enter into force?	After satisfaction of the Conditions Precedents.
	What is the length of the PPA? (Years)	15 years
	What is the initial purchase price?	Rs. 3.16 in 2002
	What is the annual % increase in purchase price?	5%
	Can the project sell power directly to major consumers? (Yes or No)	No
	What are the securities provided for the revenues? Have the domestic lenders approved these mechanisms? Are there any special clauses, or provisions of relevance to the investors?	Letter of Credit followed by Escrow and then State Govt. Guarantee
	What are the terms of Payment to the project developers? Any special clauses of relevance to the investors/lenders? Have the domestic lenders approved the payment terms?	Payment to be made on the –th day from raising the bill, failing which the LC would be revoked. Incentives @ % for payments in – days. IDFC has approved the PPA.
	What are the major provisions (event definitions, treatment of the off time, etc.) of the Force Majeure clauses?	FM clauses are fair to the promoters.
	What is the method of fixation of tariff (two-part, availability etc.)? Are there any provisions for deemed generating/penalties? What is the treatment for infirm power?	Availability based.
	Have the provisions for change in law, termination, liquidated damages, etc. been approved by existing lenders/investors?	Yes
	Would the SEB/generating utility want a share in the ownership of carbon offsets?	Not clear yet. TBD

16. Other Agreements

	Fuel supply agreement signed?	Garbage supply with LMC
	Organic Manure Purchase	Letter from the tea estate received. To be converted into an agreement in due course.
	Water/utility supply agreement signed?	Land lease agreement
	Shareholder's agreement been entered into between existing equity holders?	Being formulated.
	Special provisions of above agreements?	NA

17. Quantify and Describe Risks

	Risks	Low to High	Description
	Market?	Low	The commodities produced by the project power and organic manure are in deficit. Therefore, market risks are low except for the sale of manure, because it is not widely promoted to the farmers yet.
	Country/Sovereign?	Low	India has stable legal system and has by and large following the legal process. Contracts have been honored and businesses of the multinationals have flourished. Thus, the sovereign risk is minimal.
	Regulatory?	Low	The UP state has a functional electricity regulatory commission. The PPA has a legal validity. Also, the proposed project activity has overall support of the local/state/central govt. support
	Contract/counter party	Low	The PPA and the waste supply agreements have been entered into. These agreements are sound and fair. The other contractual structure is also established and is robust. Although, UPPCL is not in good financial health, this project has a special status and is also small in size. As such, no contract related problems are expected.
	Construction?	Low	The promoters have gathered strong EPC and other contractors. They have earlier experience in setting up such projects. The materials to be used are standard. Thus, construction is not likely to pose major challenges.
	Technology?	Medium	The technology providers have set up similar facilities elsewhere in the world. The promoters have experience in working with other effluent treatment projects in India. Combined, their strengths are sufficient to address any technology related issues.
	Management?	Low	The promoters have a very lean and efficient management, which is evident from a large number of projects they have implemented in a short span of time. In addition, they can draw any necessary resource from India or Austria

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			resource from India or Austria.
	Competition?	Low	MSW treatment is a nascent activity in India and competition in the field of MSW methanation project is very low. Also the overall size of the MSW treatment market is quite large [with over 300 Class I cities generating over 39 million tons of MSW daily]
	Exit?	Low	GOI is currently in the process of easing the companies act to allow easier closure of firms. The investment rules have already been relaxed. The Indian financial market is mature and transactions such as leveraged buyouts, creeping acquisitions etc. are common. Therefore, Exit from the companies in general and better performing ones in particular is not difficult and risky.

18. Mitigation/Coverage measures

	Risks	Describe Mitigation/Coverage
	Market?	Promoters have received letter from a tea garden for purchasing the entire production of the manure. This is proposed to be converted into a proper agreement for sale once the financial closure takes place.
	Country/Sovereign?	The PPA has been securitized with additional payment mechanisms namely, Escrow and State Government Guarantee. It also stipulates arbitration as per accepted international norms.
	Regulatory?	No major risk.
	Contract/counter party	PPA has been signed and validated by the UPERC.
	Construction?	No major risk.

	Technology?	Performance guarantees have been stipulated.
	Management?	No major risk.
	Enforceability of Contracts?	No major risk.
	Competition?	No major risk.
	Exit?	No major risk.

SECTION C: CARBON COMPONENT.

Checklists were adapted from a variety of sources including Natsource, LLC

1. GHG Mitigation Applicability Macro Checklist

√		Yes	No
	Does project generate real, measurable, long-term, additional and verifiable emissions reductions vis-à-vis current baseline alternatives?	√	
	Are there sustainable development benefits such as increased employment and protecting biodiversity?	√	
	Does the project rely on ODA from Annex B Countries?		√
	Has the project received host country approval?		√
	Does project meet size definition for Bonn Fast Track CDM? --under 15 MW for renewables projects --under <15 gigawatthours/year savings for energy efficiency projects --under15 kilotonnes CO2E for emissions reductions from process changes	√	

^ The project has been accorded by MNES as a National Demo project on biometahnization of MSW. So, approval from host country may not be difficult.

2. Emission Reduction Calculations, Monitoring and Verification Checklist

√		Yes	No
	Does the project involve a discrete reduction of emissions?	√	
	Have the emissions reductions been estimated with an accepted methodology?	√	
	Has a monitoring methodology been established?	√	
	Has a third party verifier been contracted to verify actual emissions reductions and sustainable development gains?		√
	Has clear ownership of emissions reductions been determined and documented?	√	

3. Carbon accounting details

	Parameter	Particulars
1	Baseline methodology	For methane abatement open dumping as practiced today For Power supply to grid Power mix in the Northern region and For fertilizer supplement- Emission from manufacture of urea/ammonia
2	Baseline Emissions TCO2	192,000 t CO2 per annum
3	Project Emissions TCO2	Nil
4	Emission reductions TCO2 (2-3)	192,000 t CO2 per annum

DRAFT

Greenhouse Gas Mitigation Potential Estimation

Of

5 MW solid waste biomethanation cum power project in Lucknow

Promoted by

Asia Bioenergy India Limited

By:

Greenhouse Gas Pollution Prevention-Climate Change Supplement
AUSAID/India project implemented by:
The Louis Berger Group, Inc.
C-6/7 Safdarjung Development Area
New Delhi 110 016

December 2001

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Acknowledgement & Disclaimer

This note assessing the Greenhouse Gas emission reduction potential of the 5 MW MSW biomethanation power project in Lucknow was prepared for Asia Bioenergy India Ltd (ABIL) and Infrastructure Development Finance Company Ltd. by The Louis Berger Group, Inc. The Louis Berger Group, Inc. is not responsible for the accuracy of data provided by ABIL, IDFC and that obtained from public domain. The information contained in the note is solely meant for ABIL and can be used by it to approach different funding mechanisms. The Louis Berger Group, Inc. is grateful to ABIL, IDFC and several other institutions including CEA, IPCC/IEA, UNFCCC, and The World Bank for the background data provided by them through their websites.

This note should not be considered an endorsement or certification to the project or the technology and it should not be deemed to be any undertaking, warranty or endorsement by The Louis Berger Group, Inc. and US Agency for International Development.

Executive Summary

Asia Bioenergy India Limited (ABIL) proposes to set up a 5 MW power generation plant using biogas generated by biomethanation of Municipal Solid Waste (MSW) supplied by the Lucknow Nagar Nigam (Lucknow Municipal Corporation-LMC). The plant leads to capturing methane that would otherwise have been emitted had the MSW been dumped on open dumpsites as is practiced in all the Indian cities. The project shall serve as a demonstration project to illustrate the use of advanced anaerobic digestion technology to enhance the biodegradation process. The gas, after cleaning, shall be fired in a gas engine to generate power for export to the UP Power Corporation's grid. The process would also result in production of nutrient rich organic manure, which can substitute chemical fertilizers for horticulture, fruits, plantations and gardens. The project awarded to ABIL through a competitive bidding process costs about Rs. 740 million. ABIL, a Special Purpose Vehicle company promoted by Enkem Engineers India Ltd., Entec GmbH, Austria, Jurong Engg. Ltd. (JEL) and few funds and financial institutions is providing the anaerobic digestion technology. The project is being implemented through EPC contract to several reputed international and Indian companies.

ABIL approached IDFC for funds in the form of loan and equity for the project, which is under active consideration. IDFC has a mission of encouraging environmentally safer technologies for the projects funded by them. IDFC and The Louis Berger Group, Inc. the contractor for USAID/India GEP-CCS project identified this project as a possible opportunity to demonstrate the identification of GHG emission reduction and its possible use. The project demonstrates environmental and social sustainability as it leads to reduction of a major health and methane (a major GHG) emission hazard. It leads to employment opportunities to the local population. It also helps the local rag pickers (scavengers of valued items like paper, plastics and rags) to collect these items in a safe way that helps in recycling of these items.

The project has three major streams of GHG mitigation (i) Methane captured from the MSW; (ii) reduction in the emission of carbon dioxide from the coal fired power stations in Northern India; and (iii) Avoidance of use of chemical fertilizers like urea, DAP which are manufactured in GHG intensive processes. The current way of disposal of MSW in India is predominantly dumping in the open. This leads to methane emissions through the degradation of volatile organics and also to pollution of the ground water by the leachate generated on the dumpsites. The power supply in India in general and in the northern region in particular is dominated by thermal sources mainly coal fired power stations. The output of the project would replace this carbon intensive power source thereby lead to reduction in carbon dioxide emission. Similarly, the organic manure will replace the chemical fertilizers thereby reduce the CO2 that would have been generated in the manufacture.

ABIL shall set up measurement and verification systems to monitor and control the GHG reductions. The project risks have been identified and mechanisms to mitigate/cover them have been set in. Major project agreements like power purchase agreement, waste supply agreement etc. have been signed and approved by the funding agencies. Thus, overall the project offers an attractive opportunity for investment by investors especially the carbon investors.

ABIL PROJECT - GREENHOUSE GAS (GHG) MITIGATION ASSESSMENT

1. Background of the project

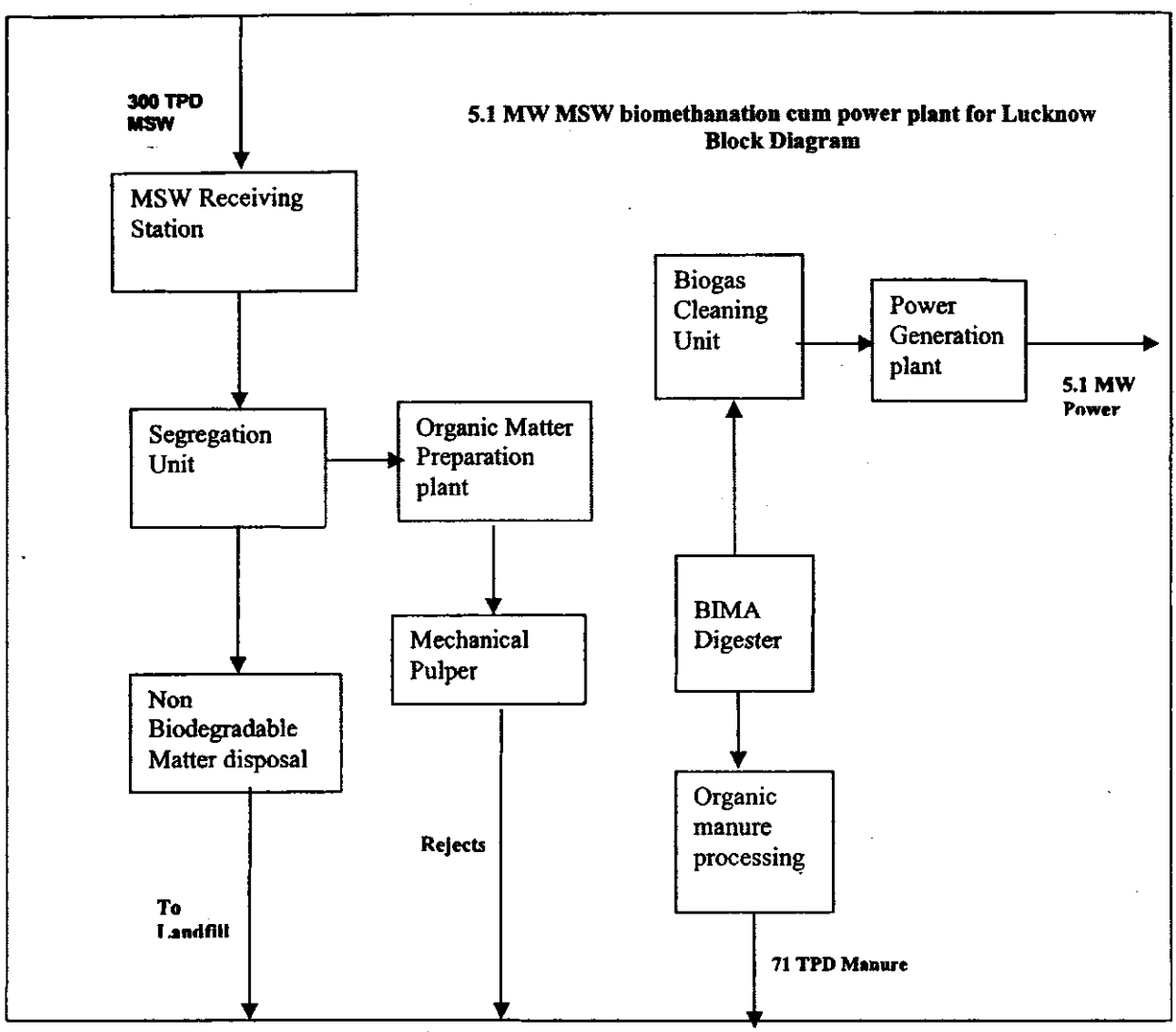
Asia Bioenergy India Limited (ABIL), a new Special Purpose Vehicle (SPV) company promoted by M/s Enkem Engineers Pvt. Ltd. (Enkem), Chennai, proposes to set up a project to generate 5.1 MW power (net) and 75 TPD Organic Manure from the municipal solid waste (MSW) to be supplied by the Lucknow Municipal Corporation (LMC), Lucknow, Uttar Pradesh (UP). Lucknow, the capital of the state of UP with a population of around 3 million generates about 1500 Tons per day (TPD) of solid waste of this about 66% is collected. LMC has agreed to supply 300 TPD of the MSW to ABIL for the above purpose that meets specifications as stated in the agreement.

ABIL shall segregate the biodegradable matter from the MSW and process the same through anaerobic digestion in specifically designed reactors to generate a biogas rich in methane content. This gas shall be used, after due treatment, in gas engines to generate electric power. The waste heat contained in the flue gases from the engine shall be recovered for generation of additional electric power. After meeting the auxiliary power generation, ABIL shall export power to the grid of UP Power Corporation Ltd. (UPPCL), originally known as UP State Electricity Board (UPSEB). ABIL's contracted capacity to UPPCL is stated at 5.1 MW. After the generation and recovery of the biogas, the remaining material shall be dried and sold as a bacteria free manure rich in organics. This manure shall be suitable to agricultural and gardening / plantation purposes. The organic manure would be available to the extent of 75 TPD from the project. The plant shall be operating for 23 hours a day for about 324 days in a year and thus available to the extent of 85%. A flow chart of the plant is given in Figure 1.

ABIL has entered into a 30-year power purchase agreement (PPA) with UPSEB on July 31, 1998 [renewable for a further period of 30 years] and a Waste Supply agreement with LMC on February 14, 1997 also for an equal term. It has received a letter of intent for purchase of organic manure from a tea estate, which is to be converted in a five-year agreement for 2500 Tons per month of bio fertilizer of specific characteristics.

The cost of proposed project is estimated at Rs. 760 million (including foreign currency expenses of US $ 5.81 million @ Rs. 43.5 per US $), which is proposed to be financed by equity of Rs. 244 million, and debt of Rs. 366 million. The National Bio-energy Board of Ministry of Non-Conventional Energy Sources (MNES) of Government of India (GOI) has accepted the project as a "National Demonstration Project". MNES has agreed to provide a subsidy of Rs. 150 million as per the scheme in view of the GHG mitigating nature of the project and its ability to demonstrate generation of energy from waste to other cities in India.

Figure 1: Process Flows



The primary Indian lender to the project appointed M/S Ernst & Young (E&Y) an international consulting of repute for conducting Techno-economic review of the project. E&Y conducted a careful review of the project documents, made a site visit and had discussions with concerned authorities for an independent assessment as also conducted some experiments with the MSW. Key conclusions of their report are as follows:

- The guarantees provided by LMC are enforceable and protect the project promoters from variations in waste quality
- The treatment system as proposed should be able to handle the MSW and generate power and biofertilizer

- The biogas generation and the associated power generation would be close to design figures (lower by about 2.5% than the design figures)
- The project risks are adequately covered to the maximum extent possible

2. GHG emission reduction objectives of the proposed project

Technology options for MSW treatment

Municipal solid waste comprises various substances and differs from place to place. Thus, the approach to treat MSW from different countries differs. There are various options for this, starting from reducing waste and recycling to composting, incineration/pyrolysis, sanitary land filling and biomethanization. The first two options are desirable irrespective of the technology for treating the waste, as these reduce the quantity of the waste and thereby the load on the treatment plant. In the incineration or pyrolysis process the biodegradable matter is burnt off, thereby using the heating value. However, as the MSW is wet, major portion of heat is taken away in evaporating the water. Also, this process may result in emission of undesirable substances like dioxins; SOx etc. These gases are more dangerous as compared with main GHGs. The composting option enables treatment of bio-degradable matter, but the gases evolved in the aerobic digestion process mainly carbon dioxide escapes in the atmosphere and thereby does not help in GHG reduction. Also, the only saleable product in this process is the compost produced. This reduces the financial viability of the process. While, this could be the advisable option for smaller municipalities where the MSW generation is not enough to economically sustain higher treatment options such as biomethanation and engineered landfill. Engineered landfill is an option, which also permits recovery of methane. However, this requires comparatively larger land and elaborate and expensive construction. It is also essential to prevent leakage of leachate in land, which could contaminate the ground water. This option may also need a similar demonstration in India before it can be used on a wider scale by municipalities. Though costlier, biomethanation offers several advantages over these options as discussed further.

a. Clean Technology nature

In the biomethanization process, the process of digestion of biodegradable matter is carried out in a closed vessel, which helps in avoidance of emission of methane (a greenhouse gas with high global warming potential) as also any leachate that is generated. Further, since the process is catalyzed by enzyme secreted by microorganisms in the culture, it helps in recovering more methane than the composting process. The methane rich biogas is collected and gainfully utilized to produce power, which is fed to the grid, thereby replacing power from carbon intensive thermal sources. The process leaves behind organic manure, free of bacteria and can be a substitute for chemical fertilizers like ammonia and urea, which generate large amounts of CO_2 during manufacture. Thus, biomethanization process helps in mitigating three sources of potential GHG emission (i) Methane gas which could have otherwise escaped from open dumpsites or composting yards (ii) GHG emissions from coal fired thermal plants while producing equivalent amount of power; and (iii) substituting chemical fertilizers, during the manufacture of which GHG emission occurs.

b. Sustainable Development objectives/aspects

The treatment cum power plant would employ about 30 persons directly and a large number of persons in the waste collection, marketing of fertilizers indirectly. The project helps in bettering environment in the city of Lucknow by a hygienic

treatment of solid waste. It therefore, improves health standard in the city. The segregation prior to biomethanization results in a large quantity of inert non-biodegradable matter like metals, earth etc. Many of these items could be recycled, thereby providing employment to poor local folks especially women. This would otherwise result in unorganized, which is fraught with hazards. [redacted]

c. ***Host country Government (GOI) objectives/approvals***

The Ministry of Non-Conventional Energy Sources (MNES) of the GOI has declared the current project as a demo project under its national program of waste to energy. GOI is providing support to the project in order to help reduce the initial cost burden. The Honorable Supreme Court of India has directed the GOI to ensure proper treatment of MSW and disallowed its dumping. In view of this, the Ministry of Environment & Forests (MOEF) has issued a Notification for proper management of MSW. In view of this, the GOI approval for this project is imminent. ABIL in cooperation with LMC and MNES is in the process of approaching MOEF for a formal host country approval for the project.

3. Business as usual or Baseline identification

The current practice of management of MSW in India comprises collection of the garbage and dumping it at specified sites within the city limits. These sites are generally unused land in the outskirts of the cities, which have large pits. These sites enable a large storage of solid waste therefore a larger life. The 300 class I cities covering a population of 250 million generate about 39 million tons of MSW every day. Only a few of these cities have initiated ways of treating their solid waste, which mainly resort to composting and land filling. The UP government, with MNES assistance conducted a survey of waste generation and collection in the state's ten major municipalities. This has resulted in identification of the present project as a showcase to other municipalities. The current practice of solid waste management in the city of Lucknow (which represents a general Indian city) is dumping in open area at various sites.

a. Project boundary

The project shall encompass the city of Lucknow from where the city garbage is collected, which was dumped otherwise on open sites. The project boundary for the first stream of GHG reduction viz. methane is the boundary of city of Lucknow.

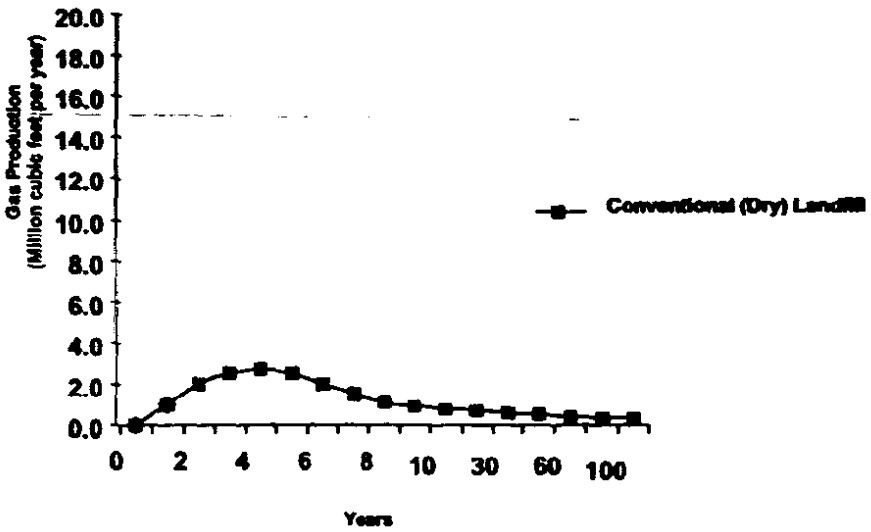
As the power is fed in the grid, which connects the city with UP state, which in turn, is well integrated with the Northern Regional grid becomes the boundary for the power supply. The overall grid in India is divided in five main geographic regions (North, West, South, East and the North-East). These region come under individual Regional Load Despatch Centers (RLDCs), which are represented by Regional Electricity Boards formed under the Indian Electricity Act, 1948. The power transfers within the RLDCs is common. The RLDCs in turn are being connected through inter regional bulk power transmission lines. However, this process of formation of a National Grid is yet to take place (At present only 3 inter regional bulk transmission lines have been functional). Thus, the RLDCs should generally be considered as independent power centers. In this case the Northern Regional Load Despatch center (NRLDC), which consists of the states of Jammu & Kashmir, Punjab, Himachal Pradesh, Haryana, Rajasthan and Uttar Pradesh and the UT of Chandigarh is considered as the project's boundary.

The organic manure avoids/substitutes the use of chemical fertilizers like urea, DAP etc. the manufacturing process of these chemicals leads to emission of CO2 and other GHGs. For the purpose of this stream of GHG reduction, it would be essential to include the fertilizer manufacturing plants in the project boundary. Although it would be desirous to include all these, it would be practical to consider average plants of these two and accord due weightage proportional to the consumption (by the intended users).

b. Relevant baseline methodology/scenarios

(i) For methane recovery: The proposed project essentially is first of its kind, capturing methane from the biodegradable material of the MSW. If the material were dumped in the open as is practiced today, these would degrade in aerobic conditions. The biological processes are shown to follow a bell

shaped curve Figure 1. Over a span of 2 to 6 years, this material would degenerate fully.



Source: Global Energy Partners LLC
Figure 1: Biogas production from dry landfills

Thus, the volatile degradable material in the waste forms methane rich biogas at a slow rate and is released in the atmosphere. Carbon contained in the biodegradable matter of the solid waste would degrade over a long period. The proposed process enables faster digestion of majority of carbonaceous material in gas. Therefore, the baseline for this stream of reduction is the total emission of methane that could occur from the typical MSW from the Lucknow city. [However, since the proposed project would capture methane reduction as per the process designed by ENTEC, the net reduction is restricted to this amount.]

(ii) For power export to grid: The power generation is using a gas engine as against the normal Rankine cycle or gas turbine. This is an innovative approach. The project would feed about 5000 kW worth of power in the grid of UP Power Corporation Ltd. (UPPCL), which is an integral part of NRLDC. The emission factor of NRLDC would therefore be the baseline as this would be the source of power in the absence of the project. A careful analysis of the performance of the regional grid suggests that on an average in the year 2001 the UP grid had ~81% of power from thermal sources, both of UPPCL's own and procurements from the central power sector utilities (CPSU). About 14% was from hydroelectric sources and rest purchased from nuclear plants of CPSUs. The thermal power mentioned above is mainly from coal fired plants using sub bituminous coal mined in central India. The coal has large amounts of ash, which leads to low conversion efficiency. Indian power grid exhibits very high transmission and distribution losses. Although the actual figures revealed off late arte quite high in many states including UP, it is preferable to use the published figure of 20% to be on a conservative side.

Since this a grid feeding power plant with a capacity < 15 MW, it would qualify for the fast track projects as defined under the Bonn agreement. The baseline is calculated from the data on installed capacities and generation details from various sources for both UPPCL and NRLDC. The data is available from the Planning Commission of India's Annual report of SEBs for June 2001 and Central Electricity Authority's report on NREB. The thermal plants are in majority based on pulverized coal fired technology. These plants mainly use sub-bituminous coal from the mines around central India. Based on the emission factors for this fuel for India as specified in the IPCC report and used by the World Bank GHG assessment handbook. The results are presented later.

(iii) For replacement of chemical fertilizer by organic manure: The proposed plant would generate 75 TPD of organic manure. The manure shall replace the use of chemical fertilizers like urea, diammonium phosphate (DAP), Potash and super phosphates mainly by plantations like tea/coffee gardens, horticultural use in municipal gardens etc. Since the manure has lower concentrations of N, P and K the release of these nutrients is slower than Chemical fertilizers. Based on the experience of the major users viz. the tea estates the equivalent amount of the manure to one ton of chemical fertilizer is found. Based on the specific energy consumption of urea and ammonia and the average of usage of these fertilizers in India, the weighted average emission factors of the chemical fertilizers is found out. The baseline emission reduction is the amount of emission by the equivalent amount of chemical fertilizers used. While, the manufacturing processes of chemical fertilizers also leads to emission of N_2O, for want of precise data these were not quantifiable and hence were not accounted for in the present analysis.

Here it needs to be clarified that the project generates organic manure, which replaces use of chemically manufactured fertilizers (in the same manner that the power generated replaces grid power.) therefore, these are NOT of the nature of embodied GHG emissions that the project replaces. Moreover, these reductions are measurable from the quantity of the chemical fertilizers, a product that would be used in absence of project's output; the carbon emission reductions from this source should qualify for CERs.

c. ***Time dimensions of the baseline***

The biomethanization technology is being introduced for the first time in the country. There are over 300 Class I cities in the country, which generate an estimated quantity of about 39 million tons of solid waste per year. It s expected that the use of the technology will take a long time before it becomes a common practice. Thus, the baseline is not likely to shifty during at least a decade during which the investors would buy the carbon offsets.

d. ***Annual /periodic estimations***

In view of the innovative nature of the proposed technology, it may not be necessary to revise the baseline estimate during the course of the first ten years during which investors are likely to purchase the credits.

e. Baseline case emissions estimation

Based on the methodology presented earlier and data collected from various sources, the baseline GHG emissions were estimated. The summary of the same is presented below.

I Methane Capture from Solid wastes

Methane generated due to biological degradation of the volatile solids in the solid waste. If the solid waste were dumped in open a majority of this amount of methane would have been generated over a period of over ten years. In the proposed process the degradation takes place at enhanced rate with the help of microbial reaction. Thus, in the absence of the project activity, there could be entire degradation of the organic matter.

Parameter	Value	Unit
Total waste received	300	Tons/day
Inert material segregated	99	Tons/day
Treatable material	201	Tons/day
Dry volatile solids	104	Tons/day
Biogas generated at STP	42320	Nm3/day
Methane recovered	25392	Nm3/day
Annual methane captured	5627	TPA
Equivalent* CO_2	118,169	TPA

* GWP of methane for 100 year horizon = 21

II CO_2 Emissions from power used in the state grid

The requirement of power in the state is met through own generation, which includes coal fired thermal and hydroelectric power plants. In addition, the UP Power Corporation purchases power from the central public sector power generating companies, which have a mix of thermal, hydel and nuclear power. Based on the respective capacities, it is found that thermal power contributes about 80% of the capacity and 20% of the hydel sources. However, based on the statistics of power generated and purchased, it is observed that in 2001 of a total 39879 MU consumed by the state grid 82.2 % was supplied from thermal sources, mainly coal fired plants, 14.4 % from hydel and 3.4 % by nuclear sources. The composition was more or less same in the year 2000, with 81.4%, 15.5% and 3.1%. The thermal plants which are based on high ash Indian coal use sub bituminous variety coal as fuel. By and large the plants are old and exhibit conversion efficiencies in the range of 33%. Indian electric power grid especially at the sub transmission and distribution levels, which operate at low voltage ratings of 33 KVA and 11 KVA, exhibit high transmission & distribution losses, sometimes in the excess of 40%. However, to be on a conservative side an estimated 20% T&D losses are assumed in the analysis.

The emission factors of these plants have been assumed on the basis of IPCC methodology (as discussed in: UNEP/OECD/IEA/IPCC 1995) for India, which is also being followed by several multilateral institutions like The World Bank. The emission factor of thermal power plants using

bituminous/anthracite coals from India is 26.2 tons Carbon/TJ. To be on a conservative side, even though many of the hydel plants of National Hydroelectric Power Corporation (NHPC) are large in size it is assumed that they do not lead to any indirect GHG emissions. After considering the mix of supply from various sources as mentioned above, the weighted average emission factor of the UP state grid is 21.5 tC/TJ.

III CO_2 Emission from inorganic fertilizers during manufacture

One of the features of the proposed project is the generation of organic manure that substitutes the use of chemical fertilizers like urea, di ammonium phosphate, and potash. During the manufacture of the chemical fertilizers like urea, ammonia, single/triple super phosphate (SSP/TSP), di-ammonium phosphate (DAP) a large amount of energy is consumed. This energy is in both thermal as well as electrical forms. In addition, during processing, raw material, intermediates and finished goods are lost due to spillages, evaporation etc. Some of the reactions also evolve CO2; nitrous oxide, perfluoro carbons and many other pollutants like SO_2, NOx, particulate matter etc. The use of the chemical fertilizers (popularly referred as NPK fertilizers in India) has increased over a last few decades. While, it has contributed greatly to the green revolution to increase the food output in the country, excessive use also leads to increase in acidity of the soil, thereby degrading its quality.

The most important step in producing ammonia (NH3) is the production of hydrogen, which is followed by the reaction between hydrogen and nitrogen. A number of processes are available to produce hydrogen, differing primarily in type of feedstock used. The hydrogen production route predominantly used worldwide is steam reforming of natural gas. In this process natural gas (CH4) is mixed with water (steam) and air to produce hydrogen (H2), carbon monoxide (CO) and carbon dioxide (CO2). Waste heat is used for preheating and steam production, and part of the methane is burnt to generate the energy required to drive the reaction. CO is further converted to Co2 and H2 using the water gas shift reaction. After CO and Co2 is removed from the gas mixture ammonia (NH_3) is obtained by synthesis reaction.

The specific Energy Consumption of fertilizer plants in India were 12.3 Gcal/ton of ammonia, 13.5 Gcal/ton of urea, and 0.06 Gcal/ton of DAP. The consumption of major fertilizers namely urea, DAP and SSP are 72%, 14% and 14% respectively. Based on the feedstock from which the fertilizers derive energy and the power consumption of process, the average emission factor of each ton of chemical fertilizer works out to approximately 2.63 tons CO_2/ton of fertilizer.[1,2,3]

[1] India's Fertilizer Industry: Productivity and Energy Efficiency *Katja Schumacher and Jayant Sathaye* Environmental Energy Technologies Division July 1999
[2] Energy Conservation at design stage, CII Energy Management Cell, under the ADB-ESP project
[3] TERI Energy Data Directory & Yearbook 1999/2000

4. GHG mitigation potential of the project

The project helps in avoiding emission of two main greenhouse gases; methane and carbon dioxide.

I The project enables capture of the methane from the biological degradation processes. If the waste is left in open it would require a long time for the microbes present in the waste as well as the soil and air to break the organic molecules into smaller molecules and ultimately methane gas. Estimated time of 15 – 20 years is needed to break various complex compounds. In the proposed plant the seed culture of microbes uses the nutrients in the waste to enhance the biodegradation process in absence of air. Thus, the anaerobic process enhanced by the enzymatic catalysis hastens the biodegradation process and increases the yield of methane. The left over solids in the waste are non degradable for all practical purposes. Based on the estimates from laboratory results and experience of the technology suppliers elsewhere, the gas generation is estimated to be around 0.86 m3/kg of volatile solids (49,290 m3/day from the project at 37^0 C) containing about 65% methane and the rest carbon dioxide, moisture etc. However, as per the technology review conducted by Ernst & Young, the gas generation has been over estimated by about 2.5%. When this is applied to the estimates gas generation is likely to be ~ 48,055 m3/day. Thus, the project helps in capturing about 25,392 m3 of methane gas at Standard Temperature and Pressure. This works out to 118,169 Tons per annum of CO_2 (GWP of methane is 21)

II The project generates a total of 5.6 MW of electric power and after meeting the plant needs exports power worth about 5.1 MW. Under assumptions of availability of 85%, the proposed project would feed 38.6 MU in the state grid of UP. In the absence of project activity, this could have been met with grid power, which has a high thermal power concentration. The state of UP generates its own power and also receives power from its share from the central power sector PSUs (Viz. NTPC, NHPC, NPC etc.). Based on the scenario outlined in the earlier section, the power generated by combustion of the methane captured would lead to reduction of carbon emissions from the coal fired grid power to the extent of 40,375 Tons per annum of CO_2.

III The proposed project generates organic manure to the extent of 71 TPD. The manure has adequate quantities of N, P and K as desired by plants especially plantations. The composition of the manure is given below:

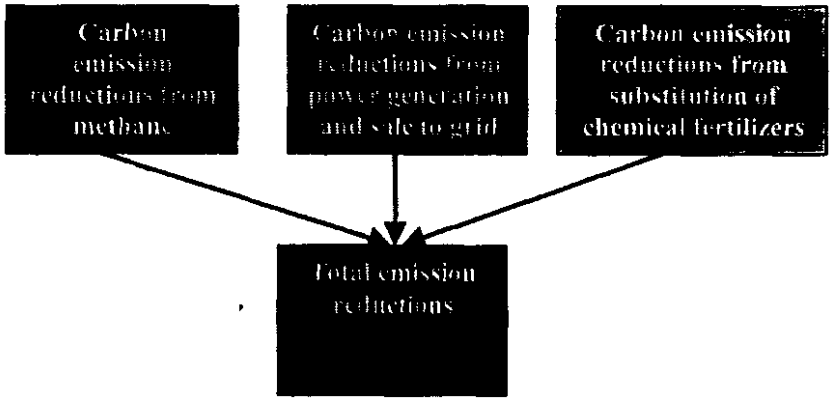
Parameter	Range
Moisture	25 – 30
Solids	70 – 75
Organics	40 – 50
Nitrogen	0.2 - 0.6
Phosphorus	0.8 – 6.8
Potassium	0.3 – 1.4
Fe, Cu, Zn	Traces
PH value	6.0 – 7.0

The plantations and even the other crops prefer this type of fertilizer on account of the slow release of nutrients, which are absorbed properly by the soil and hence the plants. In addition, the manure does not allow drainage of the nutrients and also preserves the pH of the soil. The organic manure generated from the project is assumed to be able to supplement the chemical fertilizers. It assumed that each ton to the manure should replace 500 kg of chemical fertilizers.

Therefore, the overall reduction from the project's sale of 25,560 tons of organic manure per annum works at 33,587 tons CO_2 per annum.

To summarize, the total carbon emission reductions from the project would be as given below:

Stream of carbon reductions	Carbon emission reductions tons CO_2 per annum
Capture of methane from solid waste	118,169
Power generation from methane gas	40,375
Replacement of chemical fertilizers	33,587
Total	192,131



Leakages

Leakages are defined as net change of anthropogenic emissions occurring outside the project boundary, which are measurable and attributable to the proposed project activity. The possibilities of such emissions occurring on account of this project are remote, in view of its size and its nature. Hence the leakages from this project activity are taken as nil.

5. Monitoring & Verification

Monitoring and Verification (M&V) of the emission reductions from a project is a key to ensure that the projected reductions indeed take place. The investors risk from a project are addressed to a large extent through the M&V process. The M&V for the proposed project is outlined below.

a. M&V philosophy

The proposed project has three distinct components of the emission reduction. Therefore, the M&V approach for these streams is designed separately.

For the solid waste treatment, the measure of reductions shall be from the quantity of solid waste treated, which has a relationship with the methane generated. The proposed plant would have a measurement system for the solid waste as specified in the contract with LMC. The measure of the solid waste treated will be as measured by the weighbridge to be installed by the company conforming to the Indian standards. The quantities of solid waste received through each vehicle shall be recorded in a logbook, which will be endorsed by the representatives of the company and LMC.

For the power fed to the regional grid, the measurement system is relatively clear as the metering of power is clearly specified in the PPA with UPPCL. It specifies that there shall be two meters one for export and the other for import of power. Each of these meters shall have check meters to be installed by UPPCL to maintain checks as per prudent utility practices. All the meters shall be of 0.2 accuracy class. The power supplied by the company shall be metered and tested at regular intervals.

As regards the organic manure sale, the measurement of the weight of the manure sale shall be as per the sale records of the company. These would be recorded as per the usual standards of sale of goods.

The company proposes to appoint internationally reputed engineering and auditing firms to validate the baseline methodology, estimation of emission reductions and the year-to-year achievement of the target reductions. Specialist agencies shall also review the baseline periodically at intervals suggested under the international rules to be framed.

b. M&V system specification

The M&V system based on the above philosophy will be properly documented so that it is strictly implemented. An audit of the records and system maintenance practices shall be conducted annually. The M&V system will also keep a track of the parameters such as power plant capacities added in the northern region, fertilizer consumption and developments on solid waste management and methane capture projects in the country. The major assumptions made in the GHG reduction analysis shall also be confirmed from time to time, so as to keep a track of achievement of the carbon offsets and also to account for any Leakages that may occur. These could for example be on the account of increase/decrease in emissions from the open

dumping of MSW. project acquiring less offsets than projected.

c. ***Hardware needs***

Equipment for Me f MSW received, organic manure sold, composition nt of temperature, quantity and composition of bio of power exported to the grid at the bus bar (load , data loggers and other related hardware. All the ipment is a part of the project and its cost is included

d. ***M&V protocol***

It is proposed to ies of monitoring the parameters identified earlier [redacted]

- Measure and composition of the MSW received
- Measure ty of biogas produced and its compositio
- Meter and ted and sold to the grid
- Measure ar y of manure sold
- Keep track ment practices in the city and the country
- Keep track er supply in the northern electric power grid eting the National Grid
- Keep track f chemical and organic fertilizers

This will enable ion reductions. The documents so generated shall be any interested party.

e. ***Agencies to certify*** [redacted]

f. ***M&V Cost estimates***

Item	Estimated cost Rs Million	Equivalent US$ (US$ 1 = Rs [illegible])
Additional Hardware - Specialized MIS	[redacted]	[redacted]
GHG monitoring system design and maintenance expenses	[redacted]	[redacted]
Baseline methodology emissions and reduction verification	[redacted]	[redacted]

Annual certification of emission reductions (10 years capitalized)	[redacted]

Annual adaptation cost @2% of revenues [$2X 214,035X0.02] = $ 8561.4 p.a. (@ US $ 2 per ton CO_2)

6. Estimation of cost of

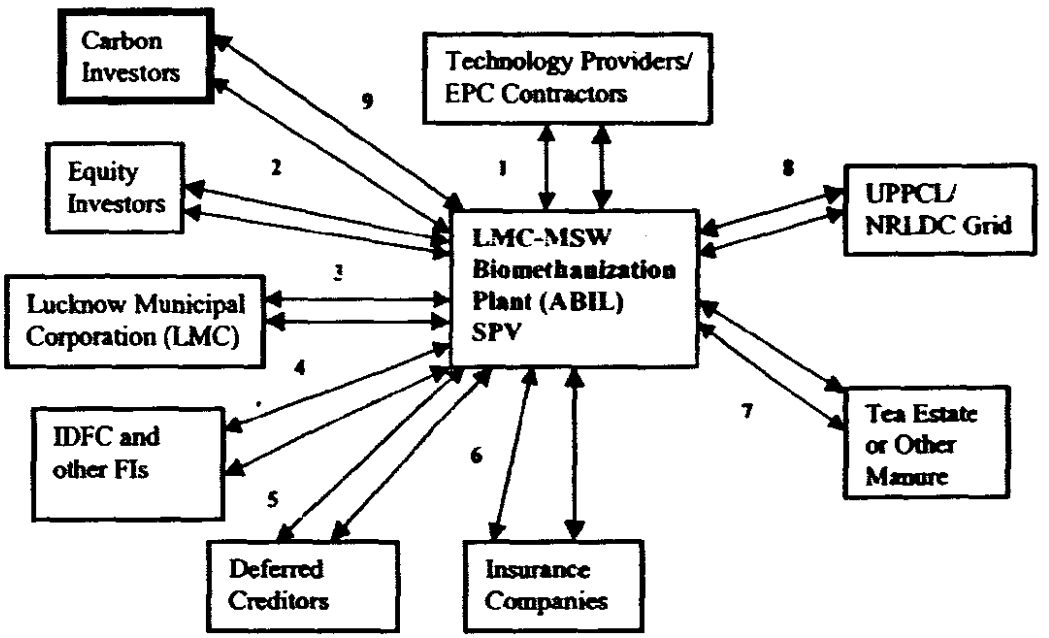
There are basically two ap cost of carbon reductions in case of non established markets, s are available. (i) The difference in the total cost of produc ect and a similar project using a traditional technology div f carbon reductions produced; or (ii) The total amount necessa profitable (or meet the hurdle rate) divided by the total tons produced. In case of the proposed project the valuable prod include treatment of 300 TPD of MSW, 5 MW power gen Organic manure production. Since conventionally there is no rovide such heterogeneous services, it would be appropriate to ach

The IRR on equity with the icts from the project namely power and manure was calculated power specified by the PPA and the market acceptable price without accounting for the carbon reductions. This analysis su of Rs. 2,200 per ton for the manure in year 1, escalating @5% IRR of 20%, the carbon price works out at **$ 3.00 per ton**. It IRR is sensitive to organic manure price; therefore the mark has been taken into account. The comparable commodity in t assumed to be the compost being produced in the Okhla plan is sold at Rs. 4 per KG in the retail market.

7. Risk assessment and mitigation mechanisms

The proposed project is exposed to various risks of various operational, technical, contractual and sovereign types. ABIL has obtained performance guarantees from various technology/equipment suppliers to ensure proper working of the plant. In addition, Ernst & Young, a reputed consulting firm has reviewed the technology, waste characteristics and the underlying contracts. Addressing these business and political risks is one of the major factors for attracting investments in the project. It may be noted that this project has been awarded to ABIL through a competitive bidding process that was conducted in a transparent manner. Thus, the risks of political acceptability are minimal. Moreover, India is faced with a formidable task of improving the solid waste disposal practices owing to various reasons like health, hygiene and aesthetics. Thus, the proposed activity is a highly socially desirable activity. The project not only addresses the problems of solid waste and emissions but also generates valuable resources and employment. In other words this is a socially and environmentally sustainable activity. All the major project agreements have been signed, reviewed and accepted by the FIs. The contractual framework is depicted in Figure 2.

Figure 2: ABIL Contractual/Performance Structure



Sr. No.	Service/performance			Transaction ←→	Annual Transactions
1	Equipment/Technology	EP[illegible] tra[illegible]		Purchase of Eqpt/Tech	-
2	Equity capital	Sha[illegible]	[illegible] nt	Equity infusion	Dividend
3	Garbage	Ca[illegible] Agr[illegible]		Supply of garbage of specified quality	
4	Loan	Lo[illegible]		Provide Loan	Interest/Principle
5	Deferred Credit	DC[illegible]		Deferred credit on specified equipment cost	Lease rental
6	Insurance Policy	Poli[illegible]		Cover fire and other risks	Insurance Premium
7	Organic Manure	Ma[illegible] Ag[illegible]		Sale of power	Payment for manure
8	Power	Po[illegible] Ag[illegible]		Sale of manure	Payment of Power tariff
9	Carbon offsets	Ca[illegible] Agr[illegible]	se	Initial Investment	Payment for Offsets

Various risks faced by the [illegible] he respective mitigation measures is described below.

Risks	Low to High	[illegible]tion
Market?	Low	[illegible]dities produced by the project power and organic manure are in deficit. Therefore, market risks are low except for the sale of manure, because it is not widely promoted to the farmers yet.
Country/Sovereign?	Low	[illegible] has stable legal system and has by and large [illegible] the legal process. Contracts have been [illegible] and businesses of the multinationals have [illegible] Thus, the sovereign risk is minimal.
Regulatory?	Low	[illegible] state has a functional electricity regulatory commission. The PPA has a legal validity. Also, the proposed project activity has overall support of the [illegible] state central govt. support
Contract/counter party	Low	[illegible] PA and the waste supply agreements have been [illegible] These agreements are sound and fair. The [illegible] contractual structure is also established and is

		robust. Although, UPPCL is not in good financial health, this project has a special status and is also small in size. As such, no contract related problems are expected.
Construction?	Low	The promoters have gathered strong EPC and other contractors. They have earlier experience in setting up such projects. The materials to be used are standard. Thus, construction is not likely to pose major challenges.
Technology?	Medium	The technology providers have set up similar facilities elsewhere in the world. The promoters have experience in working with other effluent treatment projects in India. Combined, their strengths are sufficient to address any technology related issues.
Management?	Low	The promoters have a very lean and efficient management, which is evident from a large number of projects they have implemented in a short span of time. In addition, they can draw any necessary resource from India or Austria.
Competition?	Low	MSW treatment is a nascent activity in India and competition in the field of MSW methanation project is very low. Also the overall size of the MSW treatment market is quite large [with over 300 Class I cities generating over 39 million tons of MSW daily]
Exit?	Low ,	GOI is currently in the process of easing the Companies Act to allow easier closure of firms. The investment rules have already been relaxed. The Indian financial market is mature and transactions such as leveraged buyouts, mergers & acquisitions etc. are common. Therefore, Exit from the companies in general and better performing ones in particular is not difficult and risky.

Detailed Project Report (DPR) Worksheet

For GHG mitigating projects under
USAID's Greenhouse Gas Pollution Prevention Project – Climate Change Supplement

Managed by The Louis Berger Group, Inc.

Venkatesh Coke & Power Limited
(Project Finance)

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1. Contact Information for the Prospective Borrower

	Name of Company	Venkatesh Coke & Power Limited (VCPL)	S. S. Kothari & Co. (SSK)
	Address	C-23 Friends Colony (East), Mathura Road,	Management Consultancy Division, 9A-Atma Ram House, 1 Tolstoy road
	City, State, Province	New Delhi 110065	New Delhi 110 001
	Contact Name	Ravi Agarwal, Jt. Managing Director	K. S. Mehta, Senior Partner
	Contact Phone	683 0075, 684 3335	335 5296/97, 331 1507
	Contact FAX	684 9845, 631 5779	373 1631
	Contact EMAIL	bcpl@giasdl01.vsnl.net.in	sskothari@vsnl.com

2. Availability of Financial Information on Borrower

	Audited financial statements available for last 3 fiscal years?	√	
	Audited financials being provided to LBG Washington?		
	Was firm in same general line of business for last 3 years?	√	
	Has firm reported operating profits AND net income during each of last 2 years?	√	

3. Borrower's Financial History (last three Fiscal Years)

The core promoters of VCPL are multinational (German/UK) firms and Indian firms ThyssenKrupp Group

	EBIDT	3386	2463	2184
	PAT	559	303	1106
	Net worth	10404	10936	8271
	Equity	8106	8797	5092
	Dividend	386	368	277
	Major Capital Investments	5990	5983	866
	Debt:Equity ratio	0.36	0.32	0.34
	Current Ratio	1.49	1.44	2.90
	Depreciation/Amortization Expense	1874	1579	1046
	Interest Expense	557	329	190

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RAG Group

	EBIDT	2393	2556
	PAT	409	251
	Net worth	3662	3339
	Equity	1106	1166
	Debt:Equity ratio	1.14	1.19
	Current Ratio	0.79	0.78
	Depreciation/Amortization Expense	1727	2128
	Interest Expense	326	295

4. Background information on [illegible] and unused short and long-term debt

N[illegible]able

SECTION A: CLEAN ENERGY AND GHG MITIGATION EQUIPMENT FINANCE

Not Applicable

About the Equipment/Technology: Larger clean energy or GHG mitigating projects (Project Finance) may involve more than one type of environmental equipment. Complete sections A 5 through A 10 for each piece of relevant GHG mitigating equipment.

5. Description of technology/service to be purchased

Not Applicable

6. Description of the GHG mitigating potential of the technology

Not Applicable

7. About the Business Negotiation:

	Is the manufacturer of the technolo[illegible]stic (Indian) company?		
	Is the manufacturer located oversea[illegible]?		
	Is the manufacturer a US company?		
	Have any price negotiations occurr[illegible]		
	Has a purchase order been submitte[illegible]		

How many units are in the Purchase Orde[illegible] _____
What is the estimated unit cost of technol[illegible]? _____
What is the total cost for the Purchase Or[illegible] _____

8. Contact Information on the Ma[illegible]r

√	Name of Manufacturer	
	Address	
	City, State, Province	
	Contact Name	
	Contact Phone	
	Contact FAX	
	Contact EMAIL	

9. About the Trade Financing (For Equipment Imported Into India)

Is trade financing being sought for the import of the equipment to India? No

What type of trade financing is being sought (insurance,guarantees, working capital?

NA

10. Has a domestic or overseas lender been identified?

Yes

	Name of Lender	ICICI, PFC	DEG, IFC
	Address		
	City, State, Province		
	Contact Name		
	Contact Phone		
	Contact FAX		
	Contact EMAIL		

SECTION B: PROJECT FINANCE FOR CLEAN ENERGY AND GHG MITIGATION

Project Name: Waste heat recovery from non recovery coke oven plant

Project Promoter: Venkatesh Coke & Power limited

Special Purpose Vehicle:

1. Executive Summary: Project at a Glance

Venkatesh Coke and Power Ltd. (VCPL), an export oriented unit, has been promoted for the manufacture of 758,000 tons of metallurgical grade coke and cogeneration of 110 MW power. The company proposes to set up the plant at Village Athipattu,near Chennai, Tamil Nadu under a technical and financial collaboration with Thyssen Group of Germany. Thyssen has set up a similar plant at Chicago, IL. Thyssen will also be the EPC contractors for the coke plant. VCPL has entered into a commercial collaboration with Ruhrkole (RAG) of Germany, who will supply coking coal and buy back the met coke. Both Thyssen and RAG are among the top companies in the coke business in the world. The non recovery based coke oven plant will be based on state of the art technology. VCPL proposes to generate power from waste heat carried by waste gases and coal fines generated during the coking process. The gases at 1100^0C shall be passed through waste heat recovery boilers while the coal fines from coke breeze will be fired in a CFBC boiler. Since GEP-CCS addresses clean sources of power the later is not considered for GHG reductions. Thus, the clean energy portion out of the project is restrictedf to a capacity of 65 MW. Hyundai Engg. And Construction Company Ltd. will be the EPC and O&M contractor for the power plant construction and operation. VCPL has tied up major ends of the project which includes various contracts like coal supply and coke offtake, EPC and O&M Contracts, Wheeling, Banking cum PPA etc. It is also in negotiation with various domestic lenders like PFC and international ones like IFC and DEG. VCPL proposes to offer its equity or subscribe to equity of some bulk power buyers so as to wheel power to them in the state of Tamil Nadu.

The cost of project is estimated at US $ 209 Million and is proposed to be financed by equity (~40%) and debt (60%). TNEB has agreed to wheel the power to VCPL's sister concerns/associates by charging 15% wheeling charges. The PPA also provides for purchase of excess power up to 12% at rates stipulated in the state power policy (Rs. 2.50 per kWh with 5% escalation each year. GEP-CCS has carried out an indicative GHG reduction assessment that indicates about 502,000 tCO2 equivalent abated per annum from the waste heat recovery based power generation.

2. Project Costs:

The project cost includes coke oven and p[illegible]nt costs

	Plant & Machinery#	8114.28	163.49	74.65%
	Land & Building	1806.94	36.77	16.62%
	Civil, detailed Eng			
	Erection & Commissioning			
	Preliminary & Preoperative Expenses	948.19	18.81	8.72%
	Working Capital Margin			
	Contingencies			
	Total Project Cost	10869.41	219.07	100%

Coke oven plant Rs. 4582.90 Mn , power plant Rs. [illegible]1.38 Mn.

3. Proposed Means of Financing

	Total Debt Portion @	6213.44	125.53	57.16%
	Total Equity Portion*	4655.97	93.55	42.84%
	Total Project Cost	10869.41	219.08	100%

@ Including Rupee and forex commercial facilities (Rs. 2485.37 Mn and US$ 75.32 Mn

* Including operating cash flow Rs. 513.68 Mn

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4. Committed Financing (if any)

a. Committed Debt Providers

[illegible]				
IFC				Under negotiations
PFC				

b. Committed Equity Providers (Indicative figures)

[illegible]	[illegible] US$ [illegible]	[illegible] (as % [illegible] total equity)
Domestic		
RPM, Other Indian promoters	12.8	15.2%
International		
Angleton Ltd., UK	13.8	16.4%
RAG, Germany Thyssen, Germany	20.3	24.1%
Institutional Investors		
DEG, Germany	10.6 (Under consideration)	12.6%
IFC, Washington	5.3 (Under consideration)	6.3%
Strategic Investors/VCs/IPO	21.3	25.3%
Total	84.1*	100%

* ~ 40% of project cost

5. Estimates of Profitability

	[illegible]	[illegible]	2002	[illegible]	2007	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Revenue from power sale	321.55	2475.81	2583.87	2713.06	2848.72	2991.55	3141.13	3298.19	3463.09	3636.74	3818.57
Other revenue	636.62	3514.01	3738.5	3936.22	4163.28	4418.28	4705.28	4995.97	5319.16	5662.53	6103.66
Total Revenue	**958.17**	**5989.82**	**6322.37**	**6649.28**	**7012.00**	**7409.83**	**7846.41**	**8294.16**	**8782.25**	**9299.27**	**9922.23**
Total Operational Cost	619.37	3338.86	3471.55	3499.83	3650.8	3808.99	3974.8	4148.67	4481.05	4522.45	4723.39
PBIDT	**338.8**	**2650.96**	**2850.82**	**3149.45**	**3361.2**	**3600.84**	**3871.61**	**4145.49**	**4301.2**	**4776.82**	**5198.84**
Depreciation		606.98	662.16	662.16	662.16	662.16	662.16	662.16	662.16	662.16	662.16
Interest & financing cost		575.97	614.98	564.02	511.29	456.65	399.97	341.09	279.9	130.9	
PBT		**1468.01**	**1573.68**	**1923.27**	**2187.75**	**2482.03**	**2809.48**	**3142.24**	**3359.14**	**3983.76**	**4536.68**
Provision for Tax		25.97	161.36	120.39	147.13	167.36	201.65	554.15	626.4	708.66	813.61
PAT		**1442.04**	**1412.32**	**1802.88**	**2040.62**	**2314.67**	**2607.83**	**2588.09**	**2732.74**	**3275.1**	**3723.07**
Net Cash Flow		2049.02	2074.48	2465.04	2702.78	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

6. Projected Cash Flow

	1003	2004	2005	2006	2007	2008	2009	2010			
Sources of Funds											
PAT		1442.04	1412.32	1802.88	2040.62	2314.67	2607.83	2588.09	2732.74	3275.1	3723.07
Depreciation		606.98	662.16	662.16	662.16	662.16	662.16	662.16	662.16	662.16	662.16
Inc. in Equity capital	3,051.16	1140.18									
Inc. in term loans	4576.75	1710.27									
Inc. in bank borrowings											
Total sources	7627.91	4899.47	2074.48	2465.04	2702.78	2976.83	3269.99	3250.25	3394.9	3937.26	4385.23
Application of funds											
Capital Expenditure	10869.41										
Inc. in Current Assets											
Term loan repayment		406.04	831.83	852.27	873.51	895.58	918.52	942.35	967.13	496.43	
Taxes		25.97	161.36	120.39	147.13	167.36	201.65	554.15	626.4	708.66	813.61
Dividend		775.04	856.69	880.97	880.97	880.97	880.97	880.97	880.97	880.97	880.97
Total Application	10869.41	1207.05	1849.88	1853.63	1901.61	1943.91	2001.14	2377.47	2474.5	2086.06	1694.58
Net Surplus	-3241.5	3692.42	224.6	611.41	801.17	1032.92	1268.85	872.78	920.4	1851.2	2690.65
IRR-Project	25%										
DSCR		2.70	1.97	2.22	2.43	2.66	2.94	3.23	3.45	7.61	
Av DSCR	3.25										

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7. Status of Finance Negotiations

Are you in negotiations with any prospective debt providers? If yes, please specify and elaborate on expected time frame. Yes. The promoters through their financial advisors are negotiating with both domestic and international lenders viz. ICICI, PFC and DEG and IFC. These are likely to be completed by end of 2001.

Do you plan to submit this project to a private venture capital firm or an international equity organization (e.g. REEF)? If yes identify specific fund and elaborate on negotiations.

The project was discussed with few international funding agencies including REEF. However, these have not fructified due to uncertainties prevailing and since the project agreements were not finalized. At the moment there are no applications made to any environmental funding body. The promoters are interested in obtaining carbon finance since the project indicates a high potential for the same

Do you plan to submit this project to an international tender for carbon emissions reductions (e.g. Oregon Climate Trust)? If yes, please specify tender and closing date for submission. The project developers/financial advisors have entrusted this responsibility to The Louis Berger Group, Inc. and are open to submission to any fund for which this technology is appealing and that has a greater possibilities of obtaining a higher value for the carbon offsets: These could possibly include the forthcoming Netherlands Tender or the KfW fund.

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8. Project Promoter Contact Information

		Project Developer	Financial Advisor
	Name of Project Promoter	Venkatesh Coke & Power Limited (VCPL)	S. S. Kothari & Co. (SSK)
	Address	C-23 Friends Colony (East), Mathura Road,	Management Consultancy Division, 9A-Atma Ram House, 1 Tolstoy road
	City, State, Province	New Delhi 110065	New Delhi 110 001
	Contact Name	Ravi Agarwal, Jt. Managing Director	K. S. Mehta, Senior Partner

	Contact Phone	683 0075, 684 3335	335 5296/97, 331 1507
	Contact FAX	684 9845, 631 5779	373 1631
	Contact EMAIL	bcpl@giasdl01.vsnl.net.in	sskothari@vsnl.com

9. Project Management Team

	Ravi Agarwal	**Joint Managing Director**
	A. K. Swarup	**Joint Managing Director**
	R. Rajagopal	**Vice President (Technical & Coke Ovens)**
	T. G. Sundara Raman	**Vice President (Power)**
	S. B. Mathur	**Vice President (Coordination New Delhi)**
	B. Ramadurai	**Coordination Head Chennai**

10. Project Promoter Financial History

	What were profitability figures last 3 years?	All the promoters have been exhibiting high profitability
	Book value of firm?	
	EPS reserves and surplus last 3 years?	
	What is current business?	Manufacture and distribution of met coke
	What are synergies between business and this project?	This is an expansion of existing capacity of coke manufacture and geographical distribution.

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11. Project Promoter Relevant Experience:

Briefly describe the relevant experience, if any, possessed by the project promoter. Has the promoter developed similar projects?

The core promoters are in the business of manufacture of coke from coal. However, they do not have experience in setting up and operating power plant. However, this gap has been adequately addressed through selecting reputed and experienced EPC and O&M contractors as well as hiring experts for operation of the plant. The contractors have subscribed to the equity of the project company and thus, would impart their experience to the project.

12. Special Purpose Vehicle Contact Information

	Name of SPV	
	Address	
	City, State, Province	
	Contact Name	
	Contact Phone	
	Contact FAX	
	Contact EMAIL	
	Names and shares of the promoters	
	Is a Shareholding agreement in place	
	Salient terms	

13. Project Details

	Greenfield project or involves existing equipment?	Greenfield project
	Is GHG mitigation achieved by Process Improvement or Clean Energy Generation?	Clean energy generation of a part of the capacity
	Size of Project (MW)?	110 MW
	Project Location? City, Province	Village Athipattu, near Chennai, Tamil Nadu

	Off or on-grid?	Grid connected
	State Electricity Board?	Tamil Nadu Electricity Board (TNEB)
	Technology?	Waste heat recovery using Rankine cycle
	Type of Fuel?	Waste heat from non recovery coke ovens
	Source of fuel supply?	Imported coal

14. Feasibility Details

	Was Feasibility Study prepared independently?	Yes
	What firm prepared the Feasibility Study? List address and contact details	Fichtner Consulting Engineers India (Pvt.) Ltd. Chennai

15. Background on the Power Purchase Agreement

	Does Project involve PPA (Yes or No) If no, skip to next heading.	Yes
	Has a PPA been signed? (Yes or No)	Yes
	Nature of Agreement? Take or Pay? Other?	Wheeling, banking and excess sale agreement
	Name of state electricity board or primary PPA signatory?	Tamil Nadu Electricity Board
	What date was the PPA signed?	April 10, 2000
	When does it enter into force?	Immediate
	What is the length of the PPA? (Years)	15 years
	What is the initial purchase price?	Rs. 2.36 per kWh in 1999-00
	What is the annual % increase in purchase price?	5% p.a.
	Can the project sell power directly to major consumers? (Yes or No)	PPA is for wheeling power to VCPL's own units or other firms in which VCPL holds equity or which own equity in VCPL
	What are the securities provided for the revenues? Have the domestic lenders approved these mechanisms? Are there any special clauses, or provisions of relevance to the investors?	TNEB's guarantee

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	What are the terms of Payment to the project developers? Any special clauses of relevance to the investors/lenders? Have the domestic lenders approved the payment terms?	Payment to be made within 30 days. Interest @ 14% p.a. for period of delay.
	What are the major provisions (event definitions, treatment of the off time, etc.) of the Force Majeure clauses?	FM clauses defined but effectiveness not clear
	What is the method of fixation of tariff (two part, availability etc.)? Are there any provisions for deemed generating/penalties? What is the treatment for infirm power?	Wheeling charges @ 15% of power wheeled. No provisions for Deemed generation etc.
	Have the provisions for change in law, termination, liquidated damages , etc. been approved by existing lenders/investors?	Not stated
	Would the SEB/generating utility want a share in the ownership of carbon offsets?	Not discussed yet

16. Other Agreements

	Fuel supply agreement signed?	Supply of coal by promoters.
	Water/utility supply agreement signed?	-
	Shareholder's agreement been entered into between existing equity holders?	Under negotiations
	Special provisions of above agreements?	-

17. Quantify and Describe Risks

	Risks	Low to High	Describe
	Market?	Low	Coke manufacture against firm orders. Tamil Nadu state in deficit of power. Promoters would have assured power offtakers.
	Country/Sovereign?	Low	India committed to contracts.
	Regulatory?	Medium	Power regulator not effective in the TN state
	Contract/counter party	Low	PPA/Wheeling agreement effective.
	Construction?	Low	Experienced EPC contractors being hired
	Technology?	Low	Promoters have experience in coke technology and are employing proven technology for waste heat recovery
	Management?	Low	Experienced management and O&M contractors
	Enforceability of Contracts?	Low	Similar contracts working smoothly in TN state and in India
	Competition?	Low	TN state power deficient, major IPP projects have been cancelled (for reasons specific to the developers) creating an unmet demand
	Exit?	Low	Not applicable

18. For risks identified in section 14, discuss Mitigation/Coverage measures

	Risks	Describe Mitigation/Coverage
	Market?	Promoters on the lookout for additional power off takers, so as to ensure power evacuation
	Country/Sovereign?	–
	Regulatory?	Minor revisions in the Wheeling, Banking and PPA are being sought.
	Contract/counter party	–
	Construction?	–
	Technology?	–
	Management?	–
	Enforceability of Contracts?	–
	Competition?	–
	Exit?	–

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SECTION C: CARBON COMPONENT.

Checklists were adapted from a variety of sources including Natsource, LLC

1. GHG Mitigation Applicability Macro Checklist

√		Yes	No
	Does project generate real, measurable, long-term, additional and verifiable emissions reductions vis-à-vis current baseline alternatives?	√	
	Are there sustainable development benefits such as increased employment and protecting biodiversity?	√	
	Does the project rely on ODA from Annex B Countries?		√
	Has the project received host country approval?		√
	Does project meet size definition for Bonn Fast Track CDM? --under 15 MW for renewables projects --under <15 gigawatthours/year savings for energy efficiency projects --under15 kilotonnes CO2E for emissions reductions from process changes		√

2. Emission Reduction Calculations, Monitoring and Verification Checklist

√		Yes	No
	Does the project involve a discrete reduction of emissions?	√	
	Have the emissions reductions been estimated with an accepted methodology?	√	
	Has a monitoring methodology been established?	√	
	Has a third party verifier been contracted to verify actual emissions reductions and sustainable development gains?		√
	Has clear ownership of emissions reductions been determined and documented?		√

3. Carbon accounting details

	Parameter	Particulars
1	Baseline methodology	Power generated in the Southern region and purchased from central power PSUs is mainly from coal fired thermal sources. The power generated by using waste heat ONLY (i.e. 520 million units p.a. from 65 MW capacity) is taken as clean power avoiding GHG emissions.
2	Baseline Emissions TCO2	321,298 tCO2 per annum
3	Project Emissions TCO2	-
4	Emission reductions TCO2 (2-3)	321,298 tCO2 per annum

Detailed Project Report (DPR) Worksheet

For GHG mitigating projects under
USAID's Greenhouse Gas Pollution Prevention Project – Climate Change Supplement

Managed by The Louis Berger Group, Inc.

Coastal Agro Industries, Ltd.
4 MW Cogeneration Facility Using Biomass
P.B. No. 27, TANUKU – 534 211
West Godavari District, Andhra Pradesh
(Project Finance)

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1. Contact Information for the Prospective Borrower

	Name of Company	Coastal Agro Industries Ltd.
	Address	P. B. No. 27
	City, State, Province	Tanuku, West Godavari District, Andhra Pradesh 534 211
	Contact Name	Mr. Ch. K. Visweswara Rao, CMD
	Contact Phone	08819 24982/3/42
	Contact FAX	08819 24927
	Contact EMAIL	Coastalagro_tanuku@rediffmail.com

2. Availability of Financial Information on Borrower

	Audited financial statements available for last 3 fiscal years?	√	
	Audited financials being provided to LBG Washington?	√	
	Was firm in same general line of business for last 3 years?	√	
	Has firm reported operating profits AND net income during each of last 2 years?	√	

3. Borrower's Financial History (last three Fiscal Years)

Rs. Lakhs

	EBIDT	323.58	138.95	125.57
	EBIDT/Total Income	24.8%	17.21%	21.10%
	Operating Profit (OP)	224.44	13.43	36.21
	OP/TI	17.2%	1.66%	6.08%
	Net worth	998.08	370.22	358.79
	Equity	137.80	137.8	137.8
	EPS	11.93	0.83	2.34
	Major Capital Investments	35.00	11.61	336.98
	Debt:Equity ratio	1.86	1.97	2.15
	Current Ratio	1.37	3.08	2.88
	Depreciation/Amortization Expense	43.19	45.54	34.38
	Interest Exp	55.95	79.98	54.97

SECTION A: CLEAN ENERGY AND GHG MITIGATION EQUIPMENT FINANCE

Not Applicable

About the Equipment/Technology: Larger clean energy or GHG mitigating projects (Project Finance) may involve more than one type of environmental equipment. Complete sections A 5 through A 10 for each piece of relevant GHG mitigating equipment.

5. Description of technology/service to be purchased

NA

6. Description of the GHG mitigating potential of the technology

NA

7. About the Business Negotiations

NA

	Is the manufacturer of the technology a domestic company?		
	Is the manufacturer located overseas (exporter)?		
	Is the manufacturer a US company?		
	Have any price negotiations occurred?		
	Has a purchase order been submitted?		

How many units are in the Purchase Order? _____

What is the estimated unit cost of technology (US$)? _____

What is the total cost for the Purchase Order? _____

8. Contact Information on the Manufacturer

√	Name of Manufacturer	
	Address	
	City, State, Province	
	Contact Name	
	Contact Phone	
	Contact FAX	
	Contact EMAIL	

9. About the Trade Financing (For Equipment Imported Into India)

Is trade financing being sought for the import of the equipment to India? _____

What type of trade financing is being sought (insurance,guarantees, working capital?

_____

_____

10. Has a domestic or overseas lender been identified? _____

	Name of Lender	
	Address	
	City, State, Province	
	Contact Name	
	Contact Phone	
	Contact FAX	
	Contact EMAIL	

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SECTION B: PROJECT FINANCE FOR CLEAN ENERGY AND GHG MITIGATION

Project Name: 4 MW biomass based cogeneration plant

Project Promoter: Coastal Agro Industries Ltd.

Special Purpose Vehicle: --

1. Executive Summary: Project at a Glance

Coastal Agro Industries Limited (CAIL) is a manufacturer of straw boards and kraft boards at K. Savaram village, Undrajavaram Mandal in West Godavarai District of Andhra Pradesh. The company has been in operation since 1981.

The company, in its processes, has a requirement for steam as well as power. Therefore, it has decided to set up a 4 MW co-generation project at the existing complex to meet process steam and electricity requirements. It plans to export excess power to the grid. The co-generation plant expects to generate 317 lakhs kwh power based on 24 hours by 330 days. Plant load factor is assumed to increase from 70% in first year to 80% in second year to 90% in third year and onwards. The plant will also provide 13 TPH of steam to the paper unit at a pressure of 6 kg/cm^{2}g. At present the company is drawing power from AP Transco and generating steam by burning coal.

The primary fuel will be rice paddy husk. The fuel requirement is estimated at 52,801 tons per annum based on a need for 160 tons per day for 4 MW generation and process steam. Risk husk is estimated to constitute 80% of the fuel requirement, with the balance made up of coal.

A Power Purchase and Wheeling Agreement was signed between the Transmission Corporation of Andhra Pradesh Limited (APTRANSCO) and M/s Coastal Agro Industries Limited, on 30th May, 2000. The negotiated price was Rs. 2.25 paise per unit escalating at 5% annually with 1997-98 being the base year. The PPA was applicable through 17 November, 2000. The prices will therefore have to be re-negotiated by the Government of A.P. and APERC.

2. Project Costs

√	**Plant & Machinery**	1219.00	80.20
√	**Land & Building**	1.40	0.09
√	**Civil, detailed Eng.**	142.00	9.34
√	**Erection & Commissioning**		
√	**Preliminary & Preoperative Expenses**	112.00	7.37
√	**Working Capital Margin**	17.00	1.12
√	**Contingencies**	28.60	1.88
√	**Total Project Cost**	1520.00	

3. Proposed Means of Financing

√	**Total Debt Portion**	1064.00	70
√	**Total Equity Portion**	456.00	30
√	**Total Project Cost**	1520.00	

4. Committed Financing (if any)

a. Committed Debt Providers

State Bank of India (Lead)	500	14%	10 Years	
Other FIs & Banks	564	14%	10 Years	

b. Committed Equity Providers

Promoters Equity & cash accruals	456.00	100%

5. Estimates of Profitability

Rs. In Lakhs

	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	[illegible]	[illegible]
Revenue from power sale	610.03	715.20	820.38	820.38	820.38	820.38	820.38	820.38	820.38	
Other revenue										
Fuel cost	236.55	270.34	304.14	304.14	304.14	304.14	304.14	304.14	304.14	
O&M Cost	36.20	39.82	41.81	43.90	46.10	48.40	[illegible]	53.36	56.03	
Admn/selling cost	1.80	1.80	1.98	2.18	2.40	2.64	2.90	3.19	3.51	
PBIDT	335.48	403.24	472.45	470.16	467.75	465.20	462.52	459.69	456.70	
Depreciation	140.50	140.50	140.50	140.50	140.50	140.50	140.50	140.50	140.50	
Interest Term loan	159.60	158.18	139.65	116.85	94.05	71.25	48.45	25.65	4.28	
Working Cap	8.32	10.40	12.32	12.32	12.32	12.32	12.32	12.32	12.32	
Preliminary Expenses	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
PBT	26.56	93.67	179.48	199.99	220.37	240.63	260.75	280.72	299.10	
Provision for Tax	0.00	0.00	0.00	0.00	0.00	107.78	95.74	104.89	112.01	
PAT	26.56	93.67	179.48	199.99	220.37	132.85	165.01	175.83	187.09	
EPS	1.40	4.93	9.45	10.53	11.60	6.99	8.68	9.25	9.85	
Dividend	0.00	28.50	38.00	38.00	38.00	38.00	38.00	38.00	38.00	
Retained Profit	26.56	65.17	141.48	161.99	182.37	94.85	127.01	137.83	149.09	
Depreciation and Other Writeoffs	141.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00	
Net Cash Flow	167.56	206.17	282.48	302.99	323.38	235.85	268.01	278.83	290.10	

6. Projected Cash Flow

Rs. In lakhs

Sources of Funds										
PAT	0.00	26.56	93.67	179.48	199.99	220.37	132.85	165.01	175.83	187.09
Depreciation	0.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00
Inc. in Equity capital	228.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inc. in term loans	1064.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inc. in bank borrowings	0.00	52.00	13.00	12.00	0.00	0.00	0.00	0.00	0.00	0.00
Internal accruals	228.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total sources	1520.00	219.56	247.67	332.48	340.99	361.38	273.85	306.01	316.83	328.10
Application of funds										
Capital Expenditure	1498.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Preliminary Expenses	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inc. in Current Assets	0.00	69.00	17.00	17.00	0.00	0.00	0.00	0.00	0.00	0.00
Term loan repayment	0.00	0.00	81.43	162.86	162.86	162.86	162.86	162.86	162.86	81.43
Taxes										
Dividend	0.00	0.00	28.50	38.00	38.00	38.00	38.00	38.00	38.00	38.00
Total Application	1503.00	69.00	126.93	217.86	200.86	200.86	200.86	200.86	200.86	119.43
Net Surplus	17.00	150.56	120.74	114.62	140.13	160.52	72.99	105.15	115.97	208.67
IRR	20.80%									
DSCR	2.05	1.64	1.52	1.64	1.77	1.47	1.68	1.82	3.88	1.77
Av DSCR	1.77									

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7. **Status of Finance Negotiations**

Are you in negotiations with any prospective debt providers? If yes, please specify and elaborate on expected time frame. The Company is in advanced stage of negotiations with State Bank of India for the term loan. Though this is a project that qualifies for assistance from IREDA as a renewable energy based power generation plant, IREDA informed that its overall exposure to the state of AP was high and hence it has stopped considering any more projects from AP for the time being. The project is in advanced stage of financial closure.

Do you plan to submit this project to a private venture capital firm or an international equity organization (e.g. REEF)? If yes identify specific fund and elaborate on negotiations. No.

Do you plan to submit this project to an international tender for carbon emissions reductions (e.g. Oregon Climate Trust)? If yes, please specify tender and closing date for submission. The company is interested in availing of funds in lieu of the carbon offsets generated by the project. It is discussing the same with key GOI ministries of MNES and MOEF. However, there is no such fund available at the moment. It is keen to build in the structure to satisfy the needs of prospective market based mechanism.

8. Project Promoter Contact Information

√	Name of Project Promoter	Coastal Agro Industries, Ltd.
√	Address	P.B. No. 27
√	City, State, Province	Tanuku, 534 211 West Godavari , Andhra Pradesh
√	Contact Name	Shri CH.K Visveswara Rao
√	Contact Phone	08819-24982, 24983, 24984
	Contact FAX	08819-24927
	Contact EMAIL	Coastalagro_tanuku@rediffmail.com

9. Project Management Team

√	Shri CH.K Visveswara Rao	**Chairman & Managing Director**
√	Shri CH. Rama Krishna	**Executive Director**

10. Project Promoter Financial History

√	What were profitability figures last 3 years?	Net Profit after Tax (Rs Lakhs): **2001**: 166.35 **2000**: 11.43 **1999**: 32.22
√	Book value of firm?	Rs. 38.94 per share as on March 31, 2001
√	EPS for 3 years?	(2001) Rs.12.07; (2000) Rs. 0.82; (1999) Rs 2.33
√	What is current business?	Straw Board and Kraft Board Manufacturing
√	What are synergies between business and this project?	Many of the suppliers of straw for board manufacturing also will source the rice paddy husk.

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11. Project Promoter Relevant Experience:

Briefly describe the relevant experience, if any, possessed by the project promoter. Has the promoter developed similar projects?

Company has been in operation since 1981 and has worked with rice straw suppliers in the area. Sri Visveswara Rao has over 30 years experience in the oil industry as well as straw and paper board industry. He was one of the promoters of Gouthami Solvents Limited, Tanuku, who promoted the first co-generation project in Andhra Pradesh. The company shall hire experienced personnel to operate the cogeneration plant.

12. Special Purpose Vehicle Contact Information (If applicable):

	Name of SPV	NA
	Address	
	City, State, Province	
	Contact Name	
	Contact Phone	
	Contact FAX	
	Contact EMAIL	
	Names and shares of the promoters	
	Is a Shareholding agreement in place	
	Salient terms	

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13. Project Details

√	Greenfield project or involves existing equipment?	Addition of cogeneration system to existing strawboard and kraft board manufacturing operations
√	Is GHG mitigation achieved by Process Improvement or Clean Energy Generation?	Both. Clean Energy Generation and Biomass Management (methane emission reduction)
√	Size of Project (MW)?	4 MW
√	Project Location? City, Province	Tanuku, West Godarvi District, Andhra Pradesh
√	Off or on-grid?	On-grid
√	State Electricity Board?	Transmission Corporation of Andhra Pradesh Limited
√	Technology?	Cogeneration of power and steam using biomass
√	Type of Fuel?	Paddy Husk
√	Source of fuel supply?	Local Rice Mills

14. Feasibility Details

√	Was Feasibility Study prepared independently?	Yes
√	What firm prepared the Feasibility Study? List address and contact details	**Zenith Corporate Services (P) Ltd.** Mr. A. Mohan Reddy, Director 1-5-6/B, My Home Plaza, Masab Tank Hyderabad 500 028

15. Background on the Power Purchase Agreement (if Applicable)

√	Does Project involve PPA (Yes or No) If no, skip to next heading.	Yes a PP cum Wheeling Agreement
√	Has the PPA been signed? (Yes or No)	Yes
√	Nature of Agreement? Take or Pay? Other?	Purchase of surplus energy
√	Name of state electricity board or primary PPA signatory?	APTRANSCO
√	What date was the PPA signed?	30, May, 2000
√	When does it enter into force?	Immediate
√	What is the length of the PPA? (Years)	20 years
√	What is the initial purchase price?	Rs. 2.25 paise per unit based on 1997-8 base year
√	What is the annual % increase in purchase price?	5%
√	Can the project sell power directly to major consumers? (Yes or No)	Yes
√	What are the securities provided for the revenues? Have the domestic lenders approved these mechanisms? Are there any special clauses, or provisions of relevance to the investors?	None. As the amount of energy purchased is variable over each billing period.
√	What are the terms of Payment to the project developers? Any special clauses of relevance to the investors/lenders? Have the domestic lenders approved the payment terms?	TRANSCO is to purchase only the surplus energy. The delayed payments shall attract interest @ 14% p.a.
√	What are the major provisions (event definitions, treatment of the off time, etc.) of the Force Majeure clauses?	FM clauses not included in the agreement.
√	What is the method of fixation of tariff (two part, availability etc.)? Are there any provisions for deemed generating/penalties? What is the treatment for infirm power?	MNES notified method as adapted by the AP State Govt.
√	Have the provisions for change in law, termination, liquidated damages, etc. been approved by existing lenders/investors?	No provisions
√	Would the SEB/generating utility want a share in the ownership of carbon offsets?	Not discussed yet

16. Other Agreements (where applicable)

√	Fuel supply agreement signed?	Yes, with rice millers for supply of rice husk
√	Water/utility supply agreement signed?	NA
√	Shareholder's agreement been entered into between existing equity holders?	NA
√	Special provisions of above agreements?	NA

17. Quantify and Describe Risks

√	Market?	Low to medium	AP state is in deficit in power supply (peak deficit of 13%, energy deficit of 7.8%#). The per capita electricity consumption in the Southern region has grown at a CAGR of 9.1% p.a. in the last 12 years. The only risk is in the event of non availability of the raw material due to drought etc.
√	Country/Sovereign?	Low	India has opened its economy in the last decade and has made its laws and institutions as per international standards. The sovereign risks for this project are especially low as the state of AP is among the most proactive states.
√	Regulatory?	Low	AP Electricity Regulatory Commission has been set up two years ago and is functioning properly.
√	Contract/counter party	Low	The Contract with AP TRANSCO has no unsatisfactory terms. The same is being firmed up.
√	Construction?	Low	Site location already owned.
√	Technology?	Low	Known Technology
√	Management?	Low	Experienced entrepreneurs
√	Enforceability of Contracts?	Low	Many similar contracts have been in operation and the AP TRANSCO has been honouring them. In addition, thie revenue depends marginally on the AP TRANSCO payments as the promoters may develop

			additional consumers in case there is a delay in payments from APTRANSCO
√	Competition?	Low	AP State being deficit in power and the per capita consumption rising, the size of market is large enough to allow the current and projected competition.
√	Exit?	Low	The capital markets, M&A practices and Company's Act and other relevant statutes are well developed and many such transactions take place in the country.

Annual Report of the Working of SEBs Planning Commission, GOI June 2001

18. For risks identified in section 14, discuss Mitigation/Coverage measures

√	Market?	The equipment selected allows use of a variety of fuel stocks and thereby use of alternate raw materials in the event of non-availability of rice husk.
√	Country/Sovereign?	--
√	Regulatory?	--
√	Contract/counter party	--
√	Construction?	--
√	Technology?	--
√	Management?	--
√	Enforceability of Contracts?	--
√	Competition?	--
√	Exit?	--

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SECTION C: CARBON COMPONENT.

Checklists were adapted from a variety of sources including Natsource, LLC

1. GHG Mitigation Applicability Macro Checklist

√		Yes	No
√	Does project generate real, measurable, long-term, additional and verifiable emissions reductions vis-à-vis current baseline alternatives?	√	
√	Are there sustainable development benefits such as increased employment and protecting biodiversity?	√	
√	Does the project rely on ODA from Annex B Countries?		√
√	Has the project received host country approval? **		√
√	Does project meet size definition for Bonn Fast Track CDM? --under 15 MW for renewables projects --under <15 gigawatthours/year savings for energy efficiency projects --under15 kilotonnes CO2E for emissions reductions from process changes	√	

** Promoters have discussed the project with MNES and MOEF and both are positively inclined.

2. Emission Reduction Calculations, Monitoring and Verification Checklist

√		Yes	No
√	Does the project involve a discrete reduction of emissions?	√	
√	Have the emissions reductions been estimated with an accepted methodology?	√	
√	Has a monitoring methodology been established?		√
√	Has a third party verifier been contracted to verify actual emissions reductions and sustainable development gains?		√
√	Has clear ownership of emissions reductions been determined and documented?		√

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3. Carbon accounting details

	Parameter	Particulars
1	Baseline methodology	The project is supplying power to the AP TRANSCO which is well integrated with the Southern Grid and therefore is the project boundary. The supply to users in southern grid is comprised of 72% thermal, 27% Hydel and rest nuclear. The emission factor of the supply in AP is 18.9 tC/TJ based on the sub bituminous coal as the major fuel stock. For the Steam provided to the paper plant the baseline is coal since it is the primary fuel used.
2	Baseline Emissions -Power exported to grid	23,305 tCO2 per year
3	Project Emissions TCO2	0 t CO2 per year
4	Emission reductions TCO2 (2-3)	23,305` tCO2 per year

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Detailed Project Report (DPR) Worksheet

For GHG mitigating projects under
USAID's Greenhouse Gas Pollution Prevention Project – Climate Change Supplement

Managed by The Louis Berger Group, Inc.

Bhoruka Power Corporation Ltd.
(Project Finance)

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1. Contact Information for the Prospective Borrower

	Name of Company	Bhoruka Power Corporation Limited
	Address	48, Lavelle Road, Bangalore Karnataka - 560 001, India
	City, State, Province	Bangalore, Karnataka
	Contact Name	Mr. Raghuraj Gujjar, Sr. GM – Finance
	Contact Phone	+91-80-2272271 – 4,2273285
	Contact FAX	+91-80-2245246
	Contact EMAIL	Bhopower@blr.vsnl.net .in

2. Availability of Financial Information on Borrower

	Audited financial statements available for last 3 fiscal years?	√	
	Audited financials being provided to LBG Washington?	√	
	Was firm in same general line of business for last 3 years?	√	
	Has firm reported operating profits AND net income during each of last 2 years?	√	

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3. Borrower's Financial History (last three Fiscal Years)

Rs. Lakhs

	EBIDT	1720.60	2503.39	1793.99
	EBIDT/Total Income	47.80	69.55	73.45
	Operating Profit (OP)	760.73	1308.13	834.43
	OP/TI	21.14	35.96	34.16
	Net worth	4095.32	3769.77	3461.17
	Equity	705.35	701.39	824.99
	EPS	8.75	11.92	9.90
	Dividend	233.19	389.27	457.86
	Major Capital Investments	6288.53	5580.93	5498.12
	Debt:equity ratio	1.94	2.06	2.06
	Fixed Asset Coverage Ratio	0.57	0.65	0.44
	Current Ratio	2.64	5.19	2.97
	Credit Rating by Lead FI/Bank	N. A.	N. A.	N. A.
	Depreciation/Amortisation Expense	390.95	374.03	318.26
	Interest Expense	711.85	821.23	641.30
	Current maturity of LTD	N. A.	N. A.	N. A.

4. Background Information on all used and unused short and long-term debt

Bhoruka Power Corporation (BPCL), Bangalore, was incorporated in 1986, with the objectives of setting up of hydroelectric power stations. BPCL has already commissioned Shivapur Hydel Power Station of the capacity of 2x9 MW in 1992 on Tungabhadra Left Bank Canal at Shivapur near Hospet in the state of Karnataka. BPCL has the distinction of being the first private Sector Company in Karnataka to set and operate a Hydel Power Station in the recent history. BPCL has also commissioned Shahapur Mini Hydel Scheme (4 out of 5 schemes, each of 1x1.3 MW has been commissioned) during 1996-97 on Shahapur Branch Canal at Shahapur near Gulbarga in Karnataka. Further, Rajankollur Mini Hydel Schemes (2x1.0 MW) on Hunasagi Branch Canal at Rajankollur near Narayanpur dam, Karnataka, has been commissioned by July 1999.

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SECTION B: PROJECT FINANCE FOR CLEAN ENERGY AND GHG MITIGATION

Project Name: 2 x 2.5 MW Run-of-the River Hydel Power Project in Karnataka.

Project Promoter: Bhoruka Power Corporation Limited

Special Purpose Vehicle: Not Applicable

1. Executive Summary: Project at a Glance

The promoter of the project, Bhoruka Power Corporation Limited (BPCL) is a renewable energy project developer based in the state of Karnataka in Southern India. They have installed 34 Mw of hydro capacity from small hydro-power projects in the State of Karnataka, which places them among the leading independent power producers in Karnataka, specifically focussing on run-of-the-river projects that do not require any significant civil works for the storage of the water.

BPCL proposes to implement the mini hydel project at Irpu waterfalls of Lakshmana Teertha river. This power project will be referred to as the IHP (Irpu Hydro Power) project. The Govt. of Karnataka has allotted a mini hydropower project at Irpu falls to M/s Universal Engineering, Bangalore. Subsequently, the project was transferred from M/s Universal Engineering to BPCL.

The general layout of the hydel scheme comprises a small diversion weir across river above the waterfall. The penstock bifurcates upstream of the powerhouse to feed water to two turbines of 2.5 MW capacity each. A short tailrace canal restores the flows in the river after generation of the power. Karnataka Power Corporation Limited (KPCL) has constructed a flow-measuring weir and daily flows of the river have been recorded over a period of four years. The data gives a substantial picture of the available flows throughout the year. Rainfall data is available over a period of last 26 years and a detailed hydrological study has been carried out. The studies have proven that the project is capable of generating 5 Mw of power.

The rated head and discharge for the proposed two numbers of TG unit each of 2.5 MW capacity will be 160 m and 1.87m^3/Sec respectively. The annual generation available with the installed capacity of 2x2.5 MW is estimated as 13.77 million units (MU) resulting in plant load factor of about 35%. The proposed generating voltage is 3.3 / 6.6 KVA.

The total capital cost of the project excluding interest during construction is estimated as Rs. 1700 Lakhs (Rs. 170 million). The company proposes a debt-equity ratio of around 1:3 and the loan from will be arranged Indian Renewable Energy Development Agency Limited (IREDA). The loan component is estimated as Rs. 1210 Lakhs. The cost of generation is about Rs. 2.52 / KWh.

The general layout of the hydel scheme has been formulated with a view to have at least impact on environment. In order to minimize the submergence of forestland, the proposed diversion weir will be of short height. A minimum width of land will be utilized for erection of penstock. All large trees have been identified and marked up in and during construction, the layout will be locally modified to minimum felling of trees. The unutilized excavated material will be disposed off in an environmentally friendly way.

2. Project Costs

	Land, Buildings and Civil Works	586.05	1.25	34
	Electro Mechanical works	943.20	2.00	55
	Others	44.80	0.10	03
	Interest during constructions	125.95	0.27	07
	TOTAL	**1700.00**	**3.62**	**100**

**Note: All costs are to be incurred in rupees. However, to facilitate the understanding of international finance institutions, the equivalent dollar figures are provided wherever necessary. The suggested exchange rate is Rs. 47 per USD.*

3. Proposed Means of Financing

	Total Debt Portion	510.00	2.53	70
	Total Equity Portion	1,190.00	1.09	30
	Total Project Cost	**1,700.00**	**3.62**	**100**

4. Committed Financing (If any)

a. Committed Debt Providers

Note: BPCL have not yet received any committed debt from any FI. However, initial discussions have been carried out with the Indian Renewable Energy Development Agency and the Infrastructure Development Finance Company.

b. Committed Equity Providers

Promoter*	1190.00	100%

**: The promoters are willing to participate in the project up to the aforementioned amount. However, if insisted upon, a portion may be taken up by a financing agency for which suitable arrangement for buyout by the promoters may be worked out.*

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5. Estimates of Profitability

Rs. Lakh

Revenue from power sale	452.91	475.55	499.33	524.30	550.51	578.04	606.94	637.29	669.15
Other revenue	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O&M Cost	0.00	30.59	33.64	37.01	40.71	44.78	49.26	54.18	59.60
Preliminary expenses	8.96	8.96	8.96	8.96	8.96				
PBIDT	413.36	432.95	453.36	474.83	496.77	528.78	552.76	577.68	603.59
Depreciation (SLM @ 5.8%)	0.00	100.21	100.21	100.21	100.21	100.21	100.21	100.21	100.21
Interest on Term loan @ 13%	154.70	154.70	132.60	110.50	88.40	66.30	44.20	22.10	0.00
PBT	162.66	182.25	224.76	268.13	312.37	366.48	412.55	459.58	507.59
Provision for Tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAT	162.66	182.25	224.76	268.13	312.37	366.48	412.55	459.58	507.59
Net Cash Flow	258.66	278.25	320.76	364.13	408.37	462.48	508.56	555.58	603.59

*: Year 1 represents the period of construction of the project.

6. Projected Cash Flow

Rs. Lakh

Sources of Funds	0.00	162.66	182.25	224.76	268.13	312.37	366.48	412.55	459.58	507.59	347.47
PAT	0.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00
Depreciation	510.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inc. in Equity capital	1190.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inc. in term loans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inc. in bank borrowings	**1700.00**	**258.66**	**278.25**	**320.76**	**364.13**	**408.37**	**462.48**	**508.55**	**555.58**	**603.59**	**443.47**
Total sources											
Application of funds											
Capital Expenditure	1700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inc. in Current Assets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Term loan repayment	0.00	0.00	170.00	170.00	170.00	170.00	170.00	170.00	170.00	0.00	0.00
Taxes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dividend	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Application	1700.00	0.00	170.00	170.00	170.00	170.00	170.00	170.00	170.00	0.00	0.00
Net Surplus	0.00	258.66	108.25	150.76	194.13	238.37	292.48	338.55	385.58	603.59	443.47
Net Cash Accruals	-1700.00	258.66	278.25	320.76	364.13	408.37	462.48	508.55	555.58	603.59	443.47
IRR on Project						**20%**					
DSCR		**2.67**	**1.33**	**1.50**	**1.69**		**1.92**	**2.24**	**2.58**	**3.01**	
Avg. DSCR						**2.12**					

7. Status of Finance Negotiations

Are you in negotiations with any prospective debt providers? If yes, please specify and elaborate on expected time frame.

IREDA: The promoting company has been negotiating with IREDA for a loan of 75% of the total project cost. IREDA has been the preferred financial institution for the Bhoruka Group and has funded some of their earlier projects. The expected time frame within which the loan is expected to materialise is nine months.

IDFC: Bhoruka has submitted a proposal with the Infrastructure Development Finance Company (IDFC). However, there is a significant difference in the costs of capital as sourced from the two institutions mentioned above.

Do you plan to submit this project to a private venture capital firm or an international equity organization (e.g. REEF)? If yes identify specific fund and elaborate on negotiations.

Bhoruka Power Corporation expects that the initiatives under the GEP-CCS project would be able to identify appropriate global equity finance institutions, hence no need.

Do you plan to submit this project to an international tender for carbon emissions reductions (e.g. Oregon Climate Trust)? If yes, please specify tender and closing date for submission.

While the project possesses characteristics that may make it acceptable under the emerging market based mechanisms, there are no such avenues open at the moment. With the help of the Climate change center, promoters might approach such organizations in the future.

8. Project Promoter Contact Information

	Name of Project Promoter	BORUKA POWER CORPORATION LIMITED (BPCL)
	Address	48, Lavelle Road, Bangalore Karnataka - 560 001, India
	City, State, Province	Bangalore, Karnataka, India
	Contact Name	Mr. Raghuraj Gujjar, Sr. GM – Finance
	Contact Phone	+91-80-2272271 – 4,2273285
	Contact FAX	+91-80-2245246
	Contact EMAIL	Bhopower@blr.vsnl.net .in

9. Project Management Team

	S. Chandrasekhar	Chairman and Managing Director
	Raghuraj Gujjar	Senior General Manager, Finance
	M S Sreenevas	Company Secretary and Manager, Finance

10. Project Promoter Financial History

	What were profitability figures last 3 years?	Rs. 130.8 million in 1999-2000 (PBT) Rs. 83.5 million in 1998-1999 (PBT)
	Book value of firm?	
	EPS reserves and surplus last 3 years?	Earnings per share 2000-01: Rs. 8.69 1999-00: Rs. 0.15 1998-99: Rs. 0.17
	What is current business?	The current line of business is production of electrical energy
	What are synergies between business and this project?	The two are identical.

Note: Other details pertaining to the firm's financial performances are provided in the earlier section on borrower's financial history.

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11. Project Promoter Relevant Experience:

Briefly describe the relevant experience, if any, possessed by the project promoter. Has the promoter developed similar projects?

Bhoruka Power Corporation Ltd. (BPCL), Bangalore, was incorporated in 1986 with the objective of setting up hydroelectric power stations. BPCL has set up Shivapur Hydel Power Station (2 x 9 MW) in 1992, on the Tungabhadra Left Bank Canal at Shivapur near Hospet in Karnataka. With the commissioning of the above project, **BPCL received the distinction of being the first Private Sector Company in Karnataka to set up and operate a Hydel power station in the recent past.**

Subsequent to the Shivapur Project, BPCL has commissioned Shahapur Mini Hydel Schemes (4 out of 5 schemes, each of 1 x 1.3 MW have been commissioned) during 1996-97 on Shahapur Branch Canal at Shahapur near Gulbarga in Karnataka. Further, Rajankollur Mini Hydel Scheme (2 x 1 MW) on Hunasagi Branch Canal at Rajankollur near Narayanpur dam, Karnataka, was commissioned by July 1999.

Over the past few years, the Bhoruka Group has managed to add few more power projects of the same nature. Prominent among the installations made by the company is the Madhavmantri mini Hydel power project set up on the anicut of the Madhavmantri canal. Thus, BPCL has established it self as a premier Mini hydroelectric power company.

BPCL is keen to add further capacity of mini hydel power projects in the near future and establish as one of the biggest groups in this line of business.

12. Special Purpose Vehicle Contact Information (If applicable):

	Name of SPV	NA
	Address	
	City, State, Province	
	Contact Name	
	Contact Phone	
	Contact FAX	
	Contact EMAIL	
	Names and shares of the promoters	
	Is a Shareholding agreement in place	
	Salient terms	

13. Project Details

	Greenfield project or involves existing equipment?	Greenfield Project
	Is GHG mitigation achieved by Process Improvement or Clean Energy Generation?	Through Clean Energy Generation
	Size of Project (MW)?	5 MW
	Project Location? City, Province	The proposed power project is located near Irpu village, Virajpet Taluk, Kodagu district in Karnataka state in Southern India
	Off or on-grid?	Grid-connected
	State Electricity Board?	Karnataka State Power Transmission Corporation
	Technology?	Hydro electric power generation
	Type of Fuel?	Water
	Source of fuel supply?	The Lakshmana Teertha river which is a major tributary of the Cauvery.

14. Feasibility Details

	Was Feasibility Study prepared independently?	Yes, the Feasibility Study was conducted independently.
	What firm prepared the Feasibility Study? List address and contact details	Tata Consulting Engineers Limited, 73/1, St. Marks Road, Bangalore – 560 001

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15. Background on the Power Purchase Agreement (If Applicable)

	Does Project involve PPA (Yes or No) If no, skip to next heading.	Yes.
	Has a PPA been signed? (Yes or No) *(Note: the later parameters pertain to the model PPA)*	The project PPA is currently in the process of being finalised. However, given the track record of the company, its management is confident that the same would be finalised within a period of 60 days and in a manner that has been agreed upon by the company and the Karnataka State Power Transmission Corporation Limited (KPTCL). KPTCL has developed a model PPA on the lines of which several PPAs have been executed, including the projects implemented by BPCL. This model PPA stipulates a tariff of Rs. 2.25 per kWh for 1994-1995 escalated @ a rate of 5% p.a. for a period of 10 years from COD. At the end of the 10th year from the COD, it would be 10th year tariff or the HT tariff rate fixed by KPTCL.
	Nature of Agreement? Take or Pay? Other?	Availability based
	Name of state electricity board or primary PPA signatory?	KPTCL
	What date was the PPA signed?	--
	When does it enter into force?	On satisfaction of CPs
	What is the length of the PPA? (Years)	20 years
	What is the initial purchase price?	Rs. 2.87 per kWh for the year 1999-2000
	What is the annual % increase in purchase price?	5%
	Can the project sell power directly to major consumers? (Yes or No)	No
	What are the securities provided for the revenues? Have the domestic lenders approved these mechanisms? Are there any special clauses, or provisions of relevance to the investors?	Letter of Credit
	What are the terms of Payment to the project developers? Any special clauses of relevance to the investors/lenders? Have the domestic lenders approved the payment terms?	As per MNES policy as adopted by the Karnataka State Govt.
	What are the major provisions (event definitions, treatment of the off time	FM events defined, but the payment obligations during the occurrence of an FM

	definitions, treatment of the off time, etc.) of the Force Majeure clauses?	obligations during the occurrence of an FM event not clear
	What is the method of fixation of tariff (two part, availability etc.)? Are there any provisions for deemed generating/penalties? What is the treatment for infirm power?	Based on MNES policy as adopted by Karnataka State Govt. No provisions for deemed generation.
	Have the provisions for change in law, termination, liquidated damages, etc. been approved by existing lenders/investors?	Yes
	Would the SEB/generating utility want a share in the ownership of carbon offsets?	Not discussed yet

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16. Other Agreements (where applicable)

	Fuel supply agreement signed?	Does not apply for hydropower projects.
	Water/utility supply agreement signed?	Yes, water-sharing and use agreements are finalised, with the State Authorities in Karnataka
	Shareholder's agreement been entered into between existing equity holders?	NA
	Special provisions of above agreements?	Not Applicable.

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17. Quantify and Describe Risks

Risks	Low to High	Describe
Market?	Low	There is a significant priority accorded to renewable energy projects in Karnataka. So the market risk like no off take of power is low.
Country/Sovereign?	Low	India has a stable political, financial and legal system. The institutional and market structure is well established.
Regulatory?	Low	Karnataka is a proactive state and has already initiated reforms in the power sector. As such the regulatory structure is quite robust.
Contract / counter party	Low	The promoter is presently exporting more than 30 Mw of power to the grid. So far, there has not been any instance of non-payment or litigation with the KPTCL Therefore the risk on the same is low.
Construction?	Low	The promoters are the market leaders specialising in this particular line of business, that is, small and mini hydropower projects. Therefore they have the necessary expertise.
Technology?	Low	The technology is proven.
Management?	Low	The management team has an excellent track record.
Enforceability of Contracts?	Low	As mentioned above, there are very few critical contractual agreements that need to be signed for such a project.
Competition?	Low	A similar project at a bigger scale involving storage, if constructed upstream may provide a fuel supply risk. However, such a project is not feasible.
Exit?	Low	The rules for disinvestments under existing laws governing company operation are clear and allow such transactions.

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18. For risks identified in section 14, discuss Mitigation/Coverage measures
All the risks identified are low; therefore mitigation measures are not applicable.

	Risks	Describe Mitigation/Coverage
	Market?	--
	Country/Sovereign?	--
	Regulatory?	--
	Contract/counter party	--
	Construction?	--
	Technology?	--
	Management?	--
	Enforceability of Contracts?	--
	Competition?	--
	Exit?	--

SECTION C: CARBON COMPONENT.

Checklists were adapted from a variety of sources including Natsource, LLC

1. **GHG Mitigation Applicability Macro Checklist**

√		Yes	No
	Does project generate real, measurable, long-term, additional and verifiable emissions reductions vis-à-vis current baseline alternatives?	√	
	Are there sustainable development benefits such as increased employment and protecting bio-diversity?	√	
	Does the project rely on ODA from Annex B Countries?		√
	Has the project received host country approval?		√
	Does project meet size definition for Bonn Fast Track CDM? --under 15 MW for renewables projects --under <15 gigawatthours/year savings for energy efficiency projects --under15 kilotonnes CO2E for emissions reductions from process changes	√	

2. **Emission Reduction Calculations, Monitoring and Verification Checklist**

√		Yes	No
	Does the project involve a discrete reduction of emissions?	√	
	Have the emissions reductions been estimated with an accepted methodology?	√	
	Has a monitoring methodology been established?		√
	Has a third party verifier been contracted to verify actual emissions reductions and sustainable development gains?	Does not apply	
	Has clear ownership of emissions reductions been determined and documented?	Does not apply	

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3. Carbon accounting details

	Parameter	Particulars
1	Baseline methodology*	Refer to the note below
2	Baseline Emissions TCO2	1,39,030 tons of CO2 over 10 years
3	Project Emissions TCO2	Nil
4	Emission reductions TCO2 (2-3)	1,30,9030 tons of CO2 over 10 years

*** Logic for the baseline analysis:**

In the state of Karnataka, the majority of power is supplied by thermal and large hydropower projects. The State Electricity Board buys power from various central and state utilities as the National Thermal Power Corporation, National Hydroelectric Power Corporation, etc.

The setting up of a small-scale renewable energy project as per the UNFCCC norms (< 15 MW) would automatically qualify it under the *fast-track* projects. However, for the project to *qualify* as a Climate Change Mitigation Project (CCMP), it has to be proven that the project would displace the power generated from fossil fuel sources.

Therefore, it has to be established that the project actually displaces power generated by fossil fuels. Now, the state of Karnataka being a power deficit state, there are plans to augment the power production through capacity additions through thermal as well as renewables. The point about the carbon content of the grid is that it is fairly homogenous in nature for all the states in the Southern part of India (that is, the states that are fed by the Southern Regional Load Despatch Centre). For the SRLDC, the power mix in the grid has about 73% of thermal (fossil fuel) content, and the rest being made up by nuclear and renewables. Within the regional grid there is a free exchange of power. As such, the appropriate project boundary for this project is the Southern grid.

Therefore, the power export from the project, as it feeds into the SRLDC, will earn around 73% of the total power generation, with the T&D losses added. It may be noted that as Karnataka has only one major thermal power plant at Raichur (it has other power plants operating on coal and gas of smaller capacities), the T&D losses will be higher in this case.

Therefore, with the power in the Southern Grid being homogeneous with a carbon content of around 73%, the baseline emissions reductions are 73 kWh equivalent for every 100 kWh of power produced.

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Detailed Project Report (DPR) Worksheet

For GHG mitigating projects under
USAID's Greenhouse Gas Pollution Prevention Project – Climate Change Supplement

Managed by The Louis Berger Group, Inc.

Kakatiya Alloys Private Limited
(Project Finance)

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1. Contact Information for the Prospective Borrower

Name of Company	Kakatiya Alloys Pvt. Ltd.
Address	Aziz Bagh 8-1-332/2 Sheikhpet, Hyderabad -500 008
City, State, Province	Andhra Pradesh ,India
Contact Name	Mr. R. Soma Raju
Contact Phone	91-40-3560952,6501290,3561056,3562825.
Contact FAX	91-40-3550789, 3115599
Contact EMAIL	Kalpower@vsnl.net

2. Availability of Financial Information on Borrower

	Yes	
Audited financial statements available for last 3 fiscal years?	√	
Was firm in same general line of business for last 3 years?	√	
Has firm reported operating profits AND net income during each of last 2 years?	√	

3. Borrower's Financial History (last three Fiscal Years)

	2001	2000	1999
EBIDT	3.25	3.77	3.82
EBIDT/Total Income	17.44	20.47	26.45
Operating Profit (OP)	1.09	0.37	(-).53
OP/TI	5.85	2.00	(-)3.67
Net worth	5.85	5.06	4.21
Equity	5.00	5.00	5.00
EPS	15.80	17.00	8.00
Dividend	NIL	NIL	NIL
Major Capital Investments	14.38	14.23	15.15
Debt:Equity ratio	4.16	4.29	5.44
Fixed Asset Coverage Ratio	1.30	1.29	0.95
Current Ratio	2.96	1.13	2.21
Depreciation	2.00	2.19	2.59
Interest Expense	0.33	0.61	0.83

4. Background information on all used and unused short and long-term debt

Kakatiya Alloys Private Limited (KAPL) availed "term loan from Andhra Pradesh State Financial Corporation (APSFC)" in 1986 for establishing Super Fine Wire drawing plant at Hyderabad, in addition to the term loan APSFC provided seed capital.
The same company (KAPL) is setting up the proposed 6 MW power project based on poultry litter. A 'SPV' KAL POWER Ltd. would be floated for the above purpose.
KAPL has cleared all the loans promptly and has a very good track record with APSFC. As on today KAPL is a totally debt free company.
All shares of the company are closely held by the promoter directors. The company does not have any external share holding and is a zero liability company.

SECTION A: CLEAN ENERGY AND GHG MITIGATION EQUIPMENT FINANCE

About the Equipment/Technology: Larger clean energy or GHG mitigating projects (Project Finance) may involve more than one type of environmental equipment. Complete sections A 5 through A 10 for each piece of relevant GHG mitigating equipment.

5. **Description of technology/service to be purchased**

6. **Description of the GHG mitigating potential of the technology**

7. **About the Business Negotiations**

	Is the manufacturer of the technology a domestic company?		
	Is the manufacturer located overseas (exporter)?		
	Is the manufacturer a US company?		
	Have any price negotiations occurred?		
	Has a purchase order been submitted?		

How many units are in the Purchase Order? _____
What is the estimated unit cost of technology (US$)? _____
What is the total cost for the Purchase Order? _____

8. **Contact Information on the Manufacturer**

√	Name of Manufacturer	
	Address	
	City, State, Province	
	Contact Name	
	Contact Phone	
	Contact FAX	
	Contact EMAIL	

9. **About the Trade Financing (For Equipment Imported Into India)**

Is trade financing being sought for the import of the equipment to India? _____

What type of trade financing is being sought (insurance, guarantees, and working capital?

_____

_____

10. **Has a domestic or overseas lender been identified?** _____

	Name of Lender	
	Address	
	City, State, Province	
	Contact Name	
	Contact Phone	
	Contact FAX	
	Contact EMAIL	

SECTION B: PROJECT FINANCE FOR CLEAN ENERGY AND GHG MITIGATION

Project Name: 6 MW Poultry Litter based power project

Project Promoter: KAKATIYA ALLOYS. PVT. LTD

Special Purpose Vehicle: KALPOWER

1. Executive Summary: Project at a Glance

Kakatiya Alloys Private Limited (KAPL) was set up in 1985 for manufacture of Steel and resistance alloy wires in superfine sizes used in various electrical and electronic industries. It operates as a private limited company.

With a view to diversifying operations in a related field, KAPL is proposing to set up a poultry litter based power project with a 6 MW capacity in Medak district of Andhra Pradesh. This project is launched as SPV (Special Purpose Vehicle) as power generation division of the parent company.

The proposed location in Madak district offers several advantages in terms of raw material (Poultry Litter), availability of civic amenities, available of ground water and nearness to APTRANSCo grid lines. The Poultry Litter can be collected from a number of poultry farms located within a radius of 50 km from the proposed power plant.

The Technology to be employed in the power generation is standard indigenous solid fuel combustion and steam raising technology. Fuel is delivered to a bunker where it is stored at negative pressure to reduce odour and dust emissions. It is then transferred by crane / conveyor to the combustion unit in-feed system.

The total capital cost of the project excluding interest during construction is Rs 332.00 million. Out of which equity portion is Rs. 83.00 million and expected loan is Rs 249.00 million. The Debt-Equity ratio is 3:1, which is acceptable for "Power Generation Projects. The project rate of return (IRR) is above 30%.

The company has made marketing agreement with APTRANSCO, and according to it APTRANSCO will purchase the power at a pre-determined rate 5% per annum with 1994-95 as base year.

2. **Project Costs:**

	Plant & Machinery	250.00	5.32	75.30
	Land & Building	5.00	0.11	1.51
	Civil detailed Eng.	25.00	0.53	7.53
	Erection & Commissioning	4.00	0.08	1.20
	Preliminary & Preoperative Expenses	26.00	0.55	7.83
	Working Capital Margin	15.00	0.32	4.52
	Contingencies	7.00	0.15	2.11
	Total Project Cost	332.00	7.06	100.00

3. **Proposed Means of Financing**

	Total Debt Portion	249.00	5.29	75.00
	Total Equity Portion	83.00	1.77	25.00
	Total Project Cost	332.00	7.06	100.00

4. **Committed Financing (if any)**

   a. **Committed Debt Providers**

German Dev. Bank				Under negotiations

* Since the project involves power generation from solid waste, as per the norms of the Ministry of Non-conventional Energy Sources they are eligible for a 50% waiver on the interest rate. Therefore, the project becomes financially attractive to an investor.

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b. Committed Equity Providers

Promoters	1.77	100.00

*: The promoters have committed a maximum of 25% of the total project outlay as equity contribution. However, they are open to equity contributions from other equity finance institutions or other investors.

5. Estimates of Profitability

Rs. In Million

Revenue from power sale	90.41	109.54	130.35	136.86	143.71	150.89	158.44	166.36	174.67	183.41
Other revenue	42.90	49.50	56.10	56.10	56.10	56.10	56.10	56.10	56.10	56.10
	133.31	**159.04**	**186.45**	**192.96**	**199.81**	**206.99**	**214.54**	**222.46**	**230.77**	**239.51**
Fuel cost	20.59	23.76	26.93	26.93	26.93	26.93	26.93	26.93	26.93	26.93
O&M Cost	6.50	7.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
Adm./selling cost	2.74	3.20	3.57	3.82	4.10	4.37	4.75	5.02	5.40	5.80
	29.83	**34.46**	**39.00**	**39.25**	**39.53**	**39.80**	**40.18**	**40.45**	**40.83**	**41.23**
PBIDT	103.48	124.58	147.45	153.71	160.28	167.19	174.36	182.01	189.94	198.28
Depreciation	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30
Interest Term loan	19.80	19.80	19.80	17.80	15.80	13.90	11.80	9.90	7.90	5.90
Working cap	1.40	1.70	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
PBT	58.98	79.78	102.45	110.71	119.28	128.09	137.36	146.91	156.84	167.18
Provision for Tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAT	58.98	79.78	102.45	110.71	119.28	128.09	137.36	146.91	156.84	167.18
Dividends	0.00	0.00	8.30	10.38	12.45	14.52	16.60	18.68	20.75	20.75
Net Cash Flow	56.98	79.78	94.15	100.33	106.83	113.57	120.76	128.23	136.09	146.43

6. Projected Cash Flow

Rs. Million

Sources of Funds											
PAT	0.00	58.98	79.78	102.45	110.71	119.28	128.09	137.36	146.91	156.84	167.18
Depreciation	0.00	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30
Inc. in Equity capital	83.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inc. in term loans	249.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inc. in bank borrowings	0.00	8.00	1.30	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total sources	**332.00**	**90.28**	**104.38**	**126.95**	**134.01**	**142.58**	**151.39**	**160.66**	**170.21**	**180.14**	**190.48**
Application of funds											
Capital Expenditure*	329.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inc. in Current Assets	0.00	10.60	1.80	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Term loan repayment	0.00	0.00	0.00	0.00	35.60	35.60	35.60	35.60	35.60	35.60	35.40
Taxes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dividend	0.00	0.00	0.00	8.30	10.38	12.45	14.52	16.60	18.68	20.75	20.75
Total Application	**329.40**	**10.60**	**1.80**	**9.90**	**45.98**	**48.05**	**50.12**	**52.20**	**54.28**	**56.35**	**56.15**
Net Surplus	2.60	79.68	102.58	117.05	88.03	94.53	101.27	108.46	115.93	123.79	134.33
IRR						**33.28%**					
DSCR		5.16	6.21	7.35	2.84	3.08	3.34	3.64	3.96	4.32	4.73
Av. DSCR						**4.04**					

** Note: Includes margin money for bank guarantee and working capital.*

7. Status of Finance Negotiations

Are you in negotiations with any prospective debt providers? If yes, please specify and elaborate on expected time frame.

The project promoters are currently in advanced stages of negotiations with prospective debt providers. However, as part of the non-disclosure norms of the agreement that the promoters have entered into with the funding institutions, they are not in a position to disclose information to any other individual / corporate entity, except directly to other funding institutions.

Do you plan to submit this project to a private venture capital firm or an international equity organization (e.g. REEF)? If yes identify specific fund and elaborate on negotiations.

REEF was approached but matter could not proceed. Recently promoters are going to negotiate with some Funding agency in Switzerland but they are not in a position to disclose the date and any other information to any individual/ corporate entity at this point of time.

Do you plan to submit this project to an international tender for carbon emissions reductions (e.g. Oregon Climate Trust)? If yes, please specify tender and closing date for submission.

While the project possesses all the characteristics that may make it acceptable under the emerging market based mechanisms, there are no such avenues open at the moment. With the help of the Climate change center, promoters might approach such organizations in the future.

8. Project Promoter Contact Information

Name of Project Promoter	Mr. R. Soma Raju
Address	Aziz Bagh 8-1-332/2 Sheikhpet, Hyderabad -500 008
City, State, Province	Andhra Pradesh ,India
Contact Name	Mr. R. Soma Raju
Contact Phone	91-40-3560952,6501290,3561056,3562825.
Contact FAX	91-40-3550789, 3115599
Contact EMAIL	Kalpower@vsnl.net

9. Project Management Team

Mr. R. Soma Raju	Managing Director / Chief Promoter of the company,
Mr. Ravi K. Rudraraju	In-charge of the company/ Executive Director
Mr. Rajeev K.Rudraraju	In-charge of marketing/ Executive Director
Mr. Rama Raju	Director
Mrs. R. Bharti	Director

10. Project Promoter Financial History

What were profitability figures last 3 years?	As mentioned earlier
Book value of firm?	This does not apply.
EPS reserves and surplus last 3 years?	This does not apply.
What is current business?	Manufacturing Steel and Resistance alloy wires and superfine sizes used in various Electrical and Electronic industries.
What are synergies between business and this project?	Experience & Expertise in the industrial sector.

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11. Project Promoter Relevant Experience:

Briefly describe the relevant experience, if any, possessed by the project promoter. Has the promoter developed similar projects?

No Project Developers don't have any experience in developing the similar projects. However, they propose to hire or acquire suitable personnel that would make the operation of the project less risky.

12. **Special Purpose Vehicle Contact Information (If applicable):**

	Name of SPV	KALPOWER Ltd.
	Address	Aziz Bagh 8-1-332/2 Sheikhpet, Hyderabad -500 008
	City, State, Province	Andhra Pradesh ,India
	Contact Name	Mr. R. Soma Raju
	Contact Phone	91-40-3560952,6501290,3561056,3562825.
	Contact FAX	91-40-3550789, 3115599
	Contact EMAIL	Kalpower@vsnl.net
	Names and shares of the promoters	Mr. R. Soma Raju, Mr. Ravi. K. Rudraraju, Mr. Rajeev K.Rudraraju, Mr. Rama Raju, Mrs. R. Bharti
	Is a Shareholding agreement in place	Yes
	Salient terms	

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13. Project Details

	Greenfield projects or involves existing equipment?	Greenfield project
	Is GHG mitigation achieved by Process Improvement or Clean Energy Generation?	The project achieves GHG mitigation through Clean Energy Generation.
	Size of Project (MW)?	6 MW
	Project Location? City, Province	In the Medak district of Andhra Pradesh in Southern India
	Off or on-grid?	Grid-interactive project
	State Electricity Board?	Andhra Pradesh State Power Transmission Corporation (APTRANSCo)
	Technology?	The technology is poultry waste to power. At the plant, the furnace burns the litter at very high temperatures (around 850°C or 1,500°F), heating water in a boiler to produce steam that drives a turbine linked to an electricity generator. The electricity is exported into the local electricity supplier's grid, and the steam is condensed back into water by an air-cooled condenser before being re-circulated into the boiler.
	Type of Fuel?	Poultry waste
	Source of fuel supply?	Hatcheries and poultry farms spread around the region.

14. Feasibility Details

	Was Feasibility Study prepared independently?	Yes
	What firm prepared the Feasibility Study? List address and contact details	Avant- Garde Engineers and Consultants, Chennai.

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15. Background on the Power Purchase Agreement (if Applicable)

Does Project involve PPA (Yes or No) If no, skip to next heading.	Yes
Has a PPA been signed? (Yes or No)	Yes
Nature of Agreement? Take or Pay? Other?	Pay
Name of state electricity board or primary PPA signatory?	APTRANSCO
What date was the PPA signed?	24th August 2001
When does it enter into force?	On commencement of commercial operations
What is the length of the PPA? (Years)	20
What is the initial purchase price?	3.32 Paise Per Unit
What is the annual % increase in purchase price?	5%
Can the project sell power directly to major consumers? (Yes or No)	No
What are the securities provided for the revenues? Have the domestic lenders approved these mechanisms? Are there any special clauses, or provisions of relevance to the investors?	The selling unit can insist upon Letter of Credit (LC) from APTRANSCO.
What are the terms of Payment to the project developers? Any special clauses of relevance to the investors/lenders? Have the domestic lenders approved the payment terms?	30 days from the date of presentation of bill.
What are the major provisions (event definitions, treatment of the off time, etc.) of the Force Major clauses?	The PPA is silent on major articles like Force Majeure, defaults etc. This makes it a deficient PPA and may need modifications before FC
What is the method of fixation of tariff (two part, availability etc.)? Are there any provisions for deemed generating/penalties? What is the	Tariff is to be calculated at the notified rate of 2.25/Kwh with an escalation @ 5% over the price of previous year and the rate is to

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	treatment for infirm power?	the price of previous year and the rate is to be decided by Andhra Pradesh Regulatory Commission after31-3-2004. Interest @ 10% is to be charged after delayed payment
	Have the provisions for change in law, termination, liquidated damages, etc. been approved by existing lenders/investors?	Change in Law provision may need revision. Others LD, termination etc. are not provided for.
	Would the SEB/generating utility want a share in the ownership of carbon offsets?	Not clear yet

16. Other Agreements (where applicable)

	Fuel supply agreement signed?	Is in the process of being signed
	Water/utility supply agreement signed?	NA
	Shareholder's agreement been entered into between existing equity holders?	SPV is wholly owned by the promoters
	Special provisions of above agreements?	None

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17. Quantify and Describe Risks

Risks	Low to High	Describe
Market?	Low	Since KAPL Ltd. has already entered into a PPA with APTRANSCO market risk is minimal.
Country/Sovereign?	Low	India has a stable political, financial and legal system. The institutional and market structure is well established.
Regulatory?	Low	AP Electricity Regulatory Commission has been formed and is functional.
Contract/counter party	High	APPCL's financial position is not sound. The PPA is not favorably oriented towards the promoters. Therefore, this is a significant risk at the moment. However, there are many such projects that have same structure of PPA. Hence it is likely that the PPAs would be revised when these projects approach financial closure.
Construction?	Low	No non-conventional construction is there. So construction risk is negligible.
Technology?	Medium	The proposed technology is a standard combustion technology which has been successfully in operation in England for last 10 years.
Management?	Medium	Promoters are managing Kakatiya Alloys for last 16 years. However, they do not have adequate experience in running a power project.
Enforceability of Contracts?	Low	PPA and other contracts are fully enforceable. Similar contracts are operational in the state.
Competition?	Low	Kalpower Ltd. is using poultry litter as fuel for the first time in Andhra Pradesh. The state of Andhra Pradesh is deficit in power therefore market competition is not fierce.
Exit?	Low	The rules for disinvestments under existing laws governing company operation are clear and allow such transactions.

18. For risks identified in section 14, discuss Mitigation/Coverage measures

	Risks	Describe Mitigation/Coverage
	Market?	–
	Country/Sovereign?	--
	Regulatory?	–
	Contract/counter party	PPA might need to be revised for inclusion of proper clauses covering FM, Change of Law, Defaults, termination etc.
	Construction?	Promoters shall hire appropriate personnel to ensure timely completion of construction.
	Technology?	Promoters would be seeking support from sound detailed engineering consultants.
	Management?	Promoters shall hire experienced operational personnel in the proposed plant who would be adequately trained.
	Enforceability of Contracts?	–
	Competition?	--
	Exit?	--

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SECTION C: CARBON COMPONENT.

Checklists were adapted from a variety of sources including Natsource, LLC

1. **GHG Mitigation Applicability Macro Checklist**

√		Yes	No
	Does project generate real, measurable, long-term, additional and verifiable emissions reductions vis-à-vis current baseline alternatives?	√	
	Are there sustainable development benefits such as increased employment and protecting biodiversity?	√	
	Does the project rely on ODA from Annex B Countries?		√
	Has the project received host country approval?		√
	Does project meet size definition for Bonn Fast Track CDM? --under 15 MW for renewable projects --under <15 gigawatthours/year savings for energy efficiency projects --under15 kilotonnes CO2E for emissions reductions from process changes	√	

2. **Emission Reduction Calculations, Monitoring and Verification Checklist**

√		Yes	No
	Does the project involve a discrete reduction of emissions?	√	
	Have the emissions reductions been estimated with an accepted methodology?	√	
	Has a monitoring methodology been established?		√
	Has a third party verifier been contracted to verify actual emissions reductions and sustainable development gains?		√
	Has clear ownership of emissions reductions been determined and documented?		√

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3. Carbon accounting details

	Parameter	Particulars
1	Baseline methodology	**Assumption:** The project replaces grid power generated from the marginal power plant in the relevant Load Center. Discussions with the power transmission authorities have revealed that marginal plant is a thermal plant operating on coal usage. The next step is to figure out the nature of coal that is used for the purpose of generation of power. Most of the coal used in the purpose of power generation is in the category of anthracite coal. The baseline power plant is assumed to operate at an overall efficiency level of 25%. The Transmission and Distribution losses have been assumed at 20%.
2	Baseline Emissions TCO2	34696 tons of CO2 per annum
3	Project Emissions TCO2	0
4	Emission reductions TCO2 (2-3)	34696 tons of CO2 per annum

Detailed Project Report (DPR) Worksheet

For GHG mitigating projects under
USAID's Greenhouse Gas Pollution Prevention Project – Climate Change Supplement

Managed by The Louis Berger Group, Inc.

Market Dynamics Pvt. Ltd.
(Project & Equipment Finance)

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1. Contact Information for the Prospective Borrower

	Name of Company	Market Dynamics, Rajda Sales and Rajda Industries & Exports
	Address	1702, Chatterjee International Centre, 33A, J.N. Road
	City, State, Province	Calcutta – 700 072, West Bengal, India
	Contact Name	Mr. Subir Nathak, Managing Director
	Contact Phone / Fax	91-33-226 1916 / 91-33-226 0014
	Contact EMAIL	Mdynamics@hotmail.com, snathak@yahoo.com

1. Availability of Financial Information on Borrower

	Audited financial statements available for last 3 fiscal years?	√	
	Audited financials being provided to LBG Washington? (New Delhi)	√	
	Was firm in same general line of business for last 3 years?	√	
	Has firm reported operating profits AND net income during each of last 2 years?		√

2. Borrower's Financial History (last three Fiscal Years)

Data for Market Dynamics (all figures are in Rs. Lakhs)

	EBIDT			
	EBIDT/Total Income			
	Operating Profit (OP)	4.69	(8.66)	0.87
	OP/TI			
	Net worth	36.08	21.56	27.30
	Equity	4.0	4.0	2.0
	EPS	11.30	-	1.43
	Dividend	-	-	-
	Major Capital Investments	-	-	-
	Debt:Equity ratio	1:1.22	1:1.93	1:3.3
	Fixed Asset Coverage Ratio	18.75%	18%	23%
	Current Ratio	-		
	Credit Rating by Lead FI/Bank	NA	NA	NA
	Depreciation/Amortization Expense	0.17	0.22	0.30
	Interest Expense	14.65	12.43	13.48
	Current maturity of LTD			

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Borrower's Financial History (continued)

Data for Rajda Industries and Exports (Flagship Company of Rajda Group)

	EBIDT			
	EBIDT/Total Income			
	Operating Profit (OP)	48.70	43.44	42.50
	OP/TI			
	Net worth	249.29	224.42	198.43
	Equity	43.0	43.0	43.0
	EPS	6.97	7.15	7.56
	Dividend	10%	10%	10%
	Major Capital Investments	-	24.40	-
	Debt:Equity ratio	1:1.08	1:0.91	1:0.76
	Fixed Asset Coverage Ratio	35%	38%	33%
	Current Ratio	77%	64%	75%
	Credit Rating by Lead FI/Bank	NA	NA	NA
	Depreciation/Amortization Expense	16.87	12.69	9.96
	Interest Expense	71.44	78.63	63.40
	Current maturity of LTD			

All figures are in Rs. Lakhs

Borrower's Financial History (continued)

Data on Rajda Sales Pvt. Limited (Group company of Rajda)

EBIDT			
EBIDT/Total Income			
Operating Profit (OP)	8.72	9.30	8.66
OP/TI			
Net worth	109.63	68.0	50.11
Equity (Excluding Quasi-equity)	11.0	11.0	11.0
EPS	52.80	46.51	84.03
Dividend	10%	10%	10%
Major Capital Investments	-	-	-
Debt:Equity ratio	1:3.88	1:3.76	1:3.82
Fixed Asset Coverage Ratio	12%	27%	39%
Current Ratio	102%	105%	112%
Credit Rating by Lead FI/Bank	NA	NA	NA
Depreciation/Amortization Expense	3.44	4.19	3.62
Interest Expense	54.16	44.02	33.69
Current maturity of LTD			

All figures are in Rs. Lakhs

3. **Background information on all used and unused short and long-term debt**

The company has been having continuous financial dealings with the country's premier renewable energy financial institution, namely, IREDA (Indian Renewable Energy Development Agency).
However, the company has been a creditor to the organisation, instead of a debtor. In fact, the company has not taken any debts over the last three years.

SECTION B: PROJECT FINANCE FOR CLEAN ENERGY AND GHG MITIGATION

Project Name: Biomass briquetting plant and PV powered home lighting systems

Project Promoter: Market Dynamics Pvt. Ltd.

Special Purpose Vehicle: -

1. Executive Summary: Project at a Glance

Market Dynamics has been active in the field of renewable energy for more than 10 years. Though primarily involved in the business of dealing and distributing a broad range of solar appliances, the company has also made forays into related fields as agricultural tools as power tillers etc.

The project proposed by Market Dynamics has two separate components. The first component is dissemination of solar home and solar lighting systems. This is an existing activity of the company, and the project proposal seeks financial assistance from financial institutions to scale-up its operations in a big way.

The second component involves making a foray into a new program area, namely biomass briquetting. The company has identified this area as a priority. It has proposed the setting up of a number of biomass briquetting plants in the Eastern, North-Eastern and Coastal India.

The proposed project intervention has been planned around the areas that have been identified for the sales of the solar systems. The shortlisting of the proposed biomass sites have been made on the basis of preliminary and informal surveys on the availability of biomass.

For the project involving distribution of solar devices, the company is already identified as one of the market leaders in the Eastern zone for such activity. The company has also identified an emerging business opportunity in this field, as both the Northeast and West Bengal, the target locations for the dissemination of the systems, is yet to be fully electrified.

As far as the biomass briquetting plants are concerned, Market Dynamics' idea is to replace the traditional fuels as used by the villagers for cooking and / or carrying out micro-enterprises. These traditional fuels largely involve the use of various forms of biomass, especially firewood. The use of coal or coal-based fuels is restricted by primarily cost considerations. The project seeks to replace the use of biomass by bio-wastes, converted into briquettes. The added advantage that the project derives is that the calorific values of the briquettes after compaction compares favourably with even the best quality of coal available in the rural areas at a price that is less than that of coal. Therefore, the technology is a strong tool towards ensuring the sustainability of the rural livelihoods in the target areas.

The assistance that Market Dynamics seeks from the investors is three-fold. In the first phase the company seeks grant financing to enable it to do the initial market surveys, for both the solar and the biomass briquetting ventures. With this fund, the project developer would be in a position to go into the second phase.

In the second phase, the company seeks financial support in the form of loans at rates of interest that vary between the two proposed activities. This is the phase in which the actual project implementation is going to take place.

Finally, the company is interested in selling the emission reductions (ERs) generated by the project. The management of Market Dynamics perceives an opportunity out of monetizing carbon offsets generated by the project, which may be done through a host of financial and market-based mechanisms.

2. Project Costs

Biomass Briquetting Project

	Land	12.00	25.00	17.70%
	Plant and machinery	26.00	54.17	38.35%
	Pre-operative Expenses	2.00	4.17	2.95%
	Contingencies	2.00	4.17	2.95%
	Miscellaneous Expenses	1.60	3.33	2.36%
	Land and Building Devt	12.00	25.00	17.70%
	Electrification	2.20	4.58	3.24%
	Working Capital Requirement	10.00	20.83	14.75%
	TOTAL	**67.80**	**141.25**	**1.00**

Solar Photovoltaic Project

	Cost of the System	4983	10381.25	84.45%
	Incentive for the area dealer	679.5	1415.625	11.52%
	Miscellaneous	226.5	471.875	3.84%
	Market Development	11.52	24	0.20%
	TOTAL	5900.52	12292.750	100.00%

3. Proposed Means of Financing

Please Note: The project has two component parts comprising of solar and biomass. For the solar segment, the investor makes a capital infusion of $ 1 million in the form of a loan. This loan assists the company to tide over its working capital constraints and scale-up its operations. Therefore, in the context of the project, the contributions from the investor/s and the host do not add up to the total outlay of the project. However, the market development expenses borne by the investor *and* the developer have been shown as positive cost contributions.

For an understanding, however, the shares of the investor and the host for the two projects taken together are shown below.

	Contribution from Investor	54.24	113,000	80%
	Contribution from Project Developer	13.56	28,250	20%
	Total Project Cost	67.80	141,250	100%

	Subsidy from IREDA / WBREDA	4530	9,437,500	76.77%
	Project Developer	1364.76	2,843,250	23.13%
	Investor's contribution	5.76	12,000	0.10%
	Total Project Cost	5900.52	12,292,750	100.00 %

4. Committed Financing (if any)

a. Committed Debt Providers

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b. Committed Equity Providers

IREDA (Capital Subsidy)	9,437,500	Does not apply
Market Dynamics	2,843,250* + 28,250** = 2871500	Does not apply

*: Share of Market Dynamics from solar project
**: Share of Market Dynamics from biomass briquetting project

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5. Estimates of Profitability *(Biomass Briquetting Project)*

Revenue from sale of BB*	88.1	92.5	97.2	102.0	107.1	112.5	118.1	124.0	130.2	136.7
Other revenue	0	0	0	0	0	0	0	0	0	0
Raw material costs (biomass)	23.50	23.97	24.45	24.94	25.44	25.95	26.47	27.00	27.53	28.09
Fuel cost (power)	13.44	14.11	14.82	15.56	16.34	17.15	18.01	18.91	19.86	20.85
O&M Cost	21.36	22.13	22.93	23.78	24.67	25.60	26.58	27.61	28.69	29.83
PBIDT	29.83	32.32	34.96	37.74	40.68	43.77	47.04	50.49	54.12	57.95
Depreciation	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Interest (Term loan)	6.51	4.88	4.07	3.25	2.44	1.63	0.81	0.00	0.00	0.00
PBT	20.72	24.84	28.29	31.89	35.63	39.55	43.63	47.89	51.52	55.35
Provision for Tax	7.5	8.9	10.2	11.5	12.8	14.2	15.7	17.2	18.5	19.9
PAT	13.26	15.90	18.11	20.41	22.81	25.31	27.92	30.65	32.97	35.43
Net Cash Flow	15.86	18.50	20.71	23.01	25.41	27.91	30.52	33.25	35.57	38.03

* - BB = biomass briquettes

6. **Estimates of Profitability** *(Solar Home Systems Project)*

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total Revenue	90.0	270.8	482.1	568.8	690.5	822.7	966.3	1122.0	1299.8	1441.5
Other revenue	0	0	0	0	0	0	0	0	0	0
Actual System Cost	72.0	84.1	99.0	114.0	129.0	144.0	159.0	174.0	192.0	192.0
Fuel cost (power)	0	0	0	0	0	0	0	0	0	0
O&M Cost	0	0	0	0	0	0	0	0	0	0
PBIDT	18.0	186.6	383.1	454.8	561.5	678.7	807.3	948.0	1107.8	1249.5
Depreciation	0	0	0	0	0	0	0	0	0	0
Interest (Term loan)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
PBT	-6.0	162.6	359.1	430.8	537.5	654.7	783.3	924.0	1083.8	1225.5
Provision for Tax	0	59.4	131.1	157.2	196.2	239.0	285.9	337.3	395.6	447.3
PAT	-6.0	103.3	228.0	273.6	341.3	415.7	497.4	586.7	688.2	778.2
Net Cash Flow	-6.0	103.3	228.0	273.6	341.3	415.7	497.4	586.7	688.2	778.2

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7. **Projected Cash Flow** (*Biomass briquetting Project*)

Sources of Funds										
PAT	13.26	15.90	18.11	20.41	22.81	25.31	27.92	30.65	32.97	35.43
Depreciation	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Inc. in Equity capital	0	0	0	0	0	0	0	0	0	0
Inc. in term loans	0	0	0	0	0	0	0	0	0	0
Inc. in bank borrowings	0	0	0	0	0	0	0	0	0	0
Total sources	15.86	18.50	20.71	23.01	25.41	27.91	30.52	33.25	35.57	38.03
Application of funds										
Capital Expenditure	67.80									
Inc. in Current Assets	0	0	0	0	0	0	0	0	0	0
Term loan repayment	0	13.56	6.78	6.78	6.78	6.78	6.78	6.78	0	0
Taxes	0	0	0	0	0	0	0	0	0	0
Dividend	0	0	0	0	0	0	0	0	0	0
Total Application	67.80	13.56	6.78	6.78	6.78	6.78	6.78	6.78	0.00	0.00
Net Surplus	-51.94	4.94	13.93	16.23	18.63	21.13	23.74	26.47	35.57	38.03
IRR	28.21%									
DSCR										
Avg. DSCR										

8. Projected Cash Flow *(Solar Home Systems Project)*

Sources of Funds										
PAT	-6.00	103.27	228.00	273.57	341.29	415.73	497.37	586.73	688.22	778.22
Depreciation	0	0	0	0	0	0	0	0	0	0
Inc. in Equity capital	0	0	0	0	0	0	0	0	0	0
Inc. in term loans	0	0	0	0	0	0	0	0	0	0
Inc. in bank borrowings	0	0	0	0	0	0	0	0	0	0
Total sources	-6.00	103.27	228.00	273.57	341.29	415.73	497.37	586.73	688.22	778.22
Application of funds										
Capital Expenditure	1,370.64									
Inc. in Current Assets	0	0	0	0	0	0	0	0	0	0
Term loan repayment	0	0	60	60	60	60	60	60	60	60
Taxes	0	0	0	0	0	0	0	0	0	0
Dividend	0	0	0	0	0	0	0	0	0	0
Total Application	1,370.64	0.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
Net Surplus	-1376.64	103.27	168.00	213.57	281.29	355.73	437.37	526.73	628.22	718.22
IRR	16.68%									
DSCR										
Avg. DSCR										

9. Status of Finance Negotiations

Are you in negotiations with any prospective debt providers? If yes, please specify and elaborate on expected time frame.

The project developer has had negotiations with SIDBI (Small Industries Development Bank of India) for participation in the biomass briquetting project. For the solar programme, as mentioned above, IREDA is already a contributor in the form of providing a capital subsidy. However, the project developer intends to source one investor who could invest capital in both the projects for a period in time. This would reduce the hassles from the side of Market Dynamics. Additionally, the carbon offsets generated would have fewer stakeholders to be shared with. Thus, Market Dynamics has adopted the 'business plan' approach and have outlined in detail how it envisages its business to grow over time. The document also gives a indication of the support sought for the two project concepts taken together.

Therefore, the company is interested in one investor financing both the streams. In the absence of such an entity, however, the company is willing to work with different FIs for the two different projects.

Do you plan to submit this project to a private venture capital firm or an international equity organization (e.g. REEF)? If yes identify specific fund and elaborate on negotiations.

The project developer is interested in loan contributions as a preference. Equity contributions from a firm such as the REEF can be considered only as an add-on to loans that may be provided to the company.
Also, a second consideration that limits Market Dynamics' chances with a venture equity organisation is that the rates of return generated by the projects taken together do not qualify it for financial contributions from venture equity organisations.

Do you plan to submit this project to an international tender for carbon emissions reductions (e.g. Oregon Climate Trust)? If yes, please specify tender and closing date for submission.

Yes. The project is being considered for the Netherlands Government-led CERUPT 2001 global tender on soliciting Certified Emission Reductions from Clean Development Mechanism (CDM) projects. The last date for the submission of the project to the tender (RFP) is 31st January 2002.

10. Project Promoter Contact Information

	Name of Project Promoter	Market Dynamics
	Address	33-A, Chatterjee International, Jawaharlal Nehru Road,
	City, State, Province	Calcutta – 700 001, West Bengal
	Contact Name	Mr. Subir Nathak, Managing Director
	Contact Phone	91-33-226 1916
	Contact FAX	91-33-225 3550
	Contact EMAIL	Mdynamics@hotmail.com, snathak@yahoo.com

11. Project Management Team

	Mr. Subir Nathak	Managing Director
	Shri Nandubhai Patel	Finance Manager
	Rituraj Sen Gupta	Assistant Manager (Marketing)

12. Project Promoter Financial History

	What were profitability figures last 3 years?	Provided in the earlier table.
	Book value of firm?	Provided in the earlier table.
	EPS reserves and surplus last 3 years?	Provided in the earlier table.
	What is current business?	Dealership and distribution of solar home systems
	What are synergies between business and this project?	There are significant synergies between the line of business and the project. In fact, they are almost identical

13. Project Promoter Relevant Experience:

Briefly describe the relevant experience, if any, possessed by the project promoter. Has the promoter developed similar projects?

Over the last 10 years & more, Market Dynamics has dedicated their services to renewable energy, specifically Solar Thermal and Solar photovoltaic. Following its inception in 1989, Market Dynamics entered the Solar Energy field, a path very much untreated at that point in time. After 10 years of service in this field, Market Dynamics has emerged as the one of the largest dealers and distributors of solar powered devices. In the last decade, they have been thrice awarded 'Best Dealer Award' by their equipment suppliers, TATA BP Solar India Limited. Market Dynamics today looks back with a lot of satisfaction at having chosen a field which has immense opportunities and at the same time provides a good feeling at having done at least a small bit for the rural masses.

In the field of solar thermal applications, Market Dynamics had been one of the first entrepreneurs in India to have tried and succeeded in popularising solar water heating systems in various urban applications.

As far as quantifying the efforts of Market Dynamics are concerned, they have already disseminated more than 5000 solar home systems in the catchment area of West Bengal. Though the delayed payment schemes of IREDA / WBREDA have been a retarding factor for the company's growth options, yet the company have delivered results.

The success factors attributable to the growth of the company are its strong dealer-distribution network, its pricing strategies and above all, the quality of its products.

As far as the biomass briquetting project is concerned, the company **has no direct experience of that field.** However, Market Dynamics has been the largest player in the Eastern part of the country involved in dissemination of solar PV to the rural, off-grid areas. Therefore, the company has a strong understanding of the field.

14. Special Purpose Vehicle Contact Information (If applicable):

	Name of SPV	NA
	Address	
	City, State, Province	
	Contact Name	
	Contact Phone	
	Contact FAX	
	Contact EMAIL	
	Names and shares of the promoters	
	Is a Shareholding agreement in place	
	Salient terms	

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15. Project Details

Greenfield project or involves existing equipment?	It is a Greenfield project.
Is GHG mitigation achieved by Process Improvement or Clean Energy Generation?	Through Clean Energy Generation.
Size of Project (MW)?	
Project Location? City, Province	Eastern, North-Eastern and East-Coastal parts of India
Off or on-grid?	Off-grid.
State Electricity Board?	Not applicable.
Technology?	Biomass Briquetting; Solar Photovoltaic
Type of Fuel?	Renewable.
Source of fuel supply?	Sunlight and Bio-wastes.

16. Feasibility Details

Was Feasibility Study prepared independently?	For the solar component, the concept of feasibility study does not apply. As far as the biomass briquetting plant is concerned, the technology is relatively simple and though mechanized, does not involve detailed engineering. Therefore, for the biomass briquetting plant a detailed biomass survey for the first plant site has been carried out and the Report prepared. Furthermore, for the biomass briquetting plant, technical details of a commercially operating plant is provided. Also, full technical details for the plant has been outlined in the business plan document.
What firm prepared the Feasibility Study? List address and contact details	The Biomass Survey Report was jointly prepared by: 1. Chalkgopal Cosmos Welfare Society, an NGO based in South 24-Pgs, West Bengal 2. Climate Change Centre, Development Alternatives

17. Background on the Power Purchase Agreement

Does Project involve PPA (Yes or No) If no, skip to next heading.	No
Has a PPA been signed? (Yes or No)	
Nature of Agreement? Take or Pay? Other?	
Name of state electricity board or primary PPA signatory?	
What date was the PPA signed?	
When does it enter into force?	
What is the length of the PPA? (Years)	
What is the initial purchase price?	
What is the annual % increase in purchase price?	
Can the project sell power directly to major consumers? (Yes or No)	
What are the securities provided for the revenues? Have the domestic lenders approved these mechanisms? Are there any special clauses, or provisions of relevance to the investors?	
What are the terms of Payment to the project developers? Any special clauses of relevance to the investors/lenders? Have the domestic lenders approved the payment terms?	
What are the major provisions (event definitions, treatment of the off time, etc.) of the Force Majeure clauses?	
What is the method of fixation of tariff (two part, availability etc.)? Are there any provisions for deemed generating/penalties? What is the treatment for infirm power?	
Have the provisions for change in law, termination, liquidated damages , etc. been approved by existing lenders/investors?	
Would the SEB/generating utility want a share in the ownership of carbon offsets?	

18. Other Agreements

	Fuel supply agreement signed?	For the biomass briquetting plant, the project developer has entered into informal agreements with the suppliers of the bio-waste. However, no fuel supply contracts outlining the rate of fuel offtake has been signed.
	Water/utility supply agreement signed?	Not required
	Shareholder's agreement been entered into between existing equity holders?	Not required
	Special provisions of above agreements?	Not required

19. Quantify and Describe Risks

Risks	Low to High	Describe
Market?	Medium	Market risks for the solar PV project are negligible, especially because the target markets are poorly electrified. Also, past experience shows that there has not been much of a change in the power situation. Therefore the market for solar is positive. For the biomass briquettes, the newness of the product acts as a barrier to its acceptability. Therefore, considerable pilot testing of the product is required, which makes the project riskier.
Country/Sovereign?	Low	The country and the Government have always supported initiatives in renewable energy. Moreover, off-grid applications are encouraged as a priority.
Regulatory?	Medium to High	The regulatory authority on solar, i.e. MNES / IREDA currently extends subsidies on solar PV. These are pass-through schemes of the World Bank and the KFW. In the absence of the schemes in future, the future of the MNES-IREDA program may be jeopardized.
Contract/counter party	Low	Although the biomass briquetting plants have a raw material threat, the biomass survey report clearly outlines that the availability of the wastes are far in excess of the plant's requirement. It may be added that the project developer is interested in similar sites.
Construction?	Low	The technical assistance is being provided by Hi-Tech Agro Projects, who are market leaders in the biomass briquetting technology. They have agreed to support the initiatives of the developer.
Technology?	Low to Medium	Although the technology suppliers have a long track record, yet there is sufficient skepticism on the performance of the biomass briquetting technology in general. Therefore, the presence of the risk is not rules out.
Management?	Low to Medium	The company is quite small and qualifies as a medium-sized enterprise. It has performed consistently in a market that is generally non-performing and has few successes. This shows that the Management is quite capable. However, the fact that a single person leads it makes it

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			riskier.
	Enforceability of Contracts?	Low	The contractual issues are not significant in the project.
	Competition?	Low	In the field of solar, Market Dynamics is the market leader. As far as the biomass briquetting is concerned, there is hardly any competitor. Competition from other forms of fuel is also limited, since the operations are mostly in off-grid areas where the power is not present. Even in the remote grid-fed areas, the supply is highly unreliable. Therefore, the demand for both solar and biomass briquettes would continue.
	Exit?	No Risk	For a small company, exit is not a problem since no equity is offered.

20. For risks identified in section 14, discuss Mitigation/Coverage measures

Risks	Describe Mitigation/Coverage
Market?	For the biomass briquetting project, the project developer has conducted test-launches of biomass briquettes in the proposed areas for the S-24 Pgs plant, as also for the North Bengal area, where the company is proposing to set up more plants. Market Risk on solar is considered negligible.
Country/Sovereign?	The risk is concerned to be negligible.
Regulatory?	In view of these regulatory risks materializing, the company has solicited the loan as mentioned in the document. The management perception to this risk is that the Indian Government's commitment to solar would ensure that the subsidy would remain in some form or the other, although the amount and the terms could change over time.
Contract/counter party	For the biomass briquetting project, the company has had elaborate discussions with the proposed sellers of the bio-waste. The company is confident that the written contracts & agreements can be easily signed as soon as financial closure is assured.
Construction?	The risk is concerned to be negligible.
Technology?	The investor perception of the biomass briquetting technology notwithstanding, the technology suppliers have considerable experience in the relevant field. Moreover, they have ensured free and committed after-sales supports as a part of the technology guarantee that they are committed to provide.
Management?	The Market Dynamics management, as well as the Rajda group has indicated that the project management team would be expanded with financial closure.
Enforceability of Contracts?	The risk is concerned to be negligible.
Competition?	The risk is concerned to be negligible.
Exit?	The risk is concerned to be negligible.

SECTION C: CARBON COMPONENT.

Checklists were adapted from a variety of sources including Natsource, LLC

1. GHG Mitigation Applicability Macro Checklist

√		Yes	No
	Does project generate real, measurable, long-term, additional and verifiable emissions reductions vis-à-vis current baseline alternatives?	Yes	
	Are there sustainable development benefits such as increased employment and protecting biodiversity?	Yes	
	Does the project rely on ODA from Annex B Countries?	No	
	Has the project received host country approval?	No	
	Does project meet size definition for Bonn Fast Track CDM? --under 15 MW for renewables projects --under <15 gigawatthours/year savings for energy efficiency projects --under15 kilotonnes CO2E for emissions reductions from process changes	Yes	

2. Emission reduction Calculations, Monitoring and Verification Checklist

√		Yes	No
	Does the project involve a discrete reduction of emissions?	Yes	
	Have the emissions reductions been estimated with an accepted methodology?	Yes	
	Has a monitoring methodology been established?	Yes	
	Has a third party verifier been contracted to verify actual emissions reductions and sustainable development gains?	No	
	Has clear ownership of emissions reductions been determined and documented?	Yes	Not doc.

3. Carbon accounting details

	Parameter	Particulars
1	Baseline methodology	*Biomass Briquetting:* The baseline for the biomass briquetting project is the continued use of firewood in the project area. As it is known, a large portion of the energy consumption (40%) in the country is through informal sources like forest biomass. The project seeks to replace this deforestation by biomass briquettes. *Solar Photovoltaic:* The baseline for the project varies from the use of biomass to the use of kerosene. Since the systems are of maximum 60Wp, there is no possibility of operating enterprises. For simplicity of operations, out of 45,300 systems proposed to be sold, 25,000 are assumed to operate on solar and the rest on biomass.
2	Baseline Emissions TCO2	*Biomass Briquetting:* 203,576 tons CO2 *Solar Photovoltaic:* 57,562 tons of CO2
3	Project Emissions TCO2	*Biomass Briquetting:* 12,903 tons CO2 *Solar Photovoltaic:* 0
4	Emission reductions TCO2 (2-3)	248,235 tons CO2 over 15 years *(Avoids 16,549 tons CO2 annually)*

Detailed Project Report (DPR) Worksheet

For GHG mitigating projects under
USAID's Greenhouse Gas Pollution Prevention Project – Climate Change Supplement

Managed by The Louis Berger Group, Inc.

R. R. Bioenergies Ltd.
(Project Finance)

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1. **Contact Information for the Prospective Borrower**

√		
	Name of Company	R R BIO ENERGIES LIMITED
	Address	Plot No.39, Lane No.1,Street No.3 West Marredpally **Secunderabad 500 026**
	City, State, Province	**Secunderabad, Andhra Pradesh, India**
	Contact Name	K Sudhakar
	Contact Phone	91-040-7808970,7713422,6212348
	Contact FAX	91-040-7718162
	Contact EMAIL	rrbio@hotmail.com

1. **Availability of Financial Information on Borrower**

√		Yes	No
	Audited financial statements available for last 3 fiscal years?		√
	Audited financials being provided to LBG Washington?		√
	Was firm in same general line of business for last 3 years?		√
	Has firm reported operating profits AND net income during each of last 2 years?		√

2. **Borrower's Financial History (last three Fiscal Years)**

This does not apply since the project is a **Special Purpose Vehicle.**

√		2001	2000	1999
	EBIDT			
	EBIDT/Total Income			
	Operating Profit (OP)			
	OP/TI			
	Net worth			
	Equity			
	EPS			
	Dividend			
	Major Capital Investments			
	Debt:Equity ratio			
	Fixed Asset Coverage Ratio			
	Current Ratio			

	Credit Rating by Lead FI/Bank			
	Depreciation/Amortization Expense			
	Interest Expense			
	Current maturity of LTD			

3. Background information on all used and unused short and long-term debt

The company is newly formed. Therefore, the parameters indicative of profitability of the company does not apply in this case. Also, the company has not availed of any short and/or long term debts.

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SECTION B: PROJECT FINANCE FOR CLEAN ENERGY AND GHG MITIGATION

Project Name: 12 MWe Integrated Gasifier Combined Cycle Project in Andhra Pradesh
Project Promoter: R R Bio Energies Limited

Special Purpose Vehicle:

1. Executive Summary: Project at a Glance

The project aims to set up a 12 MW exportable biomass based power generation plant in the Eluru district of Andhra Pradesh State. A total of 57 acres of land has been acquired and all necessary clearances from the State Govt. have been obtained. The company has also obtained an allotment order from the Non-Conventional Energy Dept. Corporation of Andhra Pradesh, and a "No Objection Certificate" from the State Pollution Board. Also, the power purchase agreement has been signed with the Andhra Pradesh Power Transmission Corporation Limited.

The West Godavari district in Andhra Pradesh is one of the most fertile parts of the country with sugarcane, coconut, mango, and cashew being the major plantation crops.

The implementation of the project will not only augment power generation in the state, but will also lead to increased generation of revenue, income, and employment opportunities in the rural areas leading to improvement in living standards of the rural masses. The power plant will require approximately 100,000 metric tons of biomass fuel per annum. A variety of biomass residues will be used, derived from the following crop wastes: Wood waste from forestry; sugar cane trash; tree prunings from cashewnut / mango; oil palm leaves; and coconut leaves and husk.

The plant will use Integrated Gasification Combined Cycle (IGCC) process technology. IGCC technology has already been established as one of the most advanced, efficient and environmentally sound power generation technologies currently available and this project will be the first application of this technology in India. Essentially, this involves the production of a fuel gas or "syngas" from a solid fuel, such as biomass. This fuel gas is then utilised in a combined cycle operation.

There are few cost-sharing benefits of the technology in terms of manure use of the leftover fuel mixtures. Varied fuel or their mixtures can be used as manure after processing. The technology is to be transferred from Carbona Incorporated, a firm from Finland. The main components of the technology include a) *pressurised gasification plant*, b) *gas turbines*, c) *heat recovery steam generator* and d) *steam turbine*. The biomass is fed into the pressurised gasifier through lock and feed hoppers. The *syngas* from the gasifier is then fed into the gas turbine for generation of power. The waste heat from the process is recovered by the HRSG and fed into the steam engine for generation of the additional power.

A twenty year renewable Power Purchase Agreement (PPA) with Andhra Pradesh Transmission Corporation (APTransco) was signed on 26th September 2000, with a payment mechanism whereby the purchasing entity, APTransco, will open a revolving letter of credit in favour of the company.

2. **Project Costs**

	Plant & Machinery	10.06	450.19	1.45
	Land & Building	0.22	9.85	4.41
	Civil detailed Eng.	0.67	29.98	66.23
	Erection & Commissioning	2.23	99.79	14.68
	Preliminary & Preop. Expenses	1.41	63.10	3.36
	Working Capital Margin	0.09	4.03	9.28
	Contingencies	0.51	22.82	0.59
	Total Project Cost	**15.19**	**679.76**	

3. **Proposed Means of Financing**

	Total Equity Portion	6.30	169.94	0.25
	Total Debt Portion	8.89	509.81	0.75
	Total Project Cost	**15.19**	**679.75**	1.00

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4. **Committed Financing**

a. **Committed Debt Providers**

Being Identified				

b. Committed Equity Providers

Promoter*	3.80	60.3%
MNES^ Grant$	2.50	39.7%

** The promoters are willing to participate in the project up to the aforementioned amount.*

^: Ministry of Non-conventional Energy Sources, Government of India

$: The grant from the Ministry of Non-Conventional Energy Sources is at the rate of 10 million Rupees per exportable megawatt of power. The conversion rate from rupees to dollars has been considered at Rs. 48.00

5. Estimates of Profitability

Rs. In Lakhs

Revenue from power sale	191.4	251.2	316.6	332.4	349.0	366.5	384.8	404.0	424.2	445.5
Other revenue	0	0	0	0	0	0	0	0	0	0
Fuel cost	49.1	42.1	44.2	46.4	48.7	51.1	53.7	56.4	59.2	62.1
O&M Cost	27.5	28.8	30.3	31.8	33.4	35.0	36.8	38.6	40.6	42.6
Admin/selling cost	10.4	11.3	12.6	13.5	14.9	16.7	18.0	19.8	22.1	24.3
Misc. charges	8.1	18.9	23.85	27.45	29.7	31.95	33.75	35.55	10.8	10.35
PBIDT	96.5	150.2	205.7	213.3	222.4	231.7	242.6	253.7	291.7	306.1
Depreciation	69.75	69.75	69.75	69.75	69.75	69.75	69.75	69.75	69.75	69.75
Interest Term loan	38.88	31.10	27.21	23.33	19.44	15.55	11.66	7.78	3.89	0.00
Working cap										
PBT	-12.1	49.4	108.7	120.2	133.2	146.4	161.2	176.2	218.0	236.3
Provision for Tax	0	0	0	0	0	0.14	0.84	0.86	1.02	1.02
PAT	**-12.1**	**49.4**	**108.7**	**120.2**	**133.2**	**146.3**	**160.3**	**175.3**	**217.0**	**235.3**
Net Cash Flow	57.6	119.1	178.5	190.0	203.0	216.0	230.1	245.1	286.8	305.1

6. Projected Cash Flow

Sources of Funds											
PAT	0	-12.1	49.4	108.7	120.2	133.2	146.3	160.3	175.3	217.0	235.3
Depreciation	0	69.75	69.75	69.75	69.75	69.75	69.75	69.75	69.75	69.75	69.75
Inc. in Equity capital	0	0	0	0	0	0	0	0	0	0	0
Inc. in term loans	0	0	0	0	0	0	0	0	0	0	0
Inc. in bank borrowings	0	0	0	0	0	0	0	0	0	0	0
Total sources	0	57.6	119.1	178.5	190.0	203.0	216.0	230.1	245.1	286.8	305.1
Application of funds											
Capital Expenditure	679.75										
Inc. in Current Assets	0	0	0	0	0	0	0	0	0	0	0
Term loan repayment	0	0	77.8	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9
Taxes	0	0	0	0	0	0	0	0	0	0	0
Dividend	0	0	0	0	0	0	0	0	0	0	0
Total Application	679.75		77.8	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9
Net Surplus	-679.75	57.6	41.3	139.6	151.1	164.1	177.1	191.2	206.2	247.9	266.2
IRR	15%										
DSCR											
Av DSCR											

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7. Status of Finance Negotiations

Are you in negotiations with any prospective debt providers? If yes, please specify and elaborate on expected time frame.

The project promoters are currently in advanced stages of negotiations with prospective debt providers. However, as part of the non-disclosure norms of the agreement that the promoters have entered into with the funding institutions, they are not in a position to disclose information to any other individual / corporate entity, *except directly to other funding institutions.*

Do you plan to submit this project to a private venture capital firm or an international equity organization (e.g. REEF)? If yes identify specific fund and elaborate on negotiations.

No. The project returns are less than what most equity funds require as a threshold figure.

Do you plan to submit this project to an international tender for carbon emissions reductions (e.g. Oregon Climate Trust)? If yes, please specify tender and closing date for submission.

As mentioned in the above section, the fact that the project earns sub-optimal returns on account of the initiatives taken by the project developers to introduce a foreign technology in India. This fact that the project earns less than optimal returns qualifies it as a financially additional project under certain market-based mechanisms, and therefore facilitate its possibility of earning carbon offsets, or certified emission reductions. The fact that the size of the project is around 12 Mw also places it favourably with various mechanisms that are available globally as far as the size of the project is concerned. It is generally accepted that a project size less than 15 Mw qualifies under certain market-based mechanisms to earn carbon offsets on a *fast-track* basis.

On account of the above, the promoters may consider approaching specific funds to take advantage of the GHG mitigation. In the absence of such opportunities, the project developers are interested to find an investor who wishes to invest in the carbon offsets generated by the project.

8. Project Promoter Contact Information

	Name of Project Promoter	R R Bio Energies Limited (Project Specific company)
	Address	Plot No.39, Lane No.1,Street No.3 West Marredpally **Secunderabad 500 026**
	City, State, Province	**Secunderabad, Andhra Pradesh, India**
	Contact Name	K Sudhakar
	Contact Phone	91-040-7808970,7713422,6212348
	Contact FAX	91-040-7718162
	Contact EMAIL	rrbio@hotmail.com

9. Project Management Team

	K. Sudhakar	**Managing Director**

10. Project Promoter Financial History

	What was profitability figures last 3 years?	The company has not undertaken any productive activity in the last three years, and therefore the profitability figures are not relevant.
	Book value of firm?	Does not Apply
	EPS reserves and surplus last 3 years?	Does not Apply
	What is current business?	Does not Apply
	What are synergies between business and this project?	The project and the business lines of the company are identical, more so because the company is SPV.

11. Project Promoter Relevant Experience:

Briefly describe the relevant experience, if any, possessed by the project promoter. Has the promoter developed similar projects?

The project promoters have been involved in corporate sector and have been involved, directly as well as indirectly, in private business. As the bio-data of Mr. Sudhakar reads, he has been associated with the Administrative Staff College of India (ASCI), and other institutions. The other partner Directors have also been involved, directly or indirectly, with other companies.

However, as far as experience in the relevant sector is concerned, the only Director who has that is Mr. K. Sudhakar.

12. Special Purpose Vehicle Contact Information

	Name of SPV	R R Bio Energies Limited (Project Specific company)
	Address	Plot No.39, Lane No.1,Street No.3 West Marredpally **Secunderabad 500 026**
	City, State, Province	**Secunderabad, Andhra Pradesh, India**
	Contact Name	K Sudhakar
	Contact Phone	91-040-7808970,7713422,6212348
	Contact FAX	91-040-7718162
	Contact EMAIL	rrbio@hotmail.com
	Names and shares of the promoters	
	Is a Shareholding agreement in place	Informal Agreement
	Salient terms	Equal Shareholding by the promoters.

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13. Project Details

	Greenfield project or involves existing equipment?	Greenfield Project
	Is GHG mitigation achieved by Process Improvement or Clean Energy Generation?	Clean Energy Generation
	Size of Project (MW)?	12 megawatts (exportable figure)
	Project Location? City, Province	In Andhra Pradesh, District West Godavari
	Off or on-grid?	On-grid
	State Electricity Board?	Andhra Pradesh Transmission Corporation
	Technology?	Integrated Gasifier Combined Cycle
	Type of Fuel?	Biomass
	Source of fuel supply?	Plantations in nearby vicinity; primarily includes agro-residues

14. Feasibility Details

	Was Feasibility Study prepared independently?	Yes
	What firm prepared the Feasibility Study? List address and contact details	IBIL Systems for the Feasibility of the Project CERM, U.K. for the Business Plan

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15. Background on the Power Purchase Agreement

	Does Project involve PPA (Yes or No) If no, skip to next heading.	Yes
	Has a PPA been signed? (Yes or No)	Yes
	Nature of Agreement? Take or Pay? Other?	Other
	Name of state electricity board or primary PPA signatory?	APTransco
	What date was the PPA signed?	24th August 2001
	When does it enter into force?	On commencement of commercial operations (COD)
	What is the length of the PPA? (Years)	20 (subject to renewable energy-examination in 2003)
	What is the initial purchase price?	3.32 Paise Per Unit
	What is the annual % increase in purchase price?	5%
	Can the project sell power directly to major consumers? (Yes or No)	No
	What are the securities provided for the revenues? Have the domestic lenders approved these mechanisms? Are there any special clauses, or provisions of relevance to the investors?	The selling unit has already obtained a revolving Letter of Credit (LC) for a month's dues from APTransco.
	What are the terms of Payment to the project developers? Any special clauses of relevance to the investors/lenders? Have the domestic lenders approved the payment terms?	30 days from the date of presentation of bill.
	What are the major provisions (event definitions, treatment of the off time, etc.) of the Force Majeure clauses?	Force Majeure clauses not defined in the PPA.
	What is the method of fixation of tariff (two part, availability etc.)? Are there any provisions for deemed generating/penalties? What is the treatment for infirm power?	Tariff is to be calculated at the notified rate of 2.25/Kwh with an escalation @ 5% over the price of previous year and the rate is to be decided by Andhra Pradesh Regulatory Commission after31-3-2004.
	Have the provisions for change in law, termination, liquidated damages, etc. been approved by existing lenders/investors?	Interest @ 10% is to be charged after delayed payment.
	Would the SEB/generating utility want a share in the ownership of carbon offsets?	No

16. Other Agreements

	Fuel supply agreement signed?	The fuel supply agreement has been signed with the local fuel suppliers. The same can be furnished on request.
	Water/utility supply agreement signed?	Yes.
	Shareholder's agreement been entered into between existing equity holders?	As mentioned above, an informal agreement on the shareholding pattern on the existing equity shareholders is in place. The company is willing to provide a note conforming the above.
	Special provisions of above agreements?	No.

17. Quantify and Describe Risks

	Risks	Low to High	Describe
	Market?	Low	The State Government as a priority has recognised the renewable energy projects to cover up the demand-supply gap in power. In fact, the Andhra Pradesh government is one of the most proactive states in India in this regard as A.P is an electricity deficit state. Therefore, there is a moral assurance given by the A.P Government to the renewable energy project developers. In addition, the size of the project is small and developed by an independent power producer. Therefore, the market risk is quite low.
	Country/Sovereign ?	Low	There is a risk involved in the process of developing a power project and selling power to the APTRANSCo with respect to the possibility of non-payment of dues. However, the Five Year Plan documents clearly underline the emphasis that the country places on renewable energy. Also, India as a signatory to the UNFCCC has demonstrated her commitment to climate change mitigation.
	Regulatory?	Low	The economy is in general undergoing structural transformation. Therefore, the power sector being a key sector may also undergo regulatory changes. However, AP being a leader in this respect, the proposed structural changes are mostly in place. At a micro-level, there are risks contained in the way the PPA for the project has been designed, in the sense that the PPA contains regulatory risks.
	Contract/counter party	Low,	The company has gone into detailed contractual agreements with the entities as fuel supplier, power purchase, technology supplier, etc. With each and every one of these, the promoters have either planned or have already executed an insurance package that insures the company on non-delivery or inappropriate delivery.
	Construction?	Low	The construction should not be a problem as the type of project proposed is not very innovative from the construction perspective.

	Technology?	Medium	Although the project has undergone detailed insurance of the various agreements and contracts, still the project is the first commercial execution of the IGCC technology on biomass-based project anywhere in the world. Therefore, in spite of the risk-covering instruments that are in place, the project risk is present.
	Management?	Low - Medium	The board of directors does not have direct experience of the power sector, barring one. However, they plan to introduce technical experts for project management once financial closure is attained.
	Enforceability of Contracts?	Low - Medium	All contracts are processed as legal documents, and insurance cover provides a second measure. However, the reason for the risk perception on this head to be higher on this count is that the PPA risk is high for all Andhra Pradesh renewable energy projects, due to the nature of the contracting of the agreement.
	Competition?	Does not exist	The project promoters face no competition from any side.
	Exit?	Low	The investor invests in the project specific company (SPV) and has the liberty of design his exit strategy as he deems fit.

18. For risks identified in section 14, discuss Mitigation/Coverage measures

	Risks	Describe Mitigation/Coverage
	Market?	Risk is low, so mitigation does not apply.
	Country/Sovereign?	Risk is low, so mitigation does not apply.
	Regulatory?	Risk is low, so mitigation does not apply.
	Contract/counter party	Risk is low, so mitigation does not apply.
	Construction?	Risk is low, so mitigation does not apply.
	Technology?	In addition to insuring the risk on technology failure, To mitigate the risk, the promoters have solicited equity from the equipment suppliers. They have agreed to put in equity subject to the project reaching financial closure.
	Management?	The Directors have expressed their willingness to absorb technical staff on their board as the project commences EPC.
	Enforceability of Contracts?	PPA risk is generically common to all renewable energy projects in Andhra Pradesh and cannot be considered as a risk for any one entity. Given the local Government's passion for renewable energy, this can only be attributed to negligence in the design of the PPA at the Government level.
	Competition?	Risk is low, so mitigation does not apply.
	Exit?	Risk is low, so mitigation does not apply.

SECTION C: CARBON COMPONENT.

Checklists were adapted from a variety of sources including Natsource, LLC

1. **GHG Mitigation Applicability Macro Checklist**

√		Yes	No
	Does project generate real, measurable, long-term, additional and verifiable emissions reductions vis-à-vis current baseline alternatives?	√	
	Are there sustainable development benefits such as increased employment and protecting bio-diversity?	√	
	Does the project rely on ODA from Annex B Countries?		√
	Has the project received host country approval?	Does Not Apply	
	Does project meet size definition for Bonn Fast Track CDM? --under 15 MW for renewables projects --under <15 gigawatthours/year savings for energy efficiency projects --under15 kilotons CO2E for emissions reductions from process changes	√	

2. **Emission Reduction Calculations, Monitoring and Verification Checklist**

√		Yes	No
	Does the project involve a discrete reduction of emissions?	√	
	Have the emissions reductions been estimated with an accepted methodology?	√	
	Has a monitoring methodology been established?	√	
	Has a third party verifier been contracted to verify actual emissions reductions and sustainable development gains?		√
	Has clear ownership of emissions reductions been determined and documented?	√	

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3. Carbon accounting details

	Parameter	Particulars
1	Baseline methodology	Assumption: The project replaces grid power generated from the marginal power plant in the relevant Load Centre. Discussions with the power transmission authorities have revealed that marginal plant is a thermal plant operating on coal usage. The next step is to figure out the nature of coal that is used for the purpose of generation of power. Most of the coal used in the purpose of power generation is in the category of sub-bituminous coal. The baseline power plant is assumed to operate at an overall efficiency level of 25%. The Transmission and Distribution losses have been assumed at 20%.
2	Baseline Emissions TCO2	96,930 t CO2 per year
3	Project Emissions TCO2	0
4	Emission reductions TCO2 (2-3)	96,930 t CO2 per year

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Detailed Project Report (DPR) Worksheet

For GHG mitigating projects under
USAID's Greenhouse Gas Pollution Prevention Project – Climate Change Supplement

Managed by The Louis Berger Group, Inc.

Polyene Film Industries Limited
(Equipment Finance)

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1. **(A) Contact Information for the Prospective Project Proponent**

	Name of Company	***Polyene Film Industries Ltd.***
	Address	A-11 & 12, Industrial Estate Guindy, Chennai - 600 032 India
	City, State, Province	Tamil Nadu
	Contact Name	M. Varadarajan (Director)
	Contact Phone	91- 44 - 234 2306; 91 - 44 - 234 2307
	Contact FAX	91- 44 - 234 1470
	Contact EMAIL	Suryovon@bd2.dot.net.in Poda_poda@yahoo.com

2. **(A) Availability of Financial Information on Project Proponent**

		Yes	
	Audited financial statements available for last 3 fiscal years?	✓	
	Audited financials being provided to Louis Berger Group Washington?		✓
	Was firm in same general line of business for last 3 years?	✓	
	Has firm reported operating profits AND net income during each of last 2 years?		

3. **(A) Project Proponent's Financial History (last three Fiscal Years)**

	EBIDT	-15.92	58.93	-38.25
	EBIDT/Total Income	-	23.80%	-
	Operating Profit (OP)	-22.84	51.86	-49.00
	OP/TI	-	-	-
	Net worth	-	-	-
	Equity	1.00	1.00	1.00
	EPS	-	-	-
	Dividend	-	-	-
	Major Capital Investments	8.07	-	0.97
	Debt:Equity ratio	1.31	30.38	1.20
	Fixed Asset Coverage Ratio	-	-	-
	Current Ratio	0.98	1.20	0.99
	Credit Rating by Lead FI/Bank	-	-	-
	Depreciation/Amortization Expense	0.09	0.10	0.10
	Interest Expense	3.29	2.80	5.20
	Current maturity of LTD	-	-	-

All Figures in Rs. Lakhs

2. (B) Financial Information on Group Company - Polyene General Industries

√	[illegible]	[illegible]	[illegible]
	Audited financial statements available for last 3 fiscal years?	✓	
	Audited financials being provided to Louis Berger Group Washington?		✓
	Was firm in same general line of business for last 3 years?	✓	
	Has firm reported operating profits AND net income during each of last 2 years?		

3. (B) Project Proponent Group's Financial History* (last three Fiscal Years)

Rs in Lakhs

√	[illegible]	[illegible]	[illegible]	[illegible]
	EBIDT	-23.33	11.38	62.38
	EBIDT/Total Income		3.84%	12.82%
	Operating Profit (OP)	-53.83	-18.72	29.82
	OP/TI	-	-	6.13%
	Net worth	-	-	-
	Equity	22.50	22.50	22.50
	EPS	-	-	-
	Dividend	-	-	-
	Major Capital Investments	39.87	2.21	34.36
	Debt:Equity ratio	4.26	2.95	3.86
	Fixed Asset Coverage Ratio	-	-	-
	Current Ratio	11.46	1.47	2.39
	Credit Rating by Lead FI/Bank	-	-	-
	Depreciation/Amortization Expense	0.18	0.14	0.13
	Interest Expense	10.30	13.04	14.81
	Current maturity of LTD	-	-	-

**The borrower of loan in this case from both IREDA and FIB shall be the financial intermediary, which is being currently identified. All the identified FIs have profitable operations over the last 3 years.*

4. Background information on all used and unused short and long-term debt

Polyene Film Industries have had a long tradition of a relationship with the Indian Renewable Energy Development Agency (IREDA). However, their track record has been clean.

SECTION A: CLEAN ENERGY AND GHG MITIGATION EQUIPMENT FINANCE

About the Equipment/Technology: Larger clean energy or GHG mitigating projects (Project Finance) may involve more than one type of environmental equipment. Complete sections A 5 through A 10 for each piece of relevant GHG mitigating equipment.

5. Description of technology/service to be purchased

The DC floating pumping system developed by **Polyene Film Industry** in India, in collaboration with **Hydrasol Corp, Germany / USA**. The system consists of a high efficiency DC motor (permanent magnet type, 1.17 HP) coupled to a single stage centrifugal pump. The pump essentially comprises a volute casing, impeller (3 sizes), seal chamber and a mechanical seal (Burgmann make). The pump has a plastic (HMHDPE) strainer fitted to the bottom (to prevent ingestion of solids etc). An optimally designed plastic HMHDPE float (filled with polyurethane foam) enables the pump unit to float. The float is secured to the motor-pump unit by two aluminium plates positioned through vertical guides, which are routed through holes on the motor flange. A stainless steel dome acts as the canopy for the DC motor. The complete motor–pump unit with float, strainer, cable, pipe-work etc is lowered down the well with the help of a plastic rope secured to a metallic hook (through a shackle and thimble arrangement). The hook is screwed onto a metallic bar fixed to the top surface of the vertically positioned DC motor. The plastic rope passes through a metallic pulley, secured to a 'A' frame of mild steel that is grouted to hard ground near the well. The 'A' frame pulley arrangement also makes use of suitable counter weights for stability as also for imparting optimum buoyancy to the plastic float. The floating pump unit moves up & down with the water surface and hence is a zero suction pump. The pump is self-priming and does not require a foot valve. The 1.17 HP permanent magnet DC motor's efficiency varies from 85% (part load) to 90% (full load).

The PV modules of 900 Wp capacity are mounted on aluminium super-structures, which are supported on re-inforced cement concrete, pillars (typically two pillars) through a pivot arrangement for allowing manual tracking of the sun from east to west. In areas close the equator, a single-axis tracking arrangement, at zero tilt, is considered adequate. The 900 Wp system could be configured as two sub-arrays of 450 Wp each, supported on a reinforced cement concrete pillar, standing four feet above the ground. Alternatively it can be configured as a single array but supported on two pillars. The structure's design would permit it to withstand wind speeds of 150 km/h. We propose to import the PV modules (thin film, a-Si mainly) from USA and Japanese suppliers, they are mainly **Bekart ECD Solar Systems LLC and United Soalar System Corp. /USA** and **BP Solar/USA** , along with **Kaneka Corp. Oska, Japan** has also been approached . The order has not been placed so far, only companies are identified and initial communication has been made, from which Polyene has got an assurance of PV modules supply. And total order will be split among these companies.

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6. Description of the GHG mitigating potential of the technology

The technology proposed to be used in the project is solar photovoltaic. Solar technology is a completely renewable form of energy. Therefore the project emissions are zero. In the baseline scenario, the energy use is either the continued use of electricity or the use of diesel for the purpose of use as fuel for the agricultural pumps.

Replacing the conventional pumps with DC Floating Pumps would in the first case improve the operating efficiency of the systems. Coupled with the use of the solar power, the systems not only minimizes GHG emissions but also improves the performance of the systems overall.

Per system, which is roughly of the capacity of 900 Wp, the total energy saved is around the equivalent of what a 3 HP Diesel Generator set consumes. However, there needs to be a scenario analysis based on what the farmer uses, which is either grid power or a diesel gen-set.

Constructing the Baseline

CASE I: Electricity as the b-a-u

A 900 Wp solar PV pump would replace a 3 HP pump. This pump, fed by the grid, would normally have

- A motor efficiency of around 75%.
- Line losses around 25%
- A Plant Load Factor of around 65% at the Central Generating Station (assuming it to be thermal)
- Auxiliary consumption of around 10%

With this background, the power generation required to run a 3 HP motor with the aforementioned efficiency levels would mean, at the bus bar, a total of 6.84 kW of power is needed. Overall, in a year, at the Central Generating Station, a total of 7000 kWh is required to be generated. This generation leads to an emission avoidance of around 9.44 tons of CO_2 per pump.

Therefore, with a total of 200 pumps, a total of 200*9.44 tons = 1888 tons of CO_2 are avoided annually. Over a period of 20 years, the emission avoidance is a total of 20*1888 = 37,760 tons of CO_2.

CASE II: Both Diesel and Electricity as the b-a-u

With around 60% of the pumps energised by diesel and the rest by electricity, the situation is different in the following way:

Diesel oil consumption per pump per day is around 6 litres. This would be required to generate around 30 kWh of energy for about 150 days. This translates to a total of 4.5 MWh of energy generated. Adjusting appropriately for the efficiency of the DG sets and the pumps (75%), the emissions comes to around 1.06 kgCO_2/kWh. Overall, a DG set-fed pump emits around 4.75 tons of CO_2.

For 120 pumps, operating on diesel, the total emissions are therefore **120*4.75 = 570 tons annually.** Over a period of 15 years, the figure reads **570*15 = 8,550 tons.**

The remainder is supplied by electricity from the grid. This comes to 80 pumps, at an emission of 9.44 tons CO_2 per pump annually. The result: **80*15*9.44 = 11,328 tons of CO_2 obtained.**

Combining the two, we obtain (8550 + 11328) = 19,878 tons of CO_2.

7. About the Business Negotiations

	Is the manufacturer of the technology a domestic company?		✓
	Is the manufacturer located overseas (exporter)?	✓	
	Is the manufacturer a US company?	✓	
	Have any price negotiations occurred?		✓
	Has a purchase order been submitted?		✓

Note: The project developer is proposing the setting up of 200 solar powered pumping systems. It has a business plan for installing more than 10,000 pumps over the next decade. On the basis of the proposal for setting up 200 systems, the case has been made for securing equipment finance for the 200 systems.

Therefore, as far as a Purchase Order is concerned, a proposal for 200 systems has been made. The Purchase Order is for 200 solar PV modules.

How many units are in the Purchase Order?
What is the estimated unit cost of technology (US$)?
What is the total cost for the Purchase Order? ? No

8. Contact Information on the Manufacturer

PV Modules
For the purchase of the PV modules, one of the following manufacturers would be contacted:

I)	Name of Manufacturer	Bekart ECD Solar Systems LLC and United Soalar System Corp.
	Address	1100 West Maple Road Tray
	City, State, Province	Michigan, USA
	Contact Name	Mr. Subhendu Guha(President)
	Contact Phone	284/362-4170
	Contact FAX	248/362-4442
	Contact EMAIL	Info@uni-solar.com
II)	Name of Manufacturer	BP Solar
	Address	989, Corporate Drive, MD 21090.
	City, State, Province	Linthicum, USA
	Contact Name	Mr. Steve Brant (Director) BIPV Market
	Contact Phone	410-981-0240
	Contact FAX	410-981-0278
	Contact EMAIL	

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9. About the Trade Financing (For Equipment Imported Into India)

Is trade financing being sought for the import of the equipment to India? YES
What type of trade financing is being sought - insurance, guarantees, working capital?
For the project, assistance is sought from the US Exim Bank for financing the sale of the solar modules.

10. Has a domestic or overseas lender been identified?

The project seeks the support of the US Exim Bank's scheme of financing equipment exports to other (developing) countries for the import of the Solar PV panels into the country.

	Name of Lender	US Exim Bank/ First International Bank
	Address	Vis Infrastructure Development Services
	City, State, Province	Delhi, India
	Contact Name	Mr. R. K. Gupta
	Contact Phone	
	Contact FAX	
	Contact EMAIL	

SECTION B: PROJECT FINANCE FOR CLEAN ENERGY AND GHG MITIGATION

Project Name: Installation of 200 Solar PV pumping systems in Andhra Pradesh

Project Promoter: Polyene Film Industries Ltd.

Special Purpose Vehicle: No

1. Executive Summary: Project at a Glance

The project proposes the installation of 200 solar PV water-pumping systems (DC Floating Type) in four districts of Andhra Pradesh - **Nellore, Prakasam, Cuddapah** and **Mahabubnagar**. The SPV pumping systems are expected to meet the irrigation water needs of the small farmers owning shallow open wells and about 3 to 5 acres of land cultivating crops such as vegetables, pulses, ground nut, ID crops and, sometimes upto an acre or so of rice. Along with the water table (pre and post monsoon) the open wells that are constructed would lend itself to ideally to the DC floating type of floating pumps.

The technology offers a highly efficient DC-motor driven pump coupled to the solar panels. Each 900 Wp PV array is expected to generate, on a very conservative basis, about 1500 kWh of electric energy. The pump system delivers about 120,000 to 130,000 litres of water over the day at a head of 8 metres. The quantity of water pumped is sufficient to meet the requirement of the small farmer from the standpoint of his irrigation requirements during the day.

The first step is to identify beneficiaries (small/marginal farmers), with open wells and adequate water throughout the year but with no source of power. The next step would be to convince the farmers of the benefits of the solar pumping systems. Very often District level authorities of the State Govt. and NGO network(s) constitute the interface between the supplier and the end-user.

The project structure is based on the financial intermediary scheme being implemented by IREDA for photovoltaic applications under the support of World Bank and KfW. The end user is generally required to pay only about 30% of the pumping system price upfront. The financing plan for the project is through the identification of a Financial Intermediary. The project is proposed by Polyene Films who are the in the picture as the sellers of the systems. The FI buys the systems from PFI and sells them to the farmers on lease. During the period, he makes use of the, the tax shelter accruing from the 100% depreciation provided by the Govt. In addition, the IREDA loan is sourced at a very low rate of interest (1%). Therefore, he is able to meet his financial commitments with IREDA by making use of the tax-break and other grants from the State Govt. and NABARD.
The financial engineering that is there in the system facilitates the development of the project. Also, the identification of the Financial Intermediary is the crucial issue behind the success of the project.

2. Project Costs

The major point about the project costs is that the project implementer is an entity who is different from the project proponent. The project proponent is Polyene Films, who manufactures the solar PV systems. However, the project is proposed to be implemented with the assistance of the Financial Intermediary (FI), who would take charge as the entity operating the project. The following table gives the structure of the project finances. Promoters are in negotiations with few such FIs, including IDFC, SREI Finance and Sundaram Finance.

S.no	Particulars	Per Pump (Rs. Lakh)	Total (Rs. Lakh)
1	Total Cost of the system	268,795*	537.6
2	No of systems		200
3	Overheads (at 15%)	40319	80.6
4	Net Cost	228,476	457.0
5	Module Cost	60% of net cost	-
6	Module Cost in Rs.	137,085	274.2
7	Per watt module cost	152	0.3

***Approximate Price Break-up of the total system cost:**

1. Price Per Equipment : - Rs. 268,795
2. PV Modules :- Rs. 153,000
3. Floating Pump with accessories :- Rs. 51,000
4. Installing, Start up, Commissioning, meter and spares :- Rs. 18,000
5. Mounting Structure :- Rs. 28,000
6. Margin (overheads, Profit margin) :- Rs. 18,795

3. Proposed Means of Financing

	Total Debt Portion			
	IREDA Loan	483.8	1,007,708.3	90%
	Loan – US Exim Bank	274.2	571,250	
	Total Equity Portion	48.39	100,834	10%
	Total Project Cost	537.6	1,120,000	

@ USD 1= Rs. 48

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4. **Committed Financing (If any)**

a. **Committed Debt Providers**

IREDA	483.8 Lakhs	2%	10 years	Assured

b. **Committed Equity Providers**

Polyene Films*	100,834	10%

The aforementioned amount has been proposed by Polyene Films to show their commitment to the project. Also, it assists the Financial Intermediary in ensuring that the repayment targets are met.

5. Estimates of Profitability – As Applicable to the Financial Intermediary

Cash Flow for the FI

(Amount in Rs. '000 Per Pump)

Asset Value	268.8										
Year	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
INFLOW											
Opening balance		321.8	345.1	370.7	287.4	272.3	256.5	239.9	222.4	203.9	184.3
Interest income to FI on opening balance		32.1	34.5	37.0	28.7	27.2	25.6	23.9	22.2	20.3	18.4
IREDA Loan	241.9										
Loan from US EXIM	137.0										
End-user Contribution	41.6										
Contribution from the AP Government	45.0										
Equity from PFI/ IDFC	26.8										
Tax shelter :	98.1										
Total	590.6	354.0	379.6	407.8	316.1	299.6	282.2	263.9	244.6	224.3	202.7
OUTFLOW											
Supplier	268.7										
IREDA loan Repayment		0.0	0.0	72.5	24.1	24.1	24.1	24.1	241.9	24.1	24.1
US Exim Loan Repayment		0.0	0.0	41.1	13.7	13.7	13.7	13.7	13.7	13.7	13.7
Interest on IREDA Loan		4.8	4.8	3.3	2.9	2.4	1.9	1.4	.96	.48	0.0
Interest on US Exim Loan		2.7	2.7	1.9	1.6	1.3	1.0	.82	.53	.27	0.0
Ins & Maint. Support		1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Total	268.7	8.9	8.9	120.3	43.7	43.0	42.2	41.5	40.7	40.0	39.2
Closing balance	**321.8**	**345.1**	**370.7**	**287.4**	**272.3**	**256.5**	**239.9**	**222.4**	**203.9**	**184.3**	**163.5**

6. Projected Cash Flow

Note: The Projected Cash Flow & Balance Sheet for the project do not apply for the project promoters.

6. Status of Finance Negotiations

Are you in negotiations with any prospective debt providers? If yes, please specify and elaborate on expected time frame.

The project developer is in the process of identifying the Financial Intermediary for the project. Infrastructure Development Finance Company is interested in carrying out the role of the FI for the project. The process is expected to be completed in around six months for the loan to be approved.

Do you plan to submit this project to a private venture capital firm or an international equity organization (e.g. REEF)? If yes identify specific fund and elaborate on negotiations.

The project does not have the necessary qualifications to source venture equity.

Do you plan to submit this project to an international tender for carbon emissions reductions (e.g. Oregon Climate Trust)? If yes, please specify tender and closing date for submission.

The project developer has been quite proactive on this front. They have already conducted negotiations with an investor, Ontario Power Generation, for the purpose of soliciting financial support for the project. However, due to delays in the global negotiations processes in approving the Kyoto Protocol, the deal could not be finalized.

As far as other carbon finance organizations like the Oregon Climate Trust is concerned, the project tender could be submitted.

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7. Project Promoter Contact Information

Name of Project Promoter	Polyene Film Industries Ltd.
Address	A-11 & 12, Industrial Estate Guindy, Chennai - 600 032 India
City, State, Province	Tamil Nadu
Contact Name	M. Varadarajan (Director)
Contact Phone	91- 44 - 234 2306; 91 – 44 - 234 2307
Contact FAX	91- 44 - 234 1470
Contact EMAIL	Suryovon@hd2.dot.net.in poda_poda@yahoo.com

8. Project Management Team

	Mr. M. Varadarajan,	Chairman and Chief Promoter of the Group.
	Mr. M. Parthasarathy,	Co-promoter and Senior Director.
	Lt. Col T. S. Surendra,	Director in PFI and Suryovonics Ltd
	Mr. S.V.V. Subbaraman,	Chief Maintenance and Installation Engineer

9. Project Promoter Financial History

Has been provided in the separate section provided.

	What was profitability figures last 3 years?	
	Book value of firm?	
	EPS reserves and surplus last 3 years?	
	What is current business?	
	What are synergies between business and this project?	The Polyene Group's line of business is identical to that of the project proposal.

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10. Project Promoter Relevant Experience:

Briefly describe the relevant experience, if any, possessed by the project promoter. Has the promoter developed similar projects?

The Polyene Group of Industries has been in the Solar Photovoltaic field for a little more than 12 years. The Group comprises Polyene Film Industries Ltd, PFI (pump integrators and installers) at Chennai/Hyderabad, Polyene General Industries Ltd, based at Chennai (manufacturers of HMHDPE products including floats and strainers for solar pumping systems). In addition, a company known as Suryovonics Ltd and based at Hyderabad is a part of the Group as service providers for solar PV water pumping systems.

The Group has many successes in this field. It:

- was the first in India to set up a thin film (amorphous Silicon) moduling facility.
- was the first in India to develop a solar lantern (3 Watt/ 5 watt) using Nickel metal-hydride batteries.
- was the first, anywhere in the world, to install on a large scale SPV DC floating pumping systems for irrigation.
- was the only company in India to have implemented a PV pumping program under the World Bank/ IREDA SPV Market Development Program
- has installed over 200 SPV Water Pumping Systems (DC Floating Type) till date.

11. **Special Purpose Vehicle Contact Information (If applicable):** *Not Relevant*

	Name of SPV	
	Address	
	City, State, Province	
	Contact Name	
	Contact Phone	
	Contact FAX	
	Contact EMAIL	
	Names and shares of the promoters	
	Is a Shareholding agreement in place	
	Salient terms	

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12. Project Details

	Greenfield project or involves existing equipment?	Greenfield Project
	Is GHG mitigation achieved by Process Improvement or Clean Energy Generation?	Clean Energy Generation
	Size of Project (MW)?	Installing 200 SPV powered pumping systems of 900 Wp each, therefore total capacity is around 180 MWp.
	Project Location? City, Province	Andhra Pradesh - Nellore, Prakasam, Cuddapah and Mahabubnagar
	Off or on-grid?	Off-grid
	State Electricity Board?	Andhra Pradesh State Power Transmission Corporation
	Technology?	Solar Photo Voltaic Powered Water Pumping Systems
	Type of Fuel?	Solar Energy
	Source of fuel supply?	The Sun

13. Feasibility Details

	Was Feasibility Study prepared independently?	Yes
	What firm prepared the Feasibility Study? List address and contact details	• Polyene Film Industries Ltd. has done the initial scoping of the study. • Additionally, Administrative Staff College of India, Bella Vista, Hyderabad- 500 082, Andhra Pradesh has decided to conduct a feasibility study for the project.

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14. Background on the Power Purchase Agreement (if Applicable)

	Does Project involve PPA (Yes or No) If no, skip to next heading.	*PPA is not required, as there is no sale of power involved.*
	Has a PPA been signed? (Yes or No)	
	Nature of Agreement? Take or Pay? Other?	
	Name of state electricity board or primary PPA signatory?	
	What date was the PPA signed?	
	When does it enter into force?	
	What is the length of the PPA? (Years)	
	What is the initial purchase price?	
	What is the annual % increase in purchase price?	
	Can the project sell power directly to major consumers? (Yes or No)	
	What are the securities provided for the revenues? Have the domestic lenders approved these mechanisms? Are there any special clauses, or provisions of relevance to the investors?	
	What are the terms of Payment to the project developers? Any special clauses of relevance to the investors/lenders? Have the domestic lenders approved the payment terms?	
	What are the major provisions (event definitions, treatment of the off time, etc.) of the Force Majeure clauses?	
	What is the method of fixation of tariff (two part, availability etc.)? Are there any provisions for deemed generating/penalties? What is the treatment for infirm power?	
	Have the provisions for change in law, termination, liquidated damages, etc. been approved by existing lenders/investors?	
	Would the SEB/generating utility want a share in the ownership of carbon offsets?	

15. Other Agreements (where applicable)

	Fuel supply agreement signed?	Not Applicable
	Water/utility supply agreement signed?	Not Applicable
	Shareholder's agreement been entered into between existing equity holders?	Not Applicable
	Special provisions of above agreements?	Not Applicable

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16. Quantify and Describe Risks

	Risks	Low to High	Describe
	Market?	Low	Market risks are low for the project. This is mainly on account of the fact that the poor and marginal farmers in the state of Andhra Pradesh are not in a position to either afford Diesel Generator sets or access grid power.
	Country/Sovereign?	Low	Indian government's policy has been promoting renewable energy. India is also a signatory to the United Nations Framework Convention on Climate Change, and has also agreed to the Kyoto Protocol in principle. Therefore, the country's commitment to both clean energy and climate change is clear.
	Regulatory?	Low	The power sector in AP state has been restructured and has a Regulatory Commission.
	Contract/counter party	Low	Few contractual issues are involved in this project.
	Construction?	Low	No construction is involved.
	Technology?	Low to medium	Solar Photovoltaic is a proven technology. The DC Floating Pumps are also used for agricultural purposes in India as well as in Europe. However, installations in mofusil areas may face maintenance problem
	Management?	Low	There is a committed management team for the project with the top management in the same business for the past two decades almost.
	Enforceability of Contracts?	Low	Contractual agreements are very few.
	Competition?	Low to Medium	The project faces moderate competition from other developers who could copy the model and do the same project. However, the market is big in the state and also has a large replication potential in few other states.
	Exit?	Low	The laws of disinvestments and markets are developed. The transactions like mergers and acquisition have been taking place.

17. For risks identified in section 14, discuss Mitigation/Coverage measures

Risks	Describe Mitigation/Coverage
Market?	
Country/Sovereign?	
Regulatory?	
Contract/counter party	
Construction?	
Technology?	The technology is proven, however the project proponents would be putting in place a structure to manage maintenance of the systems in rural areas.
Management?	
Enforceability of Contracts?	
Competition?	The Management is aware of the possibility of other competitors trying to copy the PFI model. However, mitigation measures are not possible on this count, since PFI cannot have a patent on their dissemination model. However, the company does have an intention to obtain a license to use the DC Floating Pumps.
Exit?	

SECTION C: CARBON COMPONENT.

Checklists were adapted from a variety of sources including Natsource, LLC

1. **GHG Mitigation Applicability Macro Checklist**

√		Yes	No
	Does project generate real, measurable, long-term, additional and verifiable emissions reductions vis-à-vis current baseline alternatives?	√	
	Are there sustainable development benefits such as increased employment and protecting biodiversity?	√	
	Does the project rely on ODA* from Annex B Countries?		
	Has the project received host country approval?		√
	Does project meet size definition for Bonn Fast Track CDM? --under 15 MW for renewable projects --under <15 gigawatthours/year savings for energy efficiency projects --under15 kilotonnes CO2E for emissions reductions from process changes	√	

** The IREDA Financial Intermediary scheme is funded by World Bank line*

2. **Emission Reduction Calculations, Monitoring and Verification Checklist**

√		Yes	No
	Does the project involve a discrete reduction of emissions?	√	
	Have the emissions reductions been estimated with an accepted methodology?	√	
	Has a monitoring methodology been established?		√
	Has a third party verifier been contracted to verify actual emissions reductions and sustainable development gains?		√
	Has clear ownership of emissions reductions been determined and documented?	√	

3. Carbon accounting details

	Parameter	Particulars
1	Baseline methodology	Has been discussed separately earlier in the document.
2	Baseline Emissions TCO2	For calculations against the grid, the emission reductions come to 9.44 TCO2 per pump per year. For calculations against the use of a diesel generator set, the emission reductions come to 4.75 TCO2 per pump per year. Assuming a broad estimate of around 60% of the pumps energised by diesel and the rest by electricity, the total emission reductions come to around 19,878 tons of CO2 obtained over 15 years.
3	Project Emissions TCO2	0 tons CO2
4	Emission reductions TCO2 (2-3)	19,878 tons of CO2