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The World Bank

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Report No. 34070-GY

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED PURCHASE OF EMISSIONS REDUCTIONS

BY THE COMMUNITY DEVELOPMENT CARBON FUND

IN THE AMOUNT OF UP TO US$5.32 MILLION

FROM THE

GUYANA SUGAR CORPORATION INC.

FOR THE

GUYANA BAGASSE COGENERATION PROJECT

January 25 2008

Sustainable Development Department
Caribbean Country Management Unit
Latin America and Caribbean Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective January 25, 2008)

Currency Unit = Guyanese Dollar (GY$)
GY$1 = US$ 0.00493340
US$ 1 = GY$202.70

FISCAL YEAR
January 1 – December 31

ABREVIATIONS AND ACRONYMS

CAS	- Country Assistance Strategy
CDCF	- Community Development Carbon Fund
CDM	- Clean Development Mechanism
CFU	- Carbon Finance Unit
CHP	- Combined Heat and Power
EB	- Executive Board
EIA	- Environmental Impact Assessment
EMP	- Environmental Management Plan
ERs	- Emissions Reductions
ERPA	- Emissions Reduction Purchase Agreement
GHGs	- Greenhouse Gases
GNEA	- Guyana National Energy Agency
GPL	- Guyana Power and Light Company
GuySuCo	- Guyana Sugar Corporation
HIPC	- Heavily Indebted Poor Country
IFC	- International Finance Corporation
KP	- Kyoto Protocol
LCSEG	- Latin America and Caribbean Region Energy
MP	- Monitoring Plan
OPCS	- Operations Policy and Country Services
PDD	- Project Design Document
PRPMO	- Poverty Reduction and Public Management Operation
PSR	- Project Status Report
RAP	- Resettlement Action Plan
RBA	- Rapid Biological Assessment
SSMP	- Skeldon Sugar Modernization Project
UNFCCC	- United Nationals Framework Convention on Climate Change
VHP	- Very High Pol

Vice President – Pamela Cox
Country Manager/Director – Yvonne M. Tsikata
Sector Director – Laura Tuck
Sector Manager – Philippe Benoit
Task Team Leader - Noreen Beg

GUYANA

BAGASSE COGENERATION PROJECT

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GUYANA: BAGASSE COGENERATION

PROJECT APPRAISAL DOCUMENT

Latin America and Caribbean Region
LCSEG

Date: January 25, 2008 **Country Director**: Yvonne M. Tsikata **Sector Manager/Director:** Philippe Benoit **Project ID:** P090044	**Team Leader:** Noreen Beg **Sectors:** Renewable energy (50%), Power (50%) **Themes:** Climate Change (P)

Project Financing Data:

[ ] Loan [ ] Credit [ ] Grant [ ] Guarantee [X] Other: Carbon Finance
For Loans/Credits/Others: The project does not involve Bank Financing. Carbon revenues are estimated at US$5.32 million up to 2014
Total Bank financing (US$ million):

Financing Plan (US$ million)

Source	**Local**	**Foreign**	**Total**
Borrower		24 .00	24.00
CDCF		5.32	5.32
Total		29.32	29.32

Borrower: Guyana Sugar Corporation Inc.
Responsible Agency: Guyana Sugar Corporation Inc.
Address: Head Office, Ogle Estate, E.C.D., Guyana
Contact Person: Paul Hough

Estimated disbursements (Bank FY/US$)

FY	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Annual										
Cumulative										

Project implementation period: April 2008 (tentative)
Expected effectiveness date:
Expected closing date: ERPA purchase concluded December 31 2014

A. PROJECT DEVELOPMENT OBJECTIVE

1. Project development objective:

1. The Guyana Bagasse Cogeneration Project (which is expected to receive financial payments to be made under the Clean Development Mechanism of the Kyoto Protocol, and therefore is hereafter referred to as the CDM Project) consists of the addition of a more efficient co-generation plant to the ongoing Skeldon Sugar Modernization Project (SSMP) -- a modern sugar factory that will manufacture Very High Pol (VHP) raw sugar. The CDM Project will generate bagasse-based electricity for internal use as well as for sale to the Berbice regional grid, displacing the use of light fuel oil in diesel engine-driven generators operated by the Guyana Power and Light Company (GPL). As the utility currently has insufficient capacity, there is extensive use of self-generation by industry and households. The project thus has the potential to displace a significant amount of this unregulated and inefficient self-generation as confidence in reliable supply is progressively built over time.

1a. Overview of the importance of the sugar sector

2. Guyana's economy has been heavily dependent on the sugar industry, which accounts for nearly a fifth of the country's GDP. In addition, the Guyana Sugar Corporation (GuySuCo) employs 18,000 permanent workers and 4,000 temporaries. There are also 5,000 workers on independent cane farms and cooperatives. Around 125,000 persons rely on the sugar industry for their livelihoods.

3. In November 2005, the European Agricultural Council agreed to cut the EU guaranteed sugar price by 36 percent over the next four years starting in 2006. Guyana's sugar sector is likely to face a large setback as a result of the reduction of preferential prices and quotas to the EU market. While the sugar industry generates 30 percent of the country's foreign exchange, preferential sales of sugar to the EU market account for half of the production volume and 70 percent of industry revenues. GuySuCo calculates that the sugar subsidy cuts will reduce the sugar industry's revenues by US$22 million in each of the crop years 2005-2006 and 2006-2007, and another US$37 million in the following crop year (Guyana Investment Climate Assessment 2006).

4. The prospects of eliminating preferential sugar arrangements by the EU, together with stiff competition in the world market, have led the Government of Guyana to institute a restructuring plan for GuySuCo which involves modernization of production facilities and efficiency improvements. The Government is convinced that even if preferential prices are eliminated, the country's sugar industry will survive if operational efficiency is improved and production costs are lowered. It is anticipated that with the SSMP, Guyana will be able to compete at world sugar prices, and it almost certainly will be a model operation in the Caribbean region.

2. Key performance indicators:

5. The primary performance indicator will be the creation and purchase of Carbon Emissions Reductions (ERs) for the project measured in tons of carbon dioxide equivalent (tCO_2e). Implicit within these ERs is the production of electricity from renewable sources partly for sale to the national utility (GPL) that, with the ER purchase by the Community Development Carbon Fund (CDCF), one of the funds managed by the Bank's Carbon Finance Unit (CFU), increases the stream of project revenues under the financing plan.

6. Another key indicator will be broadened experience on the part of GuySuCo in the operation and maintenance of the advanced technology associated with having a more efficient sugar mill and cogeneration facility. This performance indicator is particularly important given the fact that the project activity is the 'first of its kind' in the country. The Guyana Bagasse Cogeneration Project is the first bagasse cogeneration project in Guyana that will generate surplus electricity for supply to the grid. No project activity of this type is currently operational in the country. As such, skills need to be acquired (e.g., through training) in order to operate and maintain the new facilities at the high level of efficiency required for commercial success.

7. The baseline scenario for the CDM Project is the new SSMP factory without the proposed cogeneration plant. In the absence of the project activity, the SSMP factory would have a smaller cogeneration capacity with a low efficiency boiler that would be sufficient to generate energy for internal needs only, which basically is the main characteristic of existing sugar mills in the country. There would not be any surplus electricity for export to the grid, and an estimated 50,000 tonnes of surplus bagasse per year would be discarded and left to decay as has been the prevailing practice in the Berbice region.

B. STRATEGIC CONTEXT

1. Sector-related Country Assistance Strategy (CAS) goal supported by the project:

Date of latest CAS discussion: 2002

8. The project is well correlated with key CAS priorities in increasing competitiveness of the country in the world's sugar market and in improving access to basic social services, including rural electrification. The CAS had a clear vision for a new sugar mill to modernize the Guyana sugar industry. The proposed cogeneration project will utilize efficiently the bagasse that will come from the new sugar mill in the production of energy for on-site use and partly to displace fossil fuel-based electricity from the grid. Consequently, in the environmental area, the cogeneration project will help to increase the production of clean energy in the country.

9. The cogeneration project will not change the likelihood of the new Skeldon sugar factory being built in the first place, and by itself will not increase the area of cane that will be cultivated for the sugar factory. It is, nonetheless, noteworthy that the SSMP

supports agricultural expansion, but with commitment to the principles of sustainable natural resource use and the protection of natural habitats. It also augments global and local environmental benefits associated with projects under Guyana's GEF portfolio.

1a. Global Operational strategy/Program objective addressed by the project:

10. Based on World Bank Operational Policies 4.01, 4.04, 4.09, 4.11, and 4.36, and taking into account further guidance from the World Bank Latin America Region, the SSMP sugar factory, to which the Guyana Bagasse Cogeneration Project will be integrated, is in compliance with all the criteria established by the World Bank Latin America Region. The SSMP project will not have an impact on threatened and endangered species, and will promote effective wildlife or biodiversity conservation as well as provide new wetland habitats. The SSMP's Pest Management Plan emphasizes integrated pest management, careful selection of compounds, and safe pesticide use and storage.

11. In Guyana there is a critical need for reliable electricity supply at affordable prices. This concern is analyzed in detail in a recent World Bank document entitled *Guyana Investment Climate Assessment* (ICA 2006). The ICA reports that reliability of electricity supply is low, and characterized by frequent and long outages, load discharges and voltage variations. Poor reliability has been linked to dependence on old and obsolete equipment for power generation, underinvestment in the distribution grid, and lack of incentives for efficient provision of service. The poor quality of electricity supply becomes a key obstacle to growth. For example, companies' losses attributable to energy outages are estimated to reach up to four percent of their total sales on average. Since large firms can afford to invest on own power generation equipment, these losses are relatively smaller for them than for small firms.

12. Electricity prices in Guyana are the third highest in the Caribbean due in large part to the country's reliance on expensive imported oil for electricity generation. At present the cost of fuel accounts for up to 60 percent of the total cost of electricity generation. Recent oil price hikes are passed on to consumers, as logically part of such increases in production inputs would be reflected in the price that consumers have to pay.

13. Reduction of Guyana's reliance on imported oil and the improvement of energy efficiency will require large investments that will impact on the fiscal stability of the country. The World Bank estimates that an increase in electricity intensity in Guyana at a level comparable with peer Caribbean countries would require investments over the next 10 years of between US$805 million and US$1,497 million (or between 10 and 19 percent of its GDP).

2. Main sector issues and Government strategy:

14. In Guyana, key areas of government focus include competitiveness of the country, poverty reduction and improved safety nets, and infrastructure investment to support growth (through increased privatization, cost recovery mechanisms, and strengthened

governance to achieve transparency and efficiency in infrastructure spending), and improved environmental management. In terms of the sugar sector, in which sugar exports alone generate nearly a quarter of the country's export earnings, the government is pursuing a modernization strategy aimed at eliminating fiscal subsidies to sugar production, and positioning the sector for growth and future private investment.

15. The Government of Guyana is committed to the exploration and full use of renewable energy sources. The National Development Strategy states that the overall objective of the energy sector is to secure an adequate and dependable supply of electricity for future economic development of the country. This will involve reducing Guyana's dependency on imported petroleum products; fully exploring the production and utilization of new and renewable domestic energy sources; ensuring that energy is used in an environmentally sound and sustainable manner; and encouraging energy conservation practices through public awareness programs and incentives. To demonstrate a commitment to achieving self-reliance on energy needs, the Guyana National Energy Agency (GNEA) was established by Act No. 2 of 1981, known as the Energy Act. In addition, a System Development Plan prepared by the GPL reflects the official government policy of utilizing the country's renewable energy resources such as biomass and hydropower. The Prime Minister, in a press release in 2000, cited bagasse cogeneration in the GuySuCo sugar mill as a viable national option to pursue and one that could attract global climate change benefit support.

16. From an environmental perspective, Guyana has signed and ratified the Kyoto Protocol (KP) in an effort to mitigate its Greenhouse Gas (GHGs) emissions. The Guyana Bagasse Cogeneration Project will be the first bagasse cogeneration project in Guyana for grid supply of electricity.

Please see Annex 16 for a full description of the energy sector in Guyana and its institutional arrangements.

3. Sector issues to be addressed by the project and strategic choices:

17. The proposed cogeneration project will assist Guyana in achieving the following national sustainable development objectives:

Increased competitiveness: With more efficient energy generation for internal use in the new sugar factory, the cogeneration project will contribute towards increased competitiveness of the country's sugar sector in the world market. The sugar industry, which generates about one-fourth of Guyana's export earnings, plays an important role in achieving trade balance.

Decreased dependency on fossil fuel: Bagasse cogeneration is important for the energy strategy of Guyana. Cogeneration is an alternative that allows postponing the installation and/or dispatch of thermal energy generation utilities. With the project assisting the country to facilitate utilization of renewable energy resources such as biomass, the country's dependence on imported petroleum products is reduced. While this will provide economic and financial benefits to Guyana in terms of reduction in exposure to the

fluctuating costs of imported fuel, the project will also contribute in stimulating and accelerating the commercialization of renewable energy applications at the grid-connected level.

Creation of local employment: Guyana's sugar-based industry is a major employer of local labor. It directly employs 25,000 people or about 10 percent of the country's labor force.

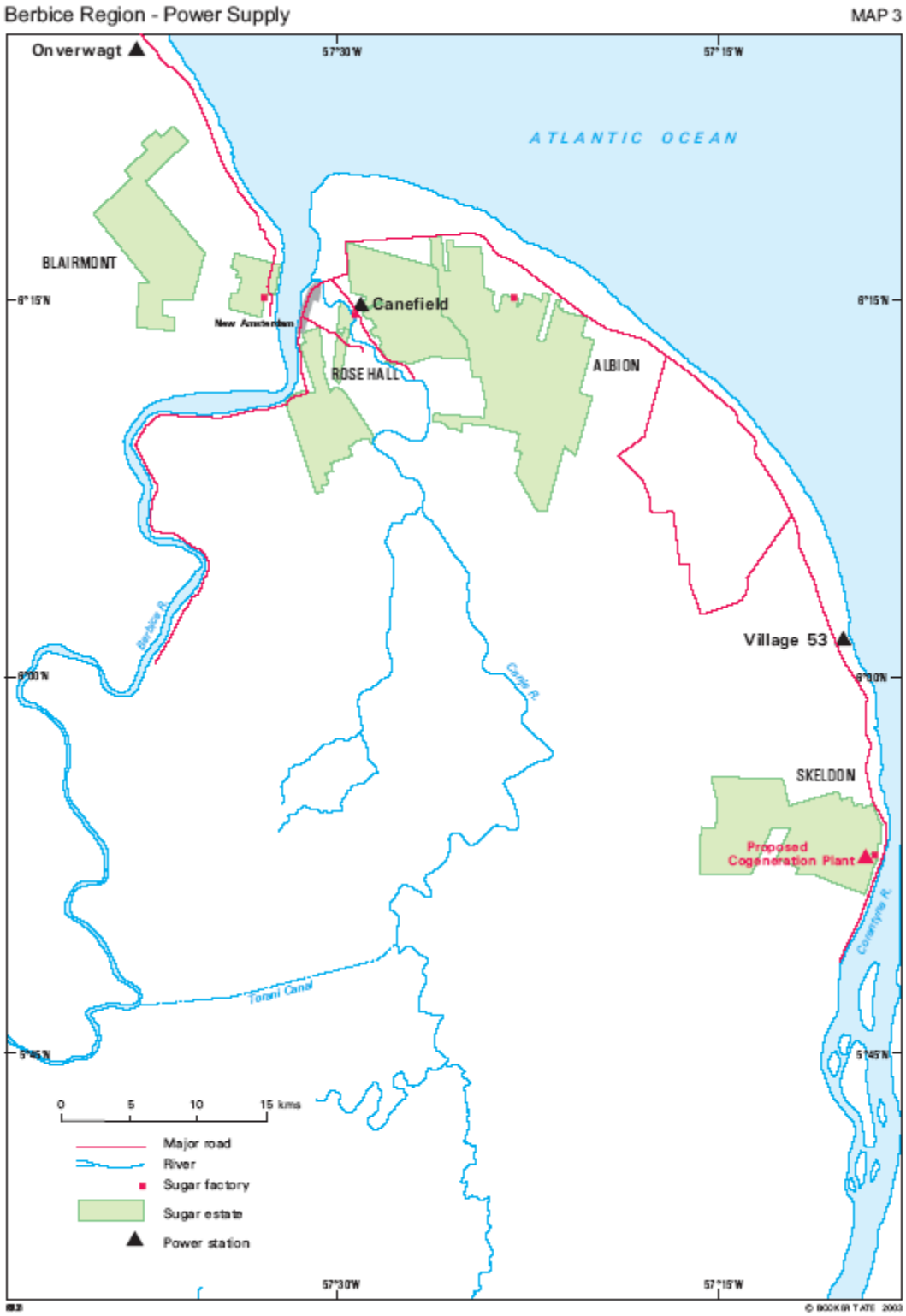
Sustainable clean energy: Bagasse cogeneration displacing the use of fossil fuel results in a cleaner environment and attracts global climate change benefit support. As a consequence, both local and foreign investments in clean energy generation can be mobilized in response to increasing energy demand and energy diversification needs. Meanwhile, the sale of CERs generated by the project will boost the attractiveness of bagasse cogeneration projects and will help to further increase the production of clean energy in Guyana. By highlighting the financial attractiveness of Clean Development Mechanism (CDM) projects, an incentive is provided for Guyana to develop other CDM projects in renewable energy (hydro and wind); waste management (methane capture, landfill gas to electricity); and energy efficiency (the use of Compact Fluorescent Lighting).

C. PROJECT DESCRIPTION SUMMARY

1. Project components (see Annex 2 for a detailed project description)

18. The aim of the Guyana Bagasse Cogeneration Project is to utilize in an efficient manner the bagasse by-product of the new Skeldon sugar factory in generating electricity for internal use as well as for sale to the national grid. The project will displace the use of light fuel oil in diesel engine driven generators operated by the GPL, the national utility, in the Berbice region. As the utility currently has insufficient capacity, there is extensive use of self-generation by industry and households. The project will also displace a significant amount of this unregulated and inefficient self-generation as confidence in reliable supply is progressively built over time.

19. The SSMP is located in the town of Corriverton, in the Berbice County on the Correntyne River, at the eastern coastal extremity of Guyana, bordering on Suriname in South America. The project cogeneration plant will be located adjacent to the new sugar factory. The map shown below displays the key factory sections and the power station.



(a) Under the ongoing SSMP project, the existing sugarcane area in the Berbice County will be expanded. The cane supply will come from the Skeldon Estate (expanded from

4,800 to 9,500 ha) and from holdings of private farmers (expanded from 300 to 4,165 ha) who will cultivate cane exclusively for sale to GuySuCo. The Guyana Bagasse Cogeneration Project will be added on to the new Skeldon sugar factory design to allow the simultaneous production of electrical power for internal needs and for sale of excess power to the Berbice regional grid. The cogeneration plant will use bagasse from the sugar factory during the cane crop seasons, and will be equipped with diesel generating capacity for co-firing fuel oil during off-crop periods when bagasse stocks have been exhausted. Under this project scheme, surplus electricity will be generated at an average of 10 MW of electricity delivering approximately 77 GWh per year to the regional grid on a firm power, year-round basis. Of the 77 GWh to be exported to the grid annually, about 85 percent (65.45 GWh) will be generated directly from bagasse, with the balance from fuel oil during off-crop periods. In addition to the grid export, 58.8 GWh per year will be produced for internal use at the sugar mill.

(b) Carbon Purchases. The World Bank as Trustee of the CDCF will purchase Certified Emission Reductions (CER) through 2012 and Verified Emission Reductions (VER) through 2014 for an approximate total value of US$5.32 million. $1.47 per tCO2e shall be used for Community Benefits pursuant to the Community Benefit Plan.

2. Key policy and institutional reforms supported by the project:

N.A.

3. Benefits and target population:

20. **Target Population:** The Guyana Bagasse Cogeneration Project is located in the Berbice region of Guyana. The region currently has 5,000 to 10,000 people without access to electricity. In addition to providing access for these consumers, the local commercial and industrial sectors will benefit from a more reliable electricity supply. Consumers will also benefit from more stable electricity prices as bagasse-based electricity becomes available and the dependence on imported fuel is reduced.

Benefits:

21. The direct beneficial effects resulting from the Guyana Bagasse Cogeneration Project include:

- The whole of the Berbice region will benefit from a more stable electricity supply as a result of the export of 10 MW of power on a firm basis year round.
- A reliable power supply will enable industrial expansion in Berbice leading to an economic environment that provides stability and, therefore, job creation.
- Job security of those workers engaged in sugar production will be enhanced over time as the sugar industry diversifies into power supply. On this account, the proposed project will provide valuable learning experience.
- The project will reduce the annual requirement for foreign exchange to purchase fossil fuel by approximately US$4.5 million at a minimum (figure calculated

utilizing 2005 oil prices. Under prevailing market conditions prices would be substantially higher, therefore making the project more attractive). This will have a direct impact on the national economy.

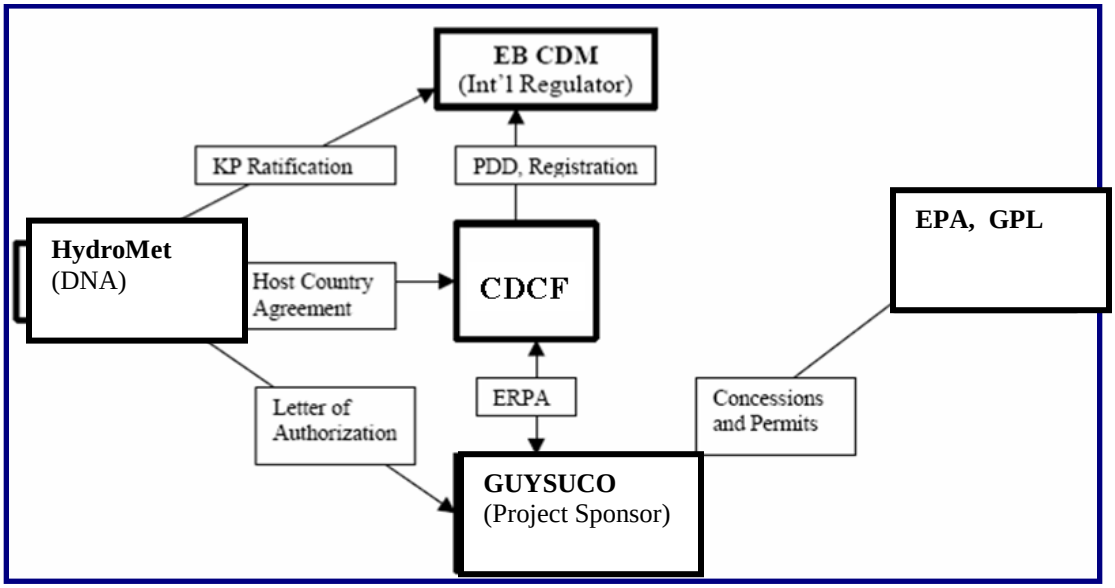
- The introduction of high technology sugar production with cogeneration of electrical power will provide an opportunity for GuySuCo's technical and professional staff to raise their awareness and experience in these areas. As well as improving their technical competence, this may cause some young professionals to pursue a more satisfying career in Guyana rather than choosing to migrate to advance their careers.

4. Institutional and implementation arrangements:

22. **Executing agency**: The project will be executed by the state-owned Guyana Sugar Corporation (GuySuCo) as Project Sponsor, through a management contract with Booker Tate Ltd. Booker Tate is a private company acting as the Project Manager for the Skeldon Sugar Modernization Project and is also, under a separate management agreement, the Corporate Manager of GuySuCo. The country's involvement is secured by a Letter of Endorsement issued and signed by His Excellency Samuel A. Hinds, the Prime Minister of Guyana and Minister Responsible for Energy, on July 28, 2000, and a Letter of Approval from the Designated National Authority for the CDM, the Hydrometeorological Service of Guyana or 'HydroMet', signed on 14 December 2006. The other institutions involved are: the Executive Board (EB) of the CDM (the International Regulator), and the government agencies in charge of permits and concessions (Guyana EPA, GPL, etc) as described in Annex 16.

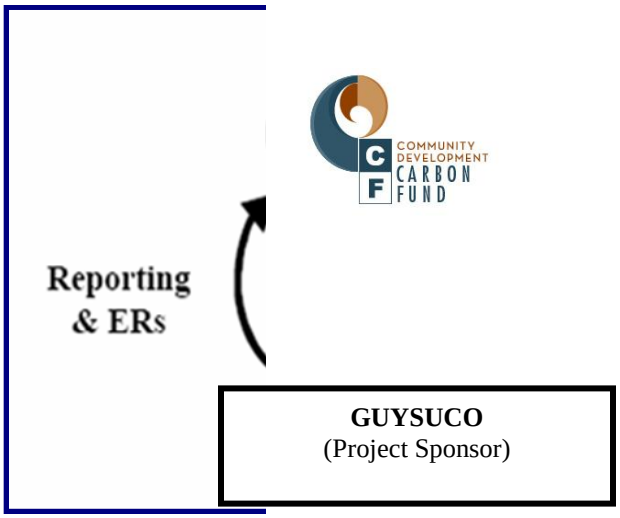
23. **Payment and Flow of Funds:** At the time of the signing of the Emission Reductions Purchase Agreement (ERPA), an anticipated schedule of payments based on the delivery of Emission Reductions (ERs) will be prepared. The project sponsor shall make requests for payment to the CDCF under the ERPA. The timing of the first payment will be agreed to in the ERPA and will occur upon declaration by the CDCF that relevant conditions have been met. The involvement of the World Bank Carbon Finance Unit (CFU) will expire after ERs up to the total contract amount of tCO_2e have been delivered. In the event that the project sponsor fails to deliver the quantity of ERs for any given calendar year as set forth in the ERPA, the project sponsor will be required to make up the shortfall over the course of the following calendar year or as other period agreed with the CDCF. Apart from the CFU's support, the project does not include any World Bank or IFC financing. Payments are made directly to the sponsor's bank account from the CDCF**.** The procedures are monitored and authorized by the World Bank's Trust Fund Unit under OPCS supervision.

Institutional Arrangements for CF Projects



For more information about institutional arrangements of Carbon Finance (CF) projects, please see refer to the CFU Operating Manual in the project files.

Direct Financial and Reporting Flows



D. PROJECT RATIONALE

1. Project alternatives considered and reasons for rejection:

24. The project was selected because of the level of commitment of the Project Sponsor (GuySuCo) and the Project Owner (Government of Guyana) in constructing a new sugar mill to modernize the country's sugar industry, the need to upgrade the transmission and distribution network to allow for a reliable and efficient off-take of power from the project to the grid, and the relatively low level of technical and financial risk associated with building a new sugar mill. The project will replace additional generation capacity that would otherwise be procured by the GPL from diesel generation.

25. Although historically the least cost capital investment alternative for new capacity to serve GPL has been diesel because of the small scale of the national grid and the great distance of any other technically viable alternatives from the Berbice region, with rising fuel costs bagasse-based electricity proves to be a more financially attractive option.

26. About 77 million kWh of surplus electricity will be sold annually to the grid. About 85 percent (65.45 million kWh) of this surplus electricity will be generated directly from bagasse, with the balance from fuel oil during off-crop periods once bagasse stocks have been consumed. The bagasse-based electricity to be exported to the grid will displace nearly 22 million liters per year of diesel, providing a significant direct foreign exchange savings to the national economy that can annually accrue as a benefit to the project as the electricity generated by the project will be paid for in the local currency. Furthermore, the Carbon Finance component of the project, through ER payments, will reduce by a minimum of 10% the foreign exchange project debt which is a clear constraint, given Guyana's debt burden.

2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned).

Project Name	ID	Product Line	Country	Status	Approved
Brazil Alta Mogiana Bagasse Cogeneration Project	**P081023**	**Carbon Offset**	**Brazil**	**Active**	**24 June 2005**
Brazil Lages Wood Waste Cogeneration Facility	**P091407**	**Carbon Offset**	**Brazil**	**Active**	**19 Sept 2005**
CTSAV Bagasse – Fuelled Cogeneration Project	**P103467**	**Carbon Offset**	**Mauritius**	**PDD under revision**	
Kakira Sugar Works Cogen Project	**P098743**	**Carbon Offset**	**Uganda**	**PDD submitted to CDM EB**	

3. Lessons learned and reflected in the project design:

27. The project grid will be the first of its kind in Guyana. The historical experience of sugar factory projects is that the seasonal nature of the sugar mill operations has been a hindrance to successful contracting for grid supply because the capacity could not be considered as firm. With Guyana's two sugar processing seasons per year and storage of surplus bagasse to cover the between season periods, the integration of the proposed cogeneration project with the new Skeldon sugar factory has full value to the national grid company.

28. The project is designed to ensure the availability of peaking power supply. Thus the cogeneration plant will have 15 MW of bagasse-based steam turbine capacity, in addition to 10MW of diesel generation capacity: one 2.5 MW diesel set for black-start and standby capability; and one 5MW and one 2.5 MW diesel sets to dedicate to the grid for peaking purposes and for use during off-crop periods if the bagasse supply runs out. Diesel generation for these purposes will allow the cogeneration plant to supply power to the grid on a firm, year-round basis.

4. Indications of borrower and recipient commitment and ownership:

N.A.

5. Value added of Bank and Global support in this project:

29. The Kyoto Protocol (KP) of the United Nations Framework Convention on Climate Change (UNFCCC) entered into force on 16 February 2005 - committing industrialized countries to reduce their carbon emissions collectively by an average of 5.2% below their 1990 levels by 2012. The Protocol provides for two flexibility mechanisms - the Clean Development Mechanism (CDM) and Joint Implementation (JI) – and the International Emission Trading mechanism - to meet these obligations. The CDM enables industrialized countries to meet some of their obligations through projects generating emission reductions in developing countries.

30. The Carbon Finance Unit of the World Bank was created to demonstrate how market-based carbon transactions could mitigate climate change and pioneer emission reduction purchase agreements, while opening up a significant new source of financing for projects in developing countries. The CFU supports projects that generate high quality Emission Reductions suitable for registration with the UNFCCC to meet KP emission targets. The objective is to develop project-based experience for this relatively new international commodity through CDM and JI processes detailed under the Protocol.

31. The buyer for this project – the CFU-managed Community Development Carbon Fund (CDCF) purchases carbon credits and enters into irrevocable Emission Reduction Purchase Agreements (ERPAs) with eligible project sponsors. Each ERPA includes, *inter alia*, the quantity, price and other delivery conditions of the ERs; it also defines the institutional roles and responsibilities for project implementation, as well as the monitoring and verification obligations. The CDCF only acquires ER rights for those

Greenhouse Gases (GHGs) defined in Annex A of the KP. The project must, at a minimum, demonstrate that it is 'additional' as defined under the KP, and that the ERs are measurable and verifiable following a protocol acceptable to the rules of the CDM or other UNFCCC bodies as necessary. The ERPA defines the minimum amount of ERs in metric tons of carbon dioxide equivalent that the eligible renewable energy projects will deliver to the CDCF. Generation and delivery of the ERs shall be carried out in accordance to the schedule set forth in the project ERPA and be completed on or prior to a date agreed upon between the CDCF and the project.

32. The overarching objective of the proposed project is to help mitigate global climate change by facilitating the use of market-based mechanisms sanctioned under the KP through support to clean energy projects in Guyana. To this end, the project will generate ERs in the country's power sector, which will then be sold to the CDCF upon verification and certification.

33. No World Bank lending is associated with the project. The CDCF will purchase carbon emission reductions as they are created as a by-product of electricity generation, under the ERPA, a contract analogous to a power purchase agreement.

The World Bank's strategy on Carbon Finance:

34. The World Bank's involvement in carbon finance helps ensure consistency between the individual projects it supports and international dialogue on climate change, while providing the ability to mobilize global experts with experience in the field, technical support for project preparation, supervision capacity, and development of linkages with other sources of expertise and funding. By mobilizing the private and public sectors on an important new source of project finance, the CFU is developing an important knowledge base and is demonstrating how insights and experience from both sectors can be pooled together to attract additional resources for sustainable development and address global environmental concerns. (Further information on the World Bank's CF strategy can be found in the Project Files and on the Carbon Finance website, <http://carbonfinance.org>)

E. SUMMARY PROJECT ANALYSIS

(Detailed assessments are in the project files, see Annex 8)

1. Economic (see Annex 4):

Economic Analysis and Additionality

35. The Emission Reduction estimates (ERs) are based on the findings of a baseline assessment contained in the CDM's Project Design Document (PDD), validated by independent experts. The baseline assessment also certifies the project's 'environmental additionality': i.e., the KP requires that "reductions in emissions are additional to any that would occur in the absence of the certified project activity". The PDD has been validated and submitted to the CDM's Executive Board for registration.

36. **Summary of Emissions Baseline Analysis:** To ensure that the carbon emission reductions purchased by the CDCF are recognized under international convention and retain as much of their inherent value as possible, a baseline assessment was undertaken to define (i) the baseline for the GHG emissions of Guyana's Electricity System which conforms with the boundary of the project, and (ii) the estimate of emissions reductions expected to be achieved with the project's implementation. This report concludes that the boundary of the project covers the extent of the factory site where the cogeneration facility is located, the Berbice Interconnected System of the national grid to which the cogeneration project will be connected and which will receive all the surplus bagasse-based produced electricity, and the trucks to be used in hauling bagasse from production or storage sites to the cogeneration facility. .

37. It should be noted that in the estimation of baseline emissions due to displacement of fossil fuel-based grid electricity, only the bagasse-based electricity generated by the project is relevant in the analysis. This amounts to at least 85 percent of the 77 GWh of surplus electricity to be supplied to the grid annually. The balance of about 15 percent (11.55 GWh) that will be generated by the project using fuel oil during off-crop periods is not included in the analysis since, in a holistic view, it will not constitute a net change in ERs. That is, in the absence of the project, it would have been produced in the grid using fuel oil.

38. **Summary of baseline methodology**: The project utilizes Approved Baseline Methodology 'ACM0006/Version 04: Consolidated methodology for grid-connected electricity generation from biomass residues'. This methodology is applicable to bagasse-based cogeneration power plants displacing grid electricity with the following conditions:

- The bagasse to be used as the feedstock for cogeneration is supplied from the same facility where the project is implemented;
- Bagasse, which is a by-product of sugarcane processing, is the predominant fuel to be used in the project plant, with supplemental co-firing of fuel oil;
- There is no increase in the production of bagasse due to the project activity itself;
- The bagasse at the project facility will not be stored for more than one year; and
- Except for transporting bagasse to the project plant, no processing of bagasse is required prior to combustion.

39. The baseline scenario for the proposed project falls under "Scenario 3" of project type "Greenfield power projects" identified in Table 1 of the ACM0006 methodology.

40. The additionality of the proposed cogeneration project has been established as a barrier removal activity in a very financially constrained investment environment (discussed in detail in the PDD, available in the project files). These barriers are due to technological and investment constraints as well as due to prevailing practice. The project, with bagasse cogeneration for grid supply, will be the first of its kind in the country. It was proposed by GuySuCo in the year 2000 but was not approved for implementation until 2004 with a Carbon Finance component.

2. Financial (see Annex 4):

41. NPV=US$27.64 million; IRR = 18.7% before taxes and interest (without Carbon revenues)

42. A feasibility study of the cogeneration project was undertaken and completed by Booker Tate in 2004, and was reviewed by the World Bank. The feasibility study analyzed four engineering designs of the project activity to determine which one would provide the highest returns:

- Scenario 1 – The Base Case and the starting point for the feasibility study; boilers fuelled on heavy fuel oil during the off-crop period when bagasse stocks are exhausted.
- Scenario 2 – The Base Case with ramped increases in power demand and cane availability.
- Scenario 3 – Interrupted power supply during the off-crop period when bagasse stocks are exhausted.
- Scenario 4 – Off- crop power provided from diesel generators when bagasse stocks are exhausted; some peaking power supply is also provided from this source.

43. In the Base Case scenarios (Scenario 1 & 2), GuySuCo would be expected to meet its power export obligations to GPL by fuelling the sugar factory boilers on heavy fuel oil during the off-crop periods when bagasse stocks are exhausted. This is the main premise of the feasibility study.

44. The feasibility study demonstrated that Scenario 4 has the strongest financial performance and economic benefits. Its internal rate of return before taxes and interest expenses was estimated at 18.7%.

45. The project activity is based on Scenario 4. The cogeneration plant would have 15 MW of bagasse-based steam turbine capacity. In addition, it would include an additional 5 MW diesel generator for peaking purposes and for use during off-crop periods when supply of bagasse runs out. (Plant design in all four scenarios includes a 2.5 MW diesel capacity for black-start and standby capability and another 2.5 MW diesel set dedicated to the grid.) This would eliminate the burning of fuel oil in the mill's boilers for electricity production during the off-crop periods. It was determined that less fuel could be used to produce more electricity, if during the off-crop periods the fuel oil would be processed through diesel units rather than through boilers. For example, under Scenario 4, the heavy fuel oil requirement to meet the 10 MW firm power obligations to GPL would be about 14% lower compared to Scenario 2.

3. Technical

46. The choice of a bagasse-based cogeneration plant as the next increment of main grid capacity undertaken by GuySuCo as part of a new sugar mill installation project is technically an excellent choice for Guyana. The technology is well proven in many commercial installations in other parts of the world, including many developing countries.

4. Fiduciary

Financial management issues:

N.A.

Procurement issues:
N.A.

5. Environmental:

Environmental Category: A

5.1 Summarize the steps undertaken for environmental assessment and EMP preparation (including consultation and disclosure) and the significant issues and their treatment emerging from this analysis.

47. **Environmental Assessment Process.** The environmental and social impacts of the Skeldon Sugar Modernization Project (SSMP) were assessed according to criteria and procedures for ensuring compliance with Bank safeguard policies as well as with the requirements of the Guyana Environmental Protection Agency (EPA). The Environmental Impact Assessment for the SSMP (*Final Environmental Impact Assessment Report: Proposed Expansion to Skeldon Estate)* was completed by the Ground Structures Engineering Consultants Inc. in March 2003. The Guyana EPA then issued a permit (Permit No. 19990204-GSEPO dated July 15, 2003) for both the SSMP and CDM cogeneration projects to proceed. Thereafter, GuySuCo concluded the preparation of its Environmental Management Plan (EMP) for the SSMP in July 2005. The EMP was assessed by Bank specialists who concluded that it is of good technical quality, operationally useful, and consistent with the applicable Bank safeguard policies.

48. **Positive Environmental Impacts.** The Bagasse Cogeneration Project promotes the mitigation of greenhouse gas emissions that contribute to global climate change through the development and international sale of High Quality Emission Reductions (ERs). At the national level, the project will contribute to improved air quality by displacing diesel fuel oil generation, with environmentally sustainable renewable energy (biomass). The Bagasse Cogeneration Project (as distinct from the ongoing SSMP) fully meets UNFCCC and CFU criteria requiring project activities not to have adverse irreversible environmental impacts.

49. **Adverse Environmental Impacts.** Most of the adverse environmental impacts associated with this project are not the result of the bagasse cogeneration facility per se, but from the expansion of sugar cane cultivation under the SSMP. The most significant adverse environmental impact of the SSMP is the conversion of some 8,565 ha of land to sugar cane cultivation, with up to another 2,500 ha for replacement cattle pasture, for a total of about 10,600 ha of land to be cleared and/or drained. Although the forests and wetlands to be cleared and/or drained harbor species of conservation interest such as Jaguars *(Panthera onca)*, they are not considered to be critical for the global (or national) survival of any species, and do not otherwise qualify as Critical Natural Habitats or Critical Forests under the Bank's Natural Habitats (OP 4.04) and Forests (OP 4.36) policies. As is explained below, the loss of these non-critical natural habitats will be mitigated through GuySuCo's protection and management of two conservancies that are of significant biodiversity conservation value.

50. Other environmental impacts of the SSMP are generally less significant and are being handled adequately by GuySuCo. Due to increased water use efficiency in irrigation, the expansion of sugar cane cultivation under the SSMP is not expected to affect local water availability for other uses; nor will it affect the flows of the Canje River. The quality of drainage water from expanded cultivation is expected to be similar to that observed for the existing cultivation, as the land preparation and management practices currently in use would be applied. Moreover, while the effluent from the existing sugar factory is not treated, the new factory would include an effluent treatment plant to significantly reduce biochemical oxygen demand (BOD), chemical oxygen demand (COD), and total suspended solids (TSS) before being discharged into the drainage canal. While sugar cultivation presents pest management challenges, GuySuCo has years of experience with successful integrated pest management approaches that minimize pesticide use and promote worker safety. With respect to air quality, the current practice of burning cane at pre-harvest would continue on the new Skeldon cane fields. However, the EIA concludes that the effects on the populated area will be negligible, from the cane fields as well as the burning of bagasse. In fact, the bagasse co-generation plant will lead to reduced particulate and NO_x emissions due to the more efficient firing of bagasse. Archaeological and other cultural resources are unlikely to be significantly affected by the SSMP; nonetheless, the bidding documents for land clearing prior to cane cultivation (or replacement pasture establishment) will specify cultural property chance finds procedures.

51. There will be no transboundary impacts resulting from the proposed cogeneration project. All the relevant impacts will occur within Guyana's borders.

5.2 What are the main features of the EMP and are they adequate?

52. The EMP addresses the environmental (as well as worker health and safety) aspects of GuySuCo's Skeldon area operations, including cane cultivation as well as the operation of the sugar factory and bagasse cogeneration facility. It includes a Pest Management Plan (PMP) for sugar cane cultivation which emphasizes integrated pest

management, careful selection of compounds, and safe pesticide use and storage. The EMP includes an annual budget for implementation, which will be adjusted as needed, should circumstances require it.

53. With respect to mitigating the significant loss of forests and wetlands due to expanded cane cultivation (along with the need for replacement cattle pasture) under the SSMP, the EMP provides for the long-term conservation of 7,520 ha contained within the Halcrow (6,000 ha) and GuySuCo (1,520 ha) conservancies. These two conservancies comprise state-owned land under GuySuCo management; in the case of the Halcrow Conservancy, GuySuCo's management responsibilities are outlined in a long-term agreement signed between GuySuCo and the National Drainage and Irrigation Board. Both conservancies serve primarily as water storage areas for nearby sugar cane and other irrigated cultivation, and both comprise relatively natural ecosystems with a mosaic of open water, marsh, freshwater swamp, upland reef forest, and related wetland habitats. Under GuySuCo's management, the fundamentally natural character of the Halcrow and GuySuCo conservancies areas will remain, although there might be some change in the proportions of each habitat type due to (relatively slight) water level changes. To help ensure effective wildlife conservation at both conservancies, the EMP prohibits all hunting and wildlife capture, and restricts fishing to traditional, small-scale activities. GuySuCo will enforce these restrictions through (i) placement of signs in strategic locations at the conservancy edges; (ii) control of vehicle and pedestrian traffic along the limited access roads that pass through GuySuCo-managed lands; and (iii) the on-the-ground presence of at least 8 conservancy rangers. GuySuCo has been requested to provide information on the implementation stage of these measures prior to negotiation of the Emissions Reduction Purchase Agreement (ERPA). The EMP also provides the explicit environmental rules that will be incorporated within the bidding documents for clearing the remaining blocks of land needed for cane cultivation and pasture replacement. See Annex 11 (Environmental Analysis) for further details.

54. GuySuCo assumes the responsibility of ensuring that the new SSMP factory and the proposed cogeneration plant are efficiently managed and that conditions of the Guyana EPA Permit are complied with.

5.3 For Category A and B projects, timeline and status of EA:
Date of receipt of final draft:

55. An EIA was completed for the entire Skeldon project in March 2003 and cleared by the Guyana EPA in July 15 of the same year.

5.4 How have stakeholders been consulted at the stage of (a) environmental screening and (b) draft EA report on the environmental impacts and proposed environment management plan? Describe mechanisms of consultation that were used and which groups were consulted?

56. Since the conception of the SSMP in 1999, there had been joint consultative meetings with the local community to discuss in detail the environmental and social

impacts of the factory project and the role that private farmers and cooperatives would play.

57. Initial public consultation was held on the following dates:
13 July 1999 - inter-agency experts meeting in Georgetown
15 July 1999 - public meeting at Skeldon
16 July 1999 - local farmer meeting at Skeldon
19 July 1999 - public meeting in Georgetown
21 August 1999 - union & workers meeting at Skeldon

58. The above meetings were advertised and the Environmental Impact Assessment process explained through the following media:
National press
National and local TV
National and local radio
Flyers
Public announcement
Notice boards

59. The issues raised in the above consultation are recorded in the Environmental Impact Assessment report.

60. Prior to publication of the final draft of the Environmental Impact Assessment report, a public hearing was held on 28 Nov 2002 at Skeldon. This was arranged and chaired by the EPA and was publicized by the EPA through the media as indicated above. At the meeting the project sponsor (GuySuCo) explained the background to the project and the benefits that would be derived by GuySuCo and the community. The EPA invited public comment and responded accordingly.

61. In late 2004, GuySuCo again held consultations on the EIA with local business groups, private farmers and cooperatives, union representatives and government authorities. The discussion emphasized the construction of the SSMP factory to manufacture VHP sugar and the accompanying expansion of existing cane cultivation at the Skeldon Estate as well as in holdings owned by private farmers and cooperatives. The integration of the proposed cogeneration facility in the new sugar factory was also elaborated making it clear that the facility would be operated to generate electrical power both for internal use and for sale to the national grid.

62. GuySuCo has a record of the outcome of the public consultations mentioned above. The EIA also summarizes the stakeholder consultations that have been carried out on the Skeldon sugar factory project.

5.5 What mechanisms have been established to monitor and evaluate the impact of the project on the environment? Do the indicators reflect the objectives and results of the EMP?

63. Environmental indicators will be monitored by the project sponsor (with involvement of the Guyana EPA) and reported to the Bank and the third-party verifiers**.** The third-party monitoring which will be responsible for emission reduction certifications will be charged with monitoring the implementation of environmental and social activities. In addition, the Bank will undertake supervision, specifically reporting on the various environmental and social aspects of each project activity.

6. Social:

6.1 Summarize key social issues relevant to the project objectives, and specify the project's social development outcomes.

64. Social screening and assessment criteria have been built into the environmental assessment methodology. These include the required public consultation during the EIA process for the SSMP as well as considerations for public opinion in project design and operation.

65. Public Consultation: Since the conception of the SSMP in 1999, there have been joint consultative meetings with the local community to discuss in detail the environmental and social impacts of the factory project and the role that private farmers and cooperatives would play. In late 2004, GuySuCo again held consultations on the EIA with local business groups, private farmers and cooperatives, union representatives and government authorities. The discussion emphasized the construction of the SSMP factory to manufacture VHP sugar and the accompanying expansion of existing cane cultivation at the Skeldon Estate as well as in holdings owned by private farmers and cooperatives. The integration of the proposed cogeneration facility in the new sugar factory was also elaborated making it clear that the facility would be operated to generate electrical power both for internal use and for sale to the national grid.

66. The EIA does not foresee any negative social impacts that are not manageable through good construction and operating practices, along with the provision of compensatory cattle grazing lands (discussed below). GuySuCo will continue to liaise with local and regional leaders to attempt to identify and solve potential social problems related to project construction and operation before they arise. GuySuCo will also ensure that the new factory and cogeneration plant are efficiently managed and conditions of the Guyana EPA permit are complied with.

67. The direct beneficial effects resulting from the Skeldon project include:

- Improved electrical service to the Berbice region resulting from supply of at least 10 MW of electricity produced by GuySuCo to the national grid (GPL).
- The number of new sugar industry jobs created as a result of the project, both by GuySuCo and private farmers and cooperative societies (who will cultivate about

4,000 ha). In addition to the new sugar mill, GuySuCo will expand its cultivated area at Skeldon from 4,800 to 9,300 ha.

- The number of stakeholder mechanisms created to facilitate coordination and collaboration between GuySuCo, local government, the unions, and the community during the project.
- GuySuCo will also allocate part of the carbon revenues to undertake social services in the community: Support to the local hospital and various improvements to the company's community center, as well a grass cutter to undertake urban landscaping in public community areas - school playgrounds, religious centers, and parks. (This grass cutter will be maintained by GuySuCo who will manage the lending schedule at no cost). (Please see Annex 17 for the list of proposed activities.) CDCF will pay an additional amount per contracted ER ($1.47 per tCO_2e) to finance additional benefits as part of the project's proposed Community Benefits Plan.

68. An assessment of the SSMP's community benefits and details of the community benefits plan are shown in Annex 17 and Annex 18, respectively.

6.2 Participatory Approach: How are key stakeholders participating in the project?

69. The Skeldon sugar estate is a focal point of the community and affects the lives of many people in the community. As a consequence, there is already an established liaison between the estate management and the local community. The Skeldon sugar factory project undertakes special efforts to ensure that the locally affected populations are also the beneficiaries of the project.

70. The proposed cogeneration project gathered stakeholders' support with the understanding that it would contribute to a more stable electricity supply in the region. Many business operators have invested to produce their own electricity using diesel generators because of the unreliability of GPL's power supply. They were enthusiastic about the prospect of improved service (fewer outages and stable voltage) in their area and said that they would resume consumption of GPL power once it has been demonstrated that service has improved.

71. While there is no involuntary resettlement of people in this project, as part of the SSMP expansion, the Cattle Farmers' Association for Villages 67-74 who previously had access to Block 2 of the Skeldon Sugar Estate to graze their cattle had to be relocated, since Block 2 is an integral area for cane field expansion and contiguous to other areas of increased cultivation. Block 2 has now been cleared for sugar cultivation.

72. In September 2006, a Select Committee was established to examine the issue of the relocation of the cattle farmers from Villages 67 - 74. The issue is now resolved as an alternate grazing location has been identified that has been deemed satisfactory to the majority of the Cattle Farmers Association. This area is the 7,440 ha Manarabisi Pasture, currently being utilized by the cattle farmers of Villages 52 – 66, who have agreed to share this land. (Villages 52 – 66 have formal title to their grazing lands). The reason for

their willingness to share is that they have been guaranteed continued use of the drained portions of the pasture. The additional rehabilitation work planned for the pasture will only increase the safety and welfare of their cattle, and once drained, the land will be sufficient for all.

73. The Government (Ministry of Agriculture), GuySuCo and the Farmers' Associations have agreed to share the cost of undertaking infrastructure work at Manarabisi pasture, to allow all 80 -100 farmers from Villages 67-74 (with approximately 7000 head of cattle) to move there in 2008.

74. Stakeholders were involved at every stage of this process, and continue to be involved as implementation commences. Minutes of stakeholder meetings are in the project file, and Bank staff held meetings with local stakeholders, the independently appointed head of the Select Committee, and representatives from the Ministry of Agriculture and GUYSUCO. More information is provided in the Resettlement Action Plan (Annex 13).

6.3 How does the project involve consultations or collaboration with NGOs or other civil society organizations?

75. Consultations on the EIA were held with affected groups, and made available for public review and for comments of the local community. Since the SSMP conception in 1999, there have been joint consultative meetings with the local community to discuss in detail the environmental and social impacts of the project, and the involvement of private farmers and cooperatives. During the design of the SSMP and the integration of a cogeneration facility, local consultations were also held regularly.

6.4 What institutional arrangements have been provided to ensure the project achieves its social development outcomes?

76. The Bank will supervise the implementation of social activities. Regular meetings with the local community will continue to monitor social impacts during the SSMP construction period and will identify and solve potential problems before they arise. The long-term implementation of the activities agreed with the local groups with regard to the new sugar factory and the proposed cogeneration plant will also be part of the third-party monitoring scheme. The Ministries of Education and Health, as well as the Ministry of Labor, Human and Social Services, will be involved in monitoring social impacts.

77. Concerning the need to relocate the pastures of the cattle farmers, a Resettlement Action Plan (RAP) has been prepared to satisfy the requirements of the World Bank's Involuntary Resettlement Policy (OP 4.12), as well as relevant Guyanese legislation. The RAP is presented in Annex 13.

6.5 How will the project monitor performance in terms of social development outcomes?

78. The project will show community benefits in the Community Benefits Monitoring Plan, which will be attached to the ERPA. These benefits will be monitored by the Verifier for the CDM project, under the guidance and supervision of Bank staff.

7. Safeguard Policies:

7.1 Are any of the following safeguard policies triggered by the project?

79. The responses shown in the table below pertain to the SSMP, and are presented here given the importance of the SSMP to the proposed cogeneration project.

80. As for the proposed Bagasse Cogeneration Project, its impacts are not considered significant. They will arise from activities (cane crushing, bagasse burning, and co-firing with fuel oil when bagasse supply runs out) which are already taking place in sugar mills in the region, except in the case of the project activity such activities are on a larger scale. As the project activity will (a) displace fossil fuel-based electricity generation by bagasse-based electrical power, and (b) avoid methane emissions by utilizing as fuel an extra 50,000 tonnes of bagasse which would otherwise be dumped and left to decay, it will result in a positive net environmental impact.

81. Furthermore, the EIA reports that the bagasse co-generation plant will lead to reduced particulate and NO_x emissions due to more efficient firing of bagasse. Emission concentrations from bagasse firing were estimated at 47.8 mg/m^3 for particulates and 40 mg/m^3 for NO_x and fall within acceptable World Bank standards (150 mg/m^3 for particulates and 70 mg/m^3 for NO_x).

Policy	Triggered
Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)	Yes
Natural Habitats (OP 4.04, BP 4.04, GP 4.04)	Yes
Forestry (OP 4.36, GP 4.36)	Yes
Pest Management (OP 4.09)	Yes
Physical Cultural Resources (OP 4.11)	Yes
Indigenous Peoples (OD 4.20)	No
Involuntary Resettlement (OP/BP 4.12)	Yes
Safety of Dams (OP 4.37, BP 4.37)	No
Projects in International Waters (OP 7.50, BP 7.50)	No
Projects in Disputed Areas (OP 7.60, BP 7.60)	No

7.2 Describe provisions made by the project to ensure compliance with applicable safeguard policies.

82. See Environmental Analysis in Annex 11; see also Annex 13 regarding the details of the resettlement issue.

Compliance with World Bank Safeguard Policies: (only ones triggered follow)

83. Compliance with Safeguard Policies that were triggered by the SSMP is discussed in detail in Annexes 11 (environmental safeguards) and 12 (social safeguards).

F. SUSTAINABILITY AND RISKS

1. Sustainability:

84. The proposed cogeneration project will contribute to diversification and sustainable energy development in Guyana, and will help build experience in diversifying potential financing for clean energy projects.

1a. Replicability:

85. The project is the first CDM project in Guyana. It will contribute toward providing a basis for future CDM projects in the country and possible replications within the sugar industry in the surviving sugar mills or their replacements.

2. Critical Risks:

86. Critical risks for the project are described below:

Risk	Risk Rating	Risk Mitigation	Risk rating After Mitigation
From Outputs to Objective Baseline risk Kyoto Protocol risk	N N	Baseline and monitoring methodologies used in the project have been approved by the CDM Executive Board and the project has been validated. CDCF only assumes risk , if any, for VER purchase after 2012, as pre-2012 ERs are payable only upon certification.	N N
From Components to Outputs Project risks: Technology and resource risk	L/M	Technology to be employed is conventional CHP and widely used all over the world. Despite being a major	L

Risk	Risk Rating	Risk Mitigation	Risk rating After Mitigation
		biomass energy project, the project's obligation to provide firm, year round, power will potentially require the use of fossil fuel when bagasse fuel stocks have been exhausted during each year's inter-crop period. As such, the economic performance of the project will be affected by fluctuations in oil prices. The use of alternative biomass fuels such as cane field trash and rice husks has been evaluated on a technical and financial basis.	
Performance/operational risk	L	Booker Tate (Project Developer) has extensive experience within the biomass renewable energy resource sector, and adequate experience as Project Manager to implement this project. GuySuCo (Project Sponsor) has a good record of operating power plants at high level of availability and have the capacity to train staff to cope with new technologies.	L
Carbon funds purchase risk	N	The World Bank would pay only for delivery of ERs, which would be associated with power generation.	N
Off-take risk	M/S	1)There is an insignificant risk of failure to conclude an adequate and fair PPA with GPL. An interim PPA is already in place to allow the sale of diesel generated power to GPL and this will be superseded by the full PPA for both diesel and bagasse generation. However the incremental financial return from sale of power to the grid is highly positive for both GuySuCo and GPL. There is therefore a	M

Risk	Risk Rating	Risk Mitigation	Risk rating After Mitigation
		strong expectation that these two parastatal entities will come to agreement on a reasonable transfer price for power sales prior to the start of bagasse generation later this year. Indeed, this will be necessity before the factory starts commercial sugar production. There is a possibility that new power coming on line could enhance GPL's negotiating position -- Synergy Holdings Inc has signed an agreement for the construction of a hydropower station worth some US$300M and through another deal will make available to GPL a four-unit Wartsila plant that will supply 25 megawatts of power -- this project will most likely not come on line soon enough to be detrimental to the signing of a PPA, given the current energy shortfall in Guyana. Signature of the PPA has been added as a condition of effectiveness for the ERPA. (2) Counter-party/payment risk represented by GPL should also be taken into account. While there are plans to strengthen the tariff structure, these will not be enacted in the next three or four years. Guysuco has retained international legal/expert capacity to draft the PPA and to ensure that the PPA addresses the risk of non/under-payment. (3) The initial project budget of US$27 million included the installation of a transmission link between	

Risk	Risk Rating	Risk Mitigation	Risk rating After Mitigation
		Skeldon and Village 53 which is the nearest GPL sub-station. Funding for this link has not yet been sourced. The reliability of the ongoing transmission link to the major load centre at Canefield is also an uncertainty and it may need an upgrade. The funding for the Village 53 link and a possible upgrade to the ongoing link are expected to cost in the region of US$ 2 TO 4 million. There is uncertainty whether this will be provided by GPL, by the project, or by others. Discussions with GPL are ongoing regarding the financial responsibility for the new transmission line. At present, the construction of this line has been put on hold, and existing distribution links will be used. This places a constraint on the level of power that may be dispatched by the cogeneration plant. The Govt of Guyana is discussing with Synergy Holdings, the private hydro investor named above in (1), an injection of an initial $20m to provide essential improvements in the existing T&D network linking up the Berbice and Demerara networks, though whether this funding will come through is highly uncertain	
Country risk	M/H	The project is located in a country of high perceived financial and political risk. It is understood that foreign commercial investors would	M

Risk	Risk Rating	Risk Mitigation	Risk rating After Mitigation
		typically require at least 20 – 25 % return on investment to assume such risks within Guyana. It was the requirement for such a high return that proved to be one of the key constraints when the co-generation scheme was first proposed in 2000. The provision of carbon finance will provide a secure source of foreign exchange income to the project, which will therefore be less susceptible to shocks caused by exchange rate fluctuations.	
Fuel supply risk	M	The bagasse supply to the co-generation plant is fundamental to the economic operation of the facility and must be accurately predicted. There has been a declining trend in the fibre content of cane delivered to Skeldon factory since the early 1990s, although from 1997 the decline in fibre content has been less significant. Fibre content tends to drop significantly in the years following a drought; drought years can be expected to occur once in every five years. GuySuCo envisages that it will directly control over 75% of the Project's cane supply from its own land with a further 25 % coming from private farmers. This does provide a sensible level of security over supply, but also means that cane supply agreements with cane farmers (reasonably large holdings on average) will have to be consummated prior to the finalization of the PPA. Cane production estimates will need to be accurate as	M/L

Risk	Risk Rating	Risk Mitigation	Risk rating After Mitigation
		they will have a direct impact on the availability of bagasse and therefore on the capability of the plant to produce low-cost export power to GPL.	

Risk Rating – H (High Risk), S (Substantial Risk), M (Modest Risk), L (Low Risk), N (Negligible Risk)

The overall risk rating for the project is Modest, depending on the final conclusion and terms of the PPA.

3. Possible Controversial Aspects:

87. Notwithstanding the deforestation (with mitigation) that is an inherent part of the SSMP, the overall project (including the CDM bagasse cogeneration facility) is not considered to be controversial within Guyana. It is understood to be benefiting the local population by having a more reliable power supply and through job creation. The project's business risks are normal for small biomass-based cogeneration projects of this type, and the CDCF is under no contractual obligation to pay if power, hence ERs, are not produced.

G. MAIN CONDITIONS

1. Effectiveness Condition

N.A.

2. Other

88. Carbon Finance is not part of the World Bank's lending program. Therefore, there will not be regular loan disbursements; however, the World Bank acting as the Trustee for the CDCF will make payments for ERs in accordance with the terms of the ERPA.

H. READINESS FOR IMPLEMENTATION

Not applicable.

I. COMPLIANCE WITH BANK POLICIES

■ 1. This project complies with all applicable Bank policies.

☐ 2. The following exceptions to Bank policies are recommended for approval. The project complies with all other applicable Bank policies.

ANNEX 1: PROJECT DESIGN SUMMARY

Guyana: Bagasse Cogeneration Project

Background

In 1998 GuySuCo undertook a strategy review of its operations. The objectives of the review were to examine ways of contributing to Guyana's economic growth and to reduce unit costs to a level that would ensure viable and sustainable operations in anticipated future markets (Skeldon Expansion, Project Definition, 1999).

The review indicated that the most significant reduction in unit costs could be achieved by increased production. The corporation identified an expanded production alternative of 435,000 tonnes of sugar per year (t/yr) as being adequate to result in substantial increases in revenue. Several options were identified for achieving the enhanced production levels. The options all examined concentrating investment in the lower cost areas of Berbice and developing larger processing plants to benefit from economies of scale and more modern technology. Table 1 shows the options approved by GuySuCo and the Government of Guyana. A decision was taken to undertake the expansion of Skeldon Estate as the first stage of the expansion process.

Table 1: Production Options Approved for GuySuCo Expansion

Location	Expanded Capacity (t/yr)
Skeldon	111,000.00
Albion-Rose Hall	153,000.00

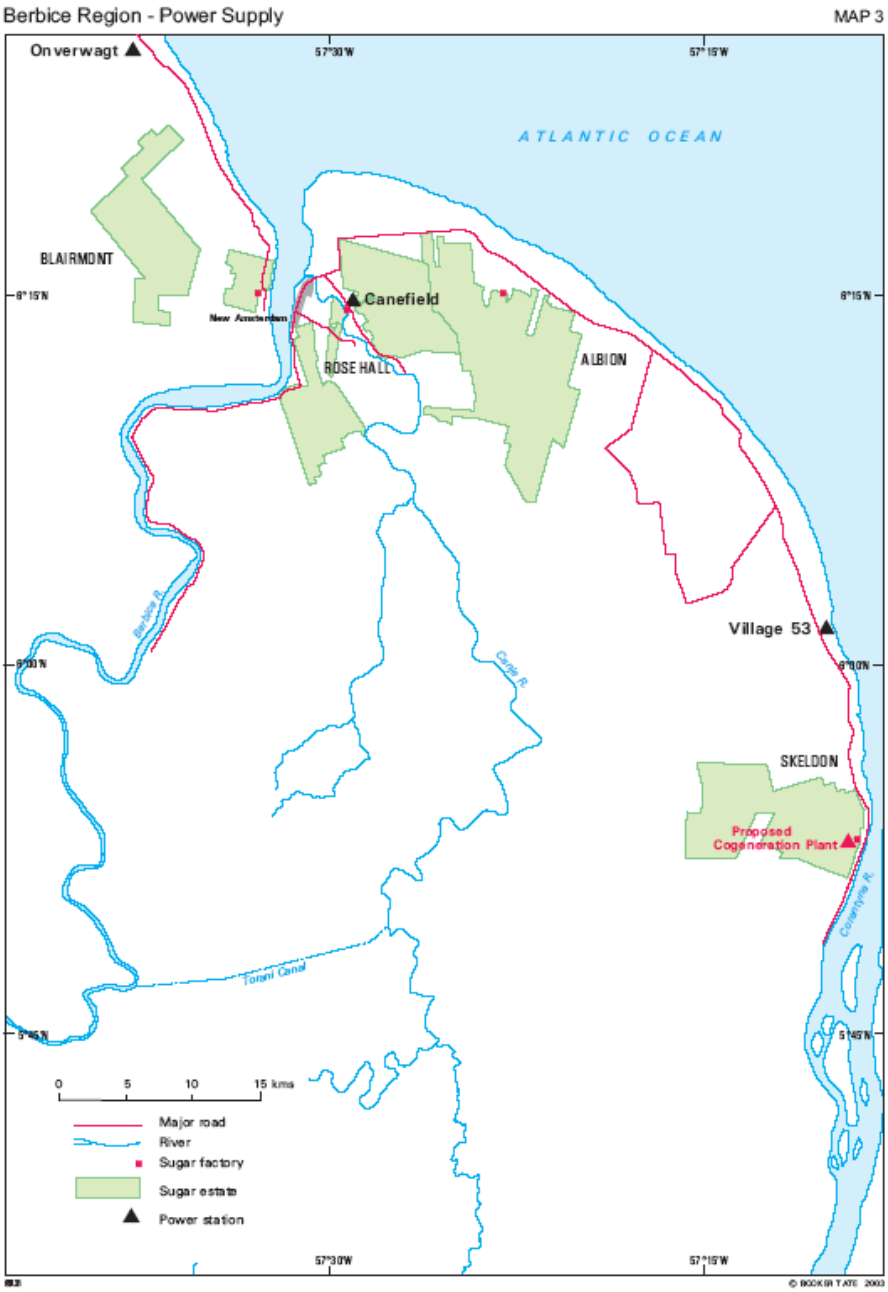
The increased processing capacity will entail the development of new cultivated areas. The corporation undertook an analysis of lands around its Skeldon facility and identified approximately 12,500 ha that could be added to its present cultivation. The analysis also identified an area of approximately 1,520 ha to serve as a mini-conservancy for the expanded estate.

Project Design and Location

The Skeldon Sugar Modernization Project is located in the Berbice County, at the eastern coastal extremity of Guyana, on the Corentyne River, bordering on Suriname in South America. The project cogeneration plant will be located adjacent to the new sugar factory. (The map shown below displays the key factory sections and the power station.) The Berbice region currently has 5,000 to 10,000 people without access to electricity. In addition to providing access for these consumers, the local commercial and industrial sectors will benefit from the more reliable power supply.

The Guyana Sugar Corporation (GuySuCo) will construct a new sugar factory and expand its cultivation at Skeldon Estate. The new factory will increase the estate sugar processing capacity from its current 90 tons to 350 tons of cane per hour. The feed to the new factory will be increased based on the addition of sugarcane from both expanded cultivation and from private cane farmers. GuySuCo itself will expand its cultivation by

the addition of approximately 4,700 ha to its existing hectarage. Private cane farmers will provide additional cultivated lands totaling approximately 4,500 ha. The private cane farming will be done by both cooperative land societies and by private land owners. The cooperatives societies are located primarily west and north of the current cultivation. The private land owners are located primarily in the Crabwood Creek/Moleson Creek area.



The Guyana Bagasse Cogeneration Project, consisting of a bagasse-powered cogeneration plant, will be added on to the new factory complex to allow the simultaneous production of electrical power for internal needs and for sale of excess power to the Berbice regional grid. This cogeneration plant will use bagasse from the sugar factory during the cane crop seasons, and will be equipped with diesel generating capacity for co-firing fuel oil during off-crop periods when bagasse stocks have been exhausted. The project's CHP thermal cycle will be based on the Rankine steam cycle.

The Rankine steam cycle is the predominant technology in all parts of the world today for generating megawatt (MW) levels of electricity from biomass. It consists of direct combustion of biomass in a boiler to raise steam, which is then expanded through a turbine. Such combined CHP, or cogeneration, systems provide greater levels of energy services per unit of biomass consumed than systems that generate power only.

The project activity will employ the Rankine steam cycle as the basic technology of its cogeneration system. Steam, at 5400 kPa and 485^0C, will be generated in two bagasse-fired boilers, each with a maximum continuous rating of 100 t/h. The generation of electrical power will utilise two turbo-alternators: a 15 MW backpressure unit (exhausting at 250 kPa a) and a 15 MW extraction-condensing unit (exhausting at 250 kPa a and 11 kPa a), with the latter for use in the off-crop seasons when the sugar factory cannot take the exhaust steam.

The cogeneration plant will have 15 MW of bagasse-based steam turbine capacity. In addition, it will also include 10 MW of diesel generation capacity: one 2.5 MW diesel set for black-start and standby capability; and one 5MW and one 2.5 MW diesel sets to dedicate to the grid for peaking purposes and for use during off-crop periods if the bagasse supply runs out. Diesel generation for these purposes will allow the cogeneration plant to supply power to the grid on a firm, year-round basis.

The cogeneration plant will be connected to the GPL transmission and distribution network at Village 53 by a 69 kV overhead line. The existing GPL substation at Village 53 will be upgraded[1] to integrate the new 69 kV supply from the plant's substation into the transmission network. From Village 53 the supply will be transmitted via an adequately rated transmission system to the load centres at New Amsterdam and Corriverton.

[1] This upgrade has been postponed due to financial considerations, and at the present time the existing substation's capacity is deemed sufficient to meet the first year's supply of power from the cogeneration plant.

ANNEX 2: DETAILED PROJECT DESCRIPTION

Guyana: Bagasse Cogeneration Project

Project Components

The aim of the Guyana Bagasse Cogeneration Project is to utilize in an efficient manner the bagasse by-product of the new Skeldon sugar factory in generating electricity for internal use as well as for sale to the national grid. The project will displace the use of light fuel oil in diesel engine driven generators operated by the GPL, the national utility, in the Berbice region. As the utility currently has insufficient capacity, there is extensive use of self-generation by industry and households. The project will also displace a significant amount of this unregulated and inefficient self-generation as confidence in reliable supply is progressively built over time.

(a) The cogeneration project will generate surplus electricity at an average of 10 MW, delivering approximately 77 GWh per year to the Berbice regional grid on a firm power, year-round basis. Of the 77 GWh to be exported to the grid annually, about 85 percent (65.45 GWh) will be generated directly from bagasse, with the balance from fuel oil during off-crop periods when bagasse stocks have been consumed. In addition to the export to the grid, 58.8 GWh per year will be produced for internal use at the new sugar mill.

GuySuCo is the Project Sponsor. Booker Tate Ltd., who is the Corporate Manager of GuySuCo, will be the Project Manager to implement the project (under a separate management agreement). Booker Tate has extensive experience in the biomass renewable resource energy sector and is able to draw upon its extensive experience of biomass production, harvesting, logistics, fuel-stock management, cogeneration energy production and alcohol production within the sugar sector.

Carbon Purchases. The World Bank as Trustee of the CDCF will purchase Certified Emission Reductions (CER) through 2012 and Verified Emission Reductions (VER) through 2014 for an approximate total value of US$5.32 million. $1.47 per tCO2e shall be used for Community Benefits pursuant to the Community Benefit Plan.

The CDCF is an additional source of finance, managed by the World Bank under the Clean Development Mechanism of the Kyoto Protocol, and has been determined to be the most appropriate source of finance for the purchase of carbon emissions reductions for the proposed project, given the potential community benefits (increased and more reliable access to electricity, job creation, etc.) that are expected to result from the proposed cogeneration facility.

ANNEX 3: ESTIMATED PROJECT COSTS

Guyana: Bagasse Cogeneration Project

N.A.

ANNEX 4: FINANCIAL ANALYSIS

Guyana: Bagasse Cogeneration Project

Feasibility study of the Guyana Bagasse Co-generation Project

In the initial design of the project, it was intended that the sugar factory would process bagasse through its boilers during the crop period, and in the off-crop period rely on heavy fuel oil to maintain electricity output to meet the 10 MW firm power grid supply obligations. However, it was later determined that the proposed plant exhibited two weaknesses in its design: (a) the use of heavy fuel oil to produce steam was not considered to be a very efficient method of electricity generation; and (b) the required "down time," of at least one month during the year, to clean and maintain the electricity plant would adversely affect GPL's need for continuous power.

Thus a revised feasibility study of the Skeldon cogeneration project was undertaken and completed in 2004 by Booker Tate, and was reviewed by the World Bank. The feasibility study analyzed four engineering designs of the cogeneration activity to determine which one would provide the highest returns:

- Scenario 1: The Base Case and the starting point for the feasibility study; boilers fuelled on heavy fuel oil during the off-crop period when bagasse stocks are exhausted.
- Scenario 2: The Base Case with ramped increases in power demand and cane availability.
- Scenario 3: Interrupted power supply during the off-crop period when bagasse stocks are exhausted.
- Scenario 4: Off-crop power provided from diesel generators when bagasse stocks are exhausted; some peaking power supply is also provided from this source.

The feasibility study demonstrated that Scenario 4 has the strongest financial performance and economic benefits. Scenario 4 will add an additional 5 MW of diesel capacity and eliminate the burning of fuel oil in the sugar mill boilers for electricity production.

On the assumption that the power sales contract under negotiation between the Skeldon mill/GuySuCo and GPL will reflect the fair value of the mill's power deliveries to the regional grid, the Booker Tate/GuySuCo analysis concludes that Scenario 4 (adding an additional 5 MW diesel capacity at an incremental investment of about US$ 5 million) is the most favorable investment option and results in an increase in the cogeneration project financial NPV from US$6.95 million in the base case to US$27.64 million in Scenario 4 (using a 10% discount rate for 20 years) and an increase in the FIRR from 13.5% in the base case to 18.7% in Scenario 4.

The above results were achieved with a weighted average of US$0.105 per kWh sales price with the peak rate over US$0.15 per kWh and the off-peak rate at about US$0.096 per kWh. At the time of the financial modeling by the project developer with a proprietary model, and by the CFU with its own financial analysis model, this pricing was viewed as optimistic and as a tactical negotiations starter. Both models produced similar results confirming the feasibility study conclusions. Sensitivity analysis was also conducted and the likely PPA negotiations outcome was considered as being within a +/- 10% variance band (the -10% the expected outcome). The current petroleum fuel market price and price trend now suggests that the initial price used for the modeling exercise was a conservative price, hence the financial viability of the CDM project is deemed as very sound.

This conclusion regarding the choice of Scenario 4 is justified and results from three additional beneficial effects compared to the other scenarios:

- The diesel generator is 1.5 to 2.0 times more efficient in converting fossil fuel to electricity than burning fuel oil in the sugar mill boilers when sugar cane bagasse is not available, resulting in a significant operational cost reduction.

- The incremental diesel investment provides greater capacity and operational flexibility to meet confirmed electricity demand in the grid area to be served by the mill, particularly during peak demand periods when power deliveries have maximum value.

- The diesels being procured by GuySuCo are more efficient than those operated by GPL on the Berbice grid, therefore some ER potential and economic benefit exists even when the Skeldon diesel generators are being operated.

The results of the sensitivity analysis of Scenario 4 are as follows:

Variable	%Change	pre-tax IRR	IRR Change	after Tax IRR	IRR Change
W/o carbon revenues		**18.7%**		**12.7%**	
kWh price	+10	20.7%	+2.0	14.6%	+1.9
	-10	16.5%	-2.2	10.7%	-2.0
Capital Cost	-10	20.3%	+1.6	14.3%	+1.6
	+4	18.1%	-0.6	12.2%	-0.5
Diesel Fuel Cost	+10	18.4%	-0.3	12.5%	-0.2
	-10	18.9%	+0.2	13.0%	+0.3
With Carbon Revenues		**19.0%**	**+0.3**	**13.2%**	**+0.5**

The overall conclusion to be made is that the project is most vulnerable to a change in the kWh price and that the increases in the petroleum fuel price will enable the negotiation of a higher kWh sales price that will more than offset the impact of the fuel price increase on the GuySuCo overall cost of production that is dominated by the bagasse-produced kWhs. The likelihood of a significant capital cost over-run is low with the Chinese turnkey package. The Carbon revenues can be viewed as a deal enhancer in this case providing some small leeway in PPA price negotiations and foreign exchange generation for debt payment purposes.

ANNEX 5: FINANCIAL SUMMARY

Guyana: Bagasse Cogeneration Project

N.A.

ANNEX 6: PROCUREMENT AND DISBURSEMENT ARRANGEMENTS

Guyana: Bagasse Cogeneration Project

[This annex is not required for CF projects as they do not follow Bank procurement and disbursement guidelines.]

ANNEX 7: PROJECT PROCESSING SCHEDULE

Guyana: Bagasse Cogeneration Project

Project Schedule	Planned	Actual
Time taken to prepare the project (months)		49
First Bank mission (identification)	January 2004	January 2004
Appraisal mission departure	December 2006	December 2006
Negotiations	June 2007	February 2008
Planned date of effectiveness	April 2008 (est)	

Bank staff who worked on the project included:

Name	Specialty
Task Team Members:	
Noreen Beg (ENVCF):	Task Team Leader
George C. Ledec (LCSEN)	Lead Ecologist
Chandra Shekhar Sinha	Deal Manager
Thomas Jeffrey Ramin (ENVCF)	Senior Social Dev. Specialist
Federica Matteoli (ENVCF)	Community Dev. Specialist
Robert Chronowski (Consultant)	Senior Technical Advisor
Adelaida Schwab (Consultant)	CDM Methodology Specialist
Almudena Mateos (Consultant)	EMP and RAP Review

ANNEX 8: DOCUMENTS IN THE PROJECT FILE

Guyana: Bagasse Cogeneration Plant

A. Project Implementation Plan

B. Bank Staff Assessments

C. Other

Guyana Bagasse Cogeneration Project PDD
Skeldon Sugar Modernization Project (SSMP) PIN
SSMP CFD
SSMP Letter of Approval
SSMP Risk Matrix
SSMP Cogeneration Feasibility Study
SSMP EIA
SSMP Term Sheet
SSMP Safeguards Team Comments
SSMP and Proposed Cogeneration Project ISDS
Minutes of Cattle Resettlement Consultations
Manarabisi Pasture Rehabilitation Costs
World Bank Carbon Finance Strategy Paper
Carbon Finance Business Operating Manual
Skeldon Landfill Site Selection Study
Halcrow Conservancy Agreement between GuySuCo and NDIB
Environmental Management Plan (includes the Pest Management Plan)
Rapid Biological Assessment of Halcrow and GuySuCo Conservancies
Resettlement Action Plan

ANNEX 9: STATEMENT OF LOANS AND CREDITS

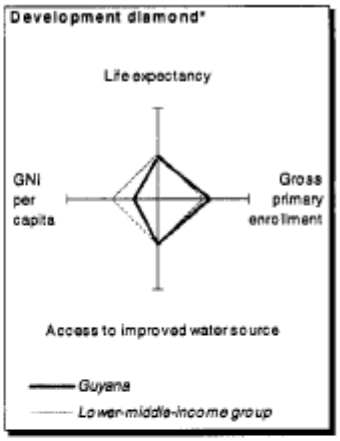
Guyana: Bagasse Cogeneration Project

N.A.

ANNEX 10: COUNTRY AT A GLANCE

Guyana: Bagasse Cogeneration project

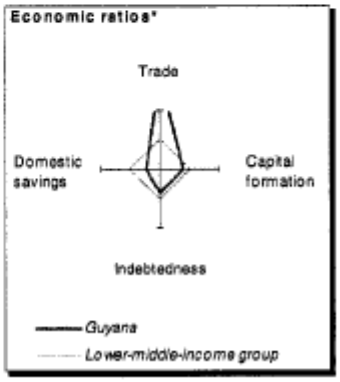
POVERTY and SOCIAL	Guyana	Latin America & Carib.	Lower-middle-income
2005			
Population, mid-year *(millions)*	0.75	551	2,475
GNI per capita *(Atlas method, US$)*	1,010	4,008	1,918
GNI *(Atlas method, US$ billions)*	0.76	2,210	4,747
Average annual growth, 1999-05			
Population *(%)*	0.2	1.4	1.0
Labor force *(%)*	1.1	2.2	1.4
Most recent estimate (latest year available, 1999-05)			
Poverty *(% of population below national poverty line)*	..	..	..
Urban population *(% of total population)*	28	77	50
Life expectancy at birth *(years)*	64	72	70
Infant mortality *(per 1,000 live births)*	48	27	33
Child malnutrition *(% of children under 5)*	14	7	12
Access to an improved water source *(% of population)*	83	91	82
Literacy *(% of population age 15+)*	..	90	89
Gross primary enrollment *(% of school-age population)*	129	119	114
Male	134	121	115
Female	125	117	113



KEY ECONOMIC RATIOS and LONG-TERM TRENDS

	1985	1995	2004	2005
GDP *(US$ billions)*	0.45	0.62	0.79	0.78
Gross capital formation/GDP	35.8	31.7	23.6	..
Exports of goods and services/GDP	48.1	101.2	95.8	..
Gross domestic savings/GDP	22.0	22.3	13.7	..
Gross national savings/GDP	..	15.4	20.0	..
Current account balance/GDP	-21.3	-14.4	-4.6	..
Interest payments/GDP	2.9	5.0	1.7	..
Total debt/GDP	335.3	340.4	169.4	..
Total debt service/exports	27.7	16.3	5.7	..
Present value of debt/GDP	..	..	64.6	..
Present value of debt/exports	..	..	59.2	..

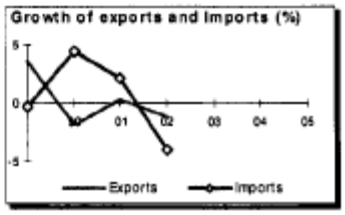
	1985-95	1995-05	2004	2005	2005-09
(average annual growth)					
GDP	2.1	1.2	1.6	-2.8	..
GDP per capita	2.4	0.9	1.4	-2.9	..
Exports of goods and services	8.4	0.5	..	..	..



STRUCTURE of the ECONOMY

	1985	1995	2004	2005
(% of GDP)				
Agriculture	26.8	41.2	31.3	..
Industry	24.6	32.6	27.0	..
Manufacturing	13.9	11.4	9.6	..
Services	48.5	26.1	41.7	..
Household final consumption expenditure	59.9	62.7	59.0	..
General gov't final consumption expenditure	18.1	15.0	27.2	..
Imports of goods and services	61.9	112.1	105.7	..

	1985-95	1995-05	2004	2005
(average annual growth)				
Agriculture	3.2	1.3	2.9	..
Industry	2.2	1.0	-0.2	..
Manufacturing	0.9	0.4	2.3	..
Services	1.3	2.1	1.9	..
Household final consumption expenditure	-0.9	3.5	..	..
General gov't final consumption expenditure	4.8	10.8	..	..
Gross capital formation	9.0	-4.9	..	..
Imports of goods and services	7.4	1.5	..	..



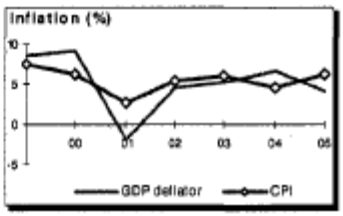
Note: 2005 data are preliminary estimates.

This table was produced from the Development Economics LDB database.

* The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

PRICES and GOVERNMENT FINANCE

	1985	1995	2004	2005
Domestic prices				
(% change)				
Consumer prices	..	12.2	4.7	6.3
Implicit GDP deflator	14.5	12.4	6.7	4.2
Government finance				
(% of GDP, includes current grants)				
Current revenue	40.0	35.1	39.6	..
Current budget balance	-36.6	10.0	7.4	..
Overall surplus/deficit	-54.4	-3.9	-0.7	..

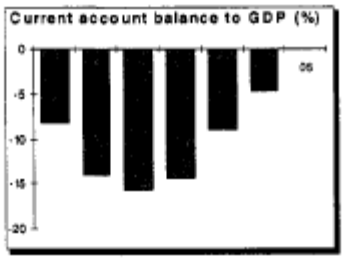


TRADE

	1985	1995	2004	2005
(US$ millions)				
Total exports (fob)	214	496	589	..
Rice	73	77	55	..
Sugar	66	126	137	..
Manufactures	21	106	..	..
Total imports (cif)	226	535	646	..
Food	5	44	..	..
Fuel and energy	..	90	169	..
Capital goods	66	188	136	..
Export price index *(2000=100)*	88	121	115	..
Import price index *(2000=100)*	..	98	122	..
Terms of trade *(2000=100)*	..	124	95	..

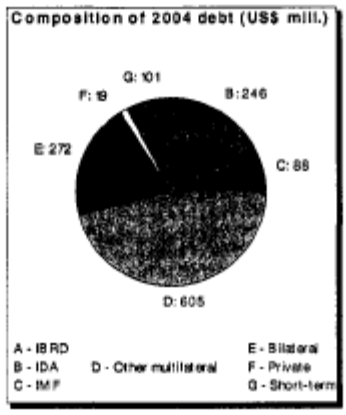
BALANCE of PAYMENTS

	1985	1995	2004	2005
(US$ millions)				
Exports of goods and services	262	629	753	..
Imports of goods and services	313	696	831	..
Resource balance	-51	-67	-77	..
Net income	-40	-54	43	..
Net current transfers	..	..	84	..
Current account balance	-97	-89	-36	..
Financing items (net)	..	87	..	..
Changes in net reserves	-	2	..	-
Memo:				
Reserves including gold *(US$ millions)*	..	269	225	..
Conversion rate *(DEC, local/US$)*	4.3	142.0	198.3	2016



EXTERNAL DEBT and RESOURCE FLOWS

	1985	1995	2004	2005
(US$ millions)				
Total debt outstanding and disbursed	1,521	2,116	1331	..
IBRD	65	35	0	0
IDA	27	203	246	226
Total debt service	73	109	49	..
IBRD	6	9	1	0
IDA	0	2	3	6
Composition of net resource flows				
Official grants	8	21	74	..
Official creditors	52	5	46	..
Private creditors	-5	-10	-1	..
Foreign direct investment (net inflows)	2	74	30	..
Portfolio equity (net inflows)	0	0	0	..
World Bank program				
Commitments	9	22	0	..
Disbursements	3	18	7	2
Principal repayments	2	7	2	4
Net flows	1	11	5	-2
Interest payments	4	5	2	2
Net transfers	-4	6	3	-4



Note: This table was produced from the Development Economics LDB database. 8/13/06

ANNEX 11: ENVIRONMENTAL ANALYSIS

Guyana: Bagasse Cogeneration project

Project Description:

The Guyana Bagasse Cogeneration Project consists of the addition of a more efficient co-generation plant to the ongoing Skeldon Sugar Modernization Project (SSMP), under which a modern, high-efficiency sugar factory is being built to manufacture Very High Pol (VHP) raw sugar. The Bagasse Cogeneration Project will generate electricity for internal use as well as for sale to the national electric utility, displacing the use of light fuel oil and heavy fuel oil in diesel engine-driven generators operated by the Guyana Power and Light Company (GPL). This cogeneration plant, to be added to the new sugar factory, will use bagasse from the sugar factory to generate an average of 10 MW of electricity. Under the SSMP project, the existing sugar cane area is being expanded to fully supply the increased capacity of the new sugar factory. The cane supply will come from the Skeldon Estate (to be expanded from 4,800 to 9,500 ha) and from holdings of private farmers (who are expected to expand their cane cultivation from about 300 to 4,165 ha). These private farmers will cultivate cane exclusively for sale to Guyana Sugar Corporation (GuySuCo).

Environmental Impacts:

The discussion below pertains largely to the SSMP, to which the proposed cogeneration project will be added on. The impacts of the proposed Bagasse Cogeneration Project itself are not considered significant. They will arise from activities (cane crushing, bagasse burning, and co-firing with fuel oil when bagasse supply runs out) that are already taking place in sugar mills in the region, except that in the case of the project activity it will be on a larger scale. As the Bagasse Cogeneration Project itself will (a) displace fossil fuel-based electricity generation by bagasse-based electrical power, and (b) avoid methane emissions by utilizing as fuel an extra 50,000 tonnes of bagasse which would otherwise be dumped and left to decay, it will result in a positive net environmental impact.

Land Clearing and Drainage. The most significant adverse environmental impact of the SSMP is the conversion of some 8,565 ha of land to sugar cane cultivation, with up to another 2,500 ha for replacement cattle pasture, for a total of about 10,600 ha of land to be cleared and/or drained. With respect to the land to be used for expanded cane cultivation, at least 3,000 ha of the GuySuCo-held land is generally intact freshwater swamp and natural forest; the 880 ha comprising Block 1 have already been entirely cleared and planted to cane; and the remaining GuySuCo and small farmer/cooperative land (comprising about 4,685 ha) is semi-natural savanna which has been drained in the past but is now covered with natural vegetation at different stages of succession. With respect to the land designated for replacement cattle pasture, about 2,630 ha is natural secondary forest (of which 75% would be cleared and the rest left standing) and 465 ha

are savanna and wetland areas (some of which would be drained to improve pasture quality). Although the lands to be cleared and drained harbor species of conservation interest such as Jaguars *(Panthera onca)*, they are not considered to be critical for the global (or national) survival of any species. Thus, the conversion of existing, non-critical natural habitats for expanded cane cultivation and replacement pasture will be significant, but (as explained below) adequately mitigated.

Water Availability. The project will entail recycling of water from the expanded cultivation and existing cultivated areas. The new Skeldon sugar cane fields will be more efficient in water use because the irrigation method will be changed from flood irrigation to overhead sprinklers; this will also reduce the risk of soil loss on freshly tilled land. In addition, the volume of water taken from the Canje River for the expanded cultivation will not increase with the expansion of cultivated area; hence, there will be no impact on flows in the Canje River attributable to irrigation water use.

Water Quality. Canals conveying drainage water pass through village communities and farmlands. Residents of nearby villages typically use drainage water for domestic, agriculture and recreational purposes. The quality of water will be impacted by drainage from the agricultural areas and by discharges from the new sugar factory. The nature of water quality change was documented for the existing cultivation, as influenced by the application of fertilizers, agrochemicals, and tillage practices. The quality of drainage water from expanded cultivation is expected to be similar to that observed for the existing cultivation, as the land preparation and management practices currently in use would be applied. According to the EIA report, analyses of surface water samples taken from the main drain for the existing estate indicate that water quality is acceptable based on FAO guidelines. Meanwhile, the quality of discharge water at the existing Skeldon factory has not been documented. However, the effluent from the existing factory is not treated whereas the design of the new factory would include an effluent treatment plant to significantly reduce biochemical oxygen demand (BOD), chemical oxygen demand (COD), and total suspended solids (TSS) levels before being discharged into the drainage canal.

Air Quality. The current practice of burning cane at pre-harvest would continue on the new Skeldon cane fields. As part of the EIA, analyses were performed to examine if minimum health standards would be exceeded in the populated areas in closest proximity to the cane area burned. In comparison to the United States Environmental Protection Agency Ambient Air Quality Standards, these analyses show that emission concentrations would all be within acceptable limits and the effects on the populated area will be negligible. A similar conclusion is reached with respect to bagasse firing to generate electrical power for operation of the new factory. The effects of bagasse firing on the populated area will be insignificant. The bagasse co-generation plant will lead to reduced particulate and NO_x emissions due to more efficient firing of bagasse. Emission concentrations from bagasse firing were estimated at 47.8 mg/m^3 for particulates and 40 mg/m^3 for NO_x and fall within acceptable World Bank standards (150 mg/m^3 for

particulates and 70 mg/m^3 for NO_x). Some dust pollution (as well as noise) is likely during project construction, but GuySuCo intends to implement measures to control these to acceptable levels.

Environmental Management Plan:

As ecological compensation for the loss of natural habitats through expanded cane cultivation and cattle pasture replacement, GuySuCo has agreed to the long-term conservation of 7,520 ha contained within the Halcrow (6,000 ha) and GuySuCo (1,520 ha) conservancies. These two conservancies comprise state-owned land under GuySuCo management; in the case of the Halcrow Conservancy, GuySuCo's management responsibilities are outlined in a long-term agreement signed between GuySuCo and the National Drainage and Irrigation Board (NDIB); a copy of this agreement has been placed in the Project Files . Both conservancies serve primarily as water storage areas for nearby sugar cane and other irrigated cultivation, and both comprise relatively natural ecosystems with a mosaic of open water, marsh, freshwater swamp, upland reef forest, and related wetland habitats. Under GuySuCo's management, the fundamentally natural character of the Halcrow and GuySuCo conservancies areas will remain, although there might be some change in the proportions of each habitat type due to (relatively slight) water level changes. To help ensure effective wildlife conservation at both conservancies, the EMP prohibits all hunting and wildlife capture, and restricts fishing to traditional, small-scale activities. GuySuCo will enforce these restrictions through (i) placement of signs in strategic locations at the conservancy edges; (ii) control of vehicle and pedestrian traffic along the limited access roads that pass through GuySuCo-managed lands; and (iii) the on-the-ground presence of at least 8 conservancy rangers. GuySuCo has been requested to provide information on the implementation stage of these measures prior to negotiation of the Emissions Reduction Purchase Agreement (ERPA).

GuySuCo has already carried out a Rapid Biological Assessment (RBA, copy has been placed in Project Files and InfoShop) to obtain baseline data on the animal and plant life of the two conservancies, which will be useful for future monitoring and management activities. The RBA also serves to increase awareness, within Guyana and internationally, of the biodiversity significance of these two conservancies.

The EMP (Appendix E, Bush Clearing Specifications for Contractors) provides the explicit environmental rules that will be incorporated within the bidding documents for clearing the remaining blocks of land needed for cane cultivation and pasture replacement. These rules require, *inter alia*, (i) proceeding in a direction (which would vary by block) that facilitates the exit of wild animals towards the remaining areas of natural habitat; (ii) placing temporary log bridges across canals to facilitate the exit of terrestrial wildlife; (iii) no hunting, wildlife capture, nor fishing by contractors and their employees; (iv) no contamination of the canals by solid or liquid wastes; and (v) no washing of machinery in the canals.

GuySuCo assumes the responsibility of ensuring that the new SSMP factory and the proposed cogeneration plant are efficiently managed and that conditions of the Guyana EPA Permit are complied with.

The EMP includes an annual budget for implementation, which will be adjusted as needed, should circumstances require it.

Environmental indicators will be monitored by the project sponsor (with involvement of the Guyana EPA) and reported to the Bank and the third-party verifiers**.** The third-party monitoring which will be responsible for emission reduction certifications will be charged with monitoring the implementation of environmental and social activities. In addition, the Bank will undertake supervision, specifically reporting on the various environmental and social aspects of each project activity.

These environmental monitoring and supervision arrangements for the Bagasse Cogeneration Project as well as the associated SSMP will be confirmed prior to signing of the Emission Reduction Purchase Agreement**.**

Compliance with World Bank Environmental Policies:

Environmental Assessment (OP 4.01). The Environmental Impact Assessment for the Skeldon Sugar Modernization Project (SSMP) (*Final Environmental Impact Assessment Report: Proposed Expansion to Skeldon Estate*, Ground Structures Engineering Consultants, March 2003), commissioned by GuySuCo, has been completed. The EIA also summarizes the stakeholder consultations that have been carried out on the SSMP project. A separate Environmental Management Plan (EMP) for the SSMP was completed in July 2005. The EMP was assessed by Bank specialists, who concluded that it was of good technical quality, operationally useful, and consistent with the Environmental Assessment OP 4.01. Both the EIA and the EMP reports have been disclosed to the InfoShop, as will be made available for public consultations Guyana at GuySuCo's Georgetown headquarters and its Skeldon office prior to negotiation of the Emissions Reductions Purchase Agreement (ERPA).

Natural Habitats (OP 4.04). As demonstrated by GuySuCo's maps of available lands for expanding sugar cane cultivation, **alternative sites** of lower environmental sensitivity are not available within an economic transport distance of the Skeldon factory. Similarly, the Manarabisi Pasture (which requires forest clearing and some drainage to be usable as replacement cattle pasture) was found to be the only technically and socially feasible site available for the approximately 7,000 head of cattle (belonging to farmers from Villages 67-74) that are to be displaced by expanding cane cultivation. Other potential replacement pasture lands would be too far away for these farmers to use without having to relocate themselves; these other lands would generally also require forest clearing and/or wetland drainage to become usable as pastures.

As noted in the EIA report, while the freshwater swamp, forest, and savanna lands to be converted for expanded cane cultivation and replacement pasture are rich in biodiversity, they do not qualify as Critical Natural Habitats (as per the Natural Habitats OP 4.04) or Critical Forests (as per the Forests OP 4.36), since (i) no species depend significantly upon these lands for their global or national survival and (ii) ecologically similar lands are still widespread on the coastal plain of Guyana.

GuySuCo intends to minimize the area of forest clearing required for the sugar cane expansion and replacement cattle pasture, consistent with the letter and spirit of OP 4.04. In the case of the pasture, while 75% of the existing Manarabisi Pasture forest is to be cleared, the remaining 25% will remain standing, largely to provide cattle shade. This remaining forest will be in the form of small forested islands surrounding relatively large trees; these islands may be interconnected as corridors to maximize their value to forest-based wildlife (where compatible with cattle movements). As with the sugar cane expansion, the forest clearing process for the Manarabisi Pasture would move in a direction that would facilitate wildlife escape to other remaining forested areas (in the Manarabisi case, from south to north). Existing pasture management at Manarabisi is environmentally fairly benign. There is no plowing, no deliberate seeding with non-native species, and little or no burning. The same practices are expected to be followed in the portion of Manarabisi Pasture that will be cleared to accommodate the relocated cattle. The expected stocking density there of just under 3 cows/ha is considered sustainable, and consistent with the rest of Manarabisi Pasture (and the Guyanese coastal plain in general).

As noted above, GuySuCo will manage both the 6,000 ha Halcrow Conservancy and 1,520 ha GuySuCo Conservancy with biodiversity conservation as an objective.
When adjusted for natural habitat quality, the 7,520 ha within these two conservancies are considered to be of greater conservation value overall than the 10,600 ha to be converted for expanded cane cultivation and replacement cattle pasture**.** This is because nearly half of the lands to be converted have been previously drained (not in anticipation of the SSMP or CDM projects) and thus fundamentally altered from an ecological standpoint. Also, while the Manarabisi Pasture forest (to be 75% cleared) is already mostly isolated from other forest blocks, the Halcrow Conservancy is contiguous with a larger area of existing forest and natural wetland habitats to the west.

Forests (OP 4.36). The wetland habitats within the protected Halcrow and GuySuCo conservancies, as well as the area to be cleared for expanded cane cultivation, include natural forests (both in the swamps and the upland reef forest stands). Thus, all of the above comments on compliance with the Natural Habitats OP/BP 4.04 apply as well to the Forests OP/BP 4.36. The Guyana Forestry Commission recently surveyed the areas to be cleared for sugar cane expansion and replacement cattle pasture, and found the number of trees of commercial value to be negligible. It should also be noted that there is presently neither logging nor other wood extraction from the Halcrow and GuySuCo conservancies, nor will GuySuCo allow any to take place under the EMP.

Pest Management (OP 4.09). GuySuCo's current pest management practices are consistent with the Bank's Pest Management Policy. The project's Pest Management Plan (PMP) is composed of Appendices B (Health and Safety Program), C (Agrochemical Policy), and D (Integrated Pest Management System) of the Environmental Management Plan (EMP). The PMP emphasizes integrated pest management, careful selection of compounds, and safe pesticide use and storage. This is important on account of possible impacts of pesticide application on workers' safety as well as potential effects of agrochemical run-off on plants and animals. In addition to following the PMP in its own cane cultivation, GuySuCo provides free technical assistance in pest management to the adjacent small farmers who are, or will be, producing cane for the new Skeldon factory.

Physical Cultural Resources (OP 4.11). The EIA included a cultural heritage assessment that concluded that no significant historic or prehistoric resources are likely to be found within the proposed expansion area for cane cultivation. Nonetheless, the possibility cannot be ruled out of discovering some items of archaeological interest in the course of land clearing for cane cultivation or pasture expansion. Accordingly, GuySuCo's technical specifications for land clearing and canal excavation routinely include the requirement for contractors to report any items of archaeological interest to the Project Manager on duty.

Compliance with Environmental Agency--EIA report approval by Environmental Agency, if required (status and date): The Skeldon project's Environmental Impact Assessment has been completed and the Guyana Environmental Protection Agency (EPA) has issued a permit (Permit No. 19990204-GSEPO dated 15 July 2003) allowing GuySuCo to proceed with the SSMP. The EIA took into consideration a cogeneration facility to be integrated with the SSMP. In compliance with this EPA permit, it was expected that GuySuCo would establish a sanitary landfill for wastes generated by construction and operation of the Skeldon facilities. GuySuCo has been requested to provide information on the stage of development of the sanitary landfill prior to negotiation of the Emissions Reduction Purchase Agreement (ERPA). GuySuCo's landfill site selection study (copy in project files) has been reviewed and found acceptable by World Bank environmental specialists.

ANNEX 12: SOCIAL ANALYSIS

Guyana: Bagasse Cogeneration Project

The Bagasse Cogeneration Project will be integrated with the Skeldon Sugar Modernization Project (SSMP), which involves the construction of a new modern sugar factory to manufacture very high pol (VHP) sugar, and will generate electrical power from bagasse for internal use and for sale to the national grid. The SSMP includes a major agricultural expansion of the existing cane cultivation at the Skeldon Estate as well as in the cane cultivation on lands owned or held by private farmers and cooperatives.

In late 2004, the project sponsor (GuySuCo) held consultations on the Environmental Impact Assessment (EIA) with local business groups, private farmers and cooperatives, union representatives and government authorities. GuySuCo has a record of the outcome of the public consultations. The EIA and EMP are available locally for public review.

Bank missions to Guyana were carried out in April and December 2006 to complete the Community Benefits Plan (CBP) required prior to ERPA signature. During Bank Team discussions with GuySuCo, the following direct and indirect community benefits were identified. The incremental payment of $1.47 per tCO_2e will be paid for the implementation of activities that provide the indirect benefits described in Item (4) and elaborated on in Annex 17.

1. Improved electrical service to the Berbice Region resulting from supply of 10 MW of electricity produced by GuySuCo to the national grid. This will be measured in terms of the amount of power actually provided to the grid by GuySuCo, the number of outages during a specified period, and the annual number of new GPL customers in the region.
2. The number of new sugar industry jobs created as a result of the project, both by GuySuCo and by private farmers and cooperative societies (who will cultivate about 4000 hectares). This will be measured in terms of types of new jobs created each year. It is expected that all labor will be hired locally.
3. The number of stakeholder mechanisms created to facilitate coordination and collaboration between GuySuCo, local government, the unions, and the community during the project. This will likely be measured in terms of structures established, meetings held and decisions taken.
4. GuySuCo will also allocate part of the carbon revenues to undertake social services in the community: Support to the local hospital and various improvements to the company's community center, as well a grass cutter to undertake urban landscaping in public community areas - school playgrounds, religious centers, and parks. (This grass cutter will be maintained by GuySuCo who will manage the lending schedule at no cost). (Please see Annex 17 for the list of proposed activities.) CDCF will pay an additional amount per contracted ER ($1.47 per tCO_2e) to finance additional benefits as part of the project's proposed Community Benefits Plan.

Both direct and indirect benefits will be measured by the Verifier of the CDM project, under the supervision and guidance of Bank staff.

During project preparation, it was confirmed that no indigenous communities reside or use the land within the area of influence of the Bagasse Cogeneration Project, nor the area to be cultivated or otherwise affected under the SSMP. Thus, the Bank's Indigenous Peoples OP 4.10 is not triggered.

Compliance with the Bank's Involuntary Resettlement Policy (OP 4.12). While there is no involuntary resettlement of people in this project, there is a need to relocate the cattle that previously had grazed on Block 2 of the Skeldon Sugar Estate. The Cattle Farmers Association for Villages 67-74 has, for many years, enjoyed customary use of Block 2 with GuySuCo's permission to graze their cattle. However, Block 2 has recently been planted with sugar cane as part of the SSMP expansion (since it is contiguous with the other areas of expanded cane cultivation) which means that the farmers are no longer able to graze their cattle there. Recognizing this, GuySuCo in 2003 offered the farmers access to a section of Block 10 west of the GuySuCo Conservancy, but this offer was rejected by the Association because of the distance from the farmers' homes and the resulting difficulty in providing adequate security against cattle theft. Since then, various attempts have been made by the Association and by GuySuCo to resolve the problem.

In September 2006, a Select Committee was established to examine the issue of replacement cattle pasture for the cattle farmers from Villages 67-74. The issue has now reached resolution as the Cattle Farmers Association agreed on September 2007 to relocate to the western half area of the Manaribisi pasture (known as Sookram's pasture), which will be shared with the cattle farmers of villages 52-66, who are the current users. The Manarabisi Pasture is an area of 7,440 ha, currently being utilized by the cattle farmers of Villages 52 – 66, who have agreed to share this land. (Villages 52 – 66 do have formal title to their grazing lands). The reason for their willingness to share is that they have been guaranteed continued use of the drained portions of the pasture. The additional rehabilitation work planned for the pasture will further increase the safety and welfare of their cattle, and once drained, the land will be sufficient for all.

The Government (Ministry of Agriculture) and GuySuCo have agreed to share the cost of undertaking infrastructure work at Manarabisi pasture, to allow all 80 -100 farmers from Villages 67-74 (with their approximately 7,000 head of cattle) to move there in 2008. These works include:

- Clearing some 2,034 ha currently under secondary forest cover.
- Construction of drainage and navigation canals and empoldering. Primary drainage works will be rehabilitated/upgraded to adequately deal with the additional cleared area and secondary drainage works (internal canals and drains) will be installed to facilitate drainage during the rainy season and to hold drinking water for cattle during the dry season.
- Fencing of the perimeter (currently about 30% is presently fenced).

The total cost of the above works has been estimated at G$268.6 million (US$1.41 million) and will be shared between the Government and GuySuCo. The participating cattle farmers will, in turn, contribute to construction of fencing, access roads, and local bridges. Some forest clearance, excavation of drains, and fence erection has already been completed. An agreement will also be negotiated with the Water Users' Association with regard to the use of access dams and waterways by both rice and cattle farmers in the area.

The Resettlement Action Plan (RAP) is provided separately as Annex 13; it is also available for public review within Guyana and has been disclosed in the Bank's InfoShop in Washington. As part of project supervision, the Bank will conduct a survey to determine that the farmers' livelihoods have not been adversely affected by the relocation of their cattle.

The Involuntary Resettlement OP 4.12 is also triggered in those projects that involve the restriction of access to natural resource use within legally designated protected areas in a manner that can adversely affect the livelihoods of economically vulnerable local people (even when no physical resettlement is involved). Although the 6,000 ha Halcrow Conservancy and 1,520 ha GuySuCo Conservancy are not formally a part of Guyana's national protected areas system, GuySuCo will (as part of the Environmental Management Plan, EMP) manage them as *de facto* protected areas (consistent with their primary water storage function) to (i) maintain the considerable biodiversity within their wetland (open water, marsh, and swamp) and upland forest ecosystems and (ii) compensate for the natural habitat loss resulting from sugar cane expansion and cattle pasture replacement (in compliance with the Natural Habitats OP 4.04 and Forests OP 4.36). In the case of these two conservancies, the Involuntary Resettlement Policy is not triggered, because GuySuCo's planned management practices would not constrain the very limited ongoing natural resource uses that materially involve local livelihoods. In particular:

- **Fishing.** According to knowledgeable GuySuCo staff, some small-scale fishing by local people takes place within the wetland areas encompassing both conservancies. Consistent with the EMP, GuySuCo would allow this small-scale fishing to continue, by issuing permits to local people that will allow them access to the conservancies. Although GuySuCo intends to prohibit fishing by GuySuCo employees and contractors, these people are not dependent on fishing for their livelihoods. No large-scale commercial fishing or aquaculture currently exist at either conservancy, and GuySuCo's conservation-oriented management practices would keep it that way.

- **Hunting.** Although (as noted in the Rapid Biodiversity Assessment) some hunting (particularly of mammals, such as Red Brocket Deer) takes place on the land that will be part of the Halcrow and GuySuCo conservancies, this activity is not an important element of local livelihoods. GuySuCo staff confirmed that the limited hunting that now takes place on conservancy lands is primarily a (presently uncontrolled) recreational activity by relatively well-off segments of the local population, particularly since access to the preferred hunting areas is relatively difficult and costly

(in terms of boat fuel). Thus, GuySuCo's prohibition of hunting within the conservancies is not expected to adversely affect local livelihoods.

- **Other Uses.** Other natural resource uses, such as logging and mining, do not now occur within the Halcrow and GuySuCo conservancy areas.

ANNEX 13: RESETTLEMENT ACTION PLAN

Guyana Bagasse Cogeneration Project
(January 2008)

INTRODUCTION

This Resettlement Action Plan has been prepared for the Guyana Bagasse Cogeneration project (through its affiliation with the Skeldon Sugar Modernization Project) to meet international standards and specifically, the terms of the World Bank OP 4.12 on Involuntary Resettlement, the policy followed by most international financial institutions. Among its requirements, this policy stipulates that any person or group of persons that has enjoyed formal or customary access to land for economic gain should be compensated for losing access to this land caused by any project with which the World Bank is involved. The specific requirement of the policy is that a Resettlement Action Plan (RAP) be prepared and agreed to by all the stakeholders involved. The RAP will spell out how the persons or groups losing access to land will be compensated. This compensation can take various forms including access to other comparable land, including preparation of that land so that it is suitable for the intended purpose(s), or it may involve a one-time payment that is agreed to by both sides. The guiding principle of the policy is that no individual or group should suffer economic loss as a result of the project and, to the extent possible, that conditions for all those involved, including those losing access to land, should be improved.

In the case of the Skeldon Sugar Modernization Project (SSMP), this policy applies with regard to the Cattle Farmers' Association for Villages 67-74 who previously had access to Block 2 of the Skeldon Sugar Estate to graze their cattle – a right accorded them by the Guyana Sugar Corporation (GuySuCo) as the Cattle Farmers do not have formal title to the land.

HISTORICAL BACKGROUND

From 1949, when a canal was built bringing water to this area, rice cultivation was the primary activity on the land, although cattle farming also took place (with the animals providing tillage for the rice). In the 1970s GuySuCo (which had been granted tenure to the land) cultivated rice, corn, pumpkins and beans on the land in co-existence with the farmers. In 1992, Mr. R. D. Panday, at the time President of the Cattle Farmers Association for Villages 67 -74, met the President of Guyana and the Minister of Agriculture seeking formal tenure for the cattle farmers who had been in Villages 67 -74 for forty years. (According to Mr. Panday the Cattle Farmers Association paid 3 cents an acre to the Government in 1949 for the land, but no records exist of this transaction).

Although in 1994 the Government considered the option of requiring GuySuCo to relinquish some land to the farmers, due to the cane field expansion plan required under the SSMP, it no longer became possible for the farmers to remain in Block 2 as this is an integral area for cane field expansion and contiguous to other areas of increased

cultivation. Block 2 has now been cleared for sugar cultivation which means the Cattle Farmers' Association is no longer able to freely graze their cattle there, and they have now been relocated to other Blocks.

Nevertheless, there have been numerous incidents of the fences bordering Block 2 being cut, and cattle being allowed to graze among the cane. This problem continued despite there being 35 guards posted in Block 2 (20 at night, and 15 in the day). After many warnings, GuySuCo finally took the step of impounding 150 heads of cattle. The fine after impoundment is G$1000 per head, of which GuySuCo will refund G$500 to the farmers, as their objective is not to penalize the cattle farmers unduly. The destruction to the cane fields, the constant need to repair fencing, and the need to retain a significant security presence provided an incentive for GuySuCo to find a lasting and equitable solution to the grazing rights issue as soon as possible.

Recognizing this, in 2002 GuySuCo did offer the farmers access to a section of Block 10+ west of the GuySuCo Conservancy, but this offer was rejected by the Farmers' Association which said that the area is too far from their homes and made it difficult to provide adequate security against theft of their cattle. Mr. Panday also states that in this area there are jaguars and other wildlife which is a threat to the cattle, the water in some areas is 3 feet high, and there is no resting ground for the cattle. Since this offer was refused in 2003, various attempts have been made by the Association and by GuySuCo to resolve the problem. Meanwhile, the cattle farmers have been given temporary grazing rights in other Blocks. In September 2006, a Select Committee was established to examine the issue of the relocation of the cattle farmers from Villages 67 - 74.

AGREEMENT

The resettlement issue has now been resolved as an alternate grazing location has been identified that has been deemed satisfactory to the majority of the Villages 67-74 Cattle Farmers' Association. [2] This area is the 18,600 acre Manarabisi pasture, currently being utilized by the cattle farmers of Villages 52 – 66 [Nos. 52-66 Cattle Producers' Association], who have agreed to share this land. (Villages 52 – 66 do have formal title to their grazing lands). The reason for their willingness to share is that they have been guaranteed continued use of the drained portions of Manarabisi pasture (which comprises the 7600 acre Sookram's pasture and the 11000 acre Whittaker pasture). The additional rehabilitation work planned for the pasture will only increase the safety and welfare of their cattle, and once drained, the land is sufficient for all.

The works within the Manarabisi Pasture are directed by a committee comprising representatives of GuySuCo, Ministry of Agriculture (MoA) and the two farmers' associations. GuySuCo is operating the equipment while the MoA and the associations agree the priorities for the works and are responsible for accepting the works. The

[2]The exception is one absentee cattle farmer who resides in Canada, and who remains opposed to the manner of distribution of land at the proposed site, per Mr. Nicholas Waldron, Chairman for the NDPP, Ministry of Agriculture. He believes the pre-existing drained area should be shared among the new arrivals from Villages 67-74, and does not wish to wait for the new areas to be drained.

agreement between GuySuCo and the Government regarding financing and cost sharing is stipulated in a Memorandum of Understanding (MOU) signed on 3rd September 2007, between Guyana Sugar Corporation, Nos. 67-74 Cattle Farmers' Association, and Nos. 52 -66 Cattle Producers' Association. A copy of this MOU is in the Project Files.

These works include:

- Clearing the approximately 3500 acres of land currently under bush cover in Sookram's Pasture (logging of these secondary growth forests to be undertaken with the supervision of the Forestry Commission).
- The construction of drainage and navigation canals and empoldering (Primary drainage will be rehabilitated/upgraded) to adequately deal with additional cleared acreage; and secondary drainage -- internal canals and drains – will be installed to facilitate drainage during the rainy season and to hold drinking water for cattle during the dry season.
- Construction of access roads to the land.
- Fencing of the perimeter (currently about 30% is fenced).[3].

The total cost of the above works has been estimated at G$ 268.6 million/ US$1.41 million and will be shared between the Government, GuySuCo, and the Cattle Associations. The Government will provide G$82 million to purchase two excavators and one D6 bulldozer to assist the Associations to rehabilitate the land within the pasture. GuySuCo will contribute G$50 million towards the operating costs associated with empoldering, drainage, and bush clearing, while the remainder of the operating costs shall be borne by the Nos. 67-74 Association. GuySuCo shall commence the empoldering, drainage, and bush clearing work upon provision of the funds from the Government to purchase the equipment. However, some bush clearance, excavation of drains, and fence erection has already been completed.

An agreement will be negotiated with the Water Users Association with regard to the use of access dams and waterways used by both rice and cattle farmers in the area.

The Nos. 67-74 Association shall relocate the cattle to Sookram's Pasture within three months of completion of the abovementioned works.

RESPONSIBLE INSTITUTIONS AND STAKEHOLDERS

The following persons have all attended meetings and been involved in the resolution of the grazing rights issue at Skeldon Estate. Persons interviewed for this RAP have been marked with an asterisk.

[3] It is agreed that construction of access roads to the cattle pasture and erection of fences around the pasture shall be the responsibility of the farmers' associations.

Ministry of Agriculture:

Robert Persaud	Minister of Agriculture
Dindyal Permaul	Permanent Secretary*
Nicholas Waldron	Head of National Dairy Development Programme (NDDP), Ministry of Agriculture*
M. Sampat	Area Representative, NDDP

Guyana Sugar Corporation Ltd (Guysuco):

Ronald Alli	Chairman
Nick Jackson	Chief Executive Officer*
Hubert Rodney	Member of Guysuco Board
Dindyal Permaul	Member of Guysuco Board
Mickey Persaud	General Manager, Skeldon Estate*
Peter Longley	Agriculture Manager, Skeldon Sugar Modernization Project*
Jaleel Ahmed	Cane Farming Liaison Manager, Skeldon Estate*

Guyana Lands and Survey Commission:

Trevor John	Representative, Region 6

Water Users Association

Mr. Panday*

Forestry Commission

No 52 – 66 Cattle Farmers Association:

Ramesh Bisnauth	President
D. Chaitram	Representative

No 67 -74 Cattle Farmers Association:

Neville Budhan	President
R. D. Panday	Representative (past President)*
R. Makhanlall	Representative
Inderjit Nandlall	Representative
C. Persaud	Representative

Table 1 Government's Administrative Responsibilities

Ministries and Departments	Responsibilities
Ministry of Agriculture	• Responsible for obtaining feedback on agricultural workers (in this case cattle farmers' associations) and negotiating an equitable solution to grazing rights issues within the country's economic priorities[4] • Also partly responsible for encouraging sugar cane farming in Guyana, in this case supporting GuySuCo's need for expansion of cane fields • The chosen facilitator is Dr Nicholas Waldron, Head of the National Dairy Development Programme
Guyana Lands and Survey Commission	Responsible for assessing the ownership and allocation of lands, and the zoning of lands for agricultural, industrial, commercial, and residential use. Settlement of land tenure for all farmers[5]
National Drainage and Irrigation Board	Responsible for clearing and drainage of bush to make it suitable for cattle grazing in Manarabisi pasture, currently used by Villages 52 – 66 for grazing cattle.
Forestry Commission	Ensures that sustainable logging practices are followed

[4] Dr Permaul, the Permanent Secretary, has explained that Guyana is considering an agricultural diversification plan, an element of which is to expand its cattle farming in order to export beef products to the Caribbean islands. This provides another incentive to resolve grazing rights issues such as the one at the Skeldon Sugar Estate – most agricultural production and cattle farming take place within 20 miles of the coast, and as a result there are frequent land disputes between the two groups.

[5] The government plans to set up a semi-autonomous body to act as a clearing-house for land tenure rights disputes.

PROJECT POLICY FRAMEWORK

Project Affected Areas

Table 2.1 Affected Land Plots by Sections - Number of affected farmers

Sections	Number of farmers	Heads of Cattle	Value of cattle
Villages 67 -74	80-100	7,000 in 1995 (ranging from 10 – 300 per farmer) There are less cattle now, but no formal census has been undertaken	G$70-80,000 per head (US$ 368 – 421 per head approx.)

Source: Interviews with GuySuCo, Cattle Farmers' Association, NDDP, Ministry of Agriculture

Table 2.2 Area of affected land under pasture

Sections	Area of all land plots under pasture
Block 2 (now vacated)	700 acres approx.
Manarabisi Pasture	17,000 acres, split between Sookram's pasture (6,000 acres) and Whittaker's pasture (11,000 acres)

Source: Map of Skeldon Area and Surrounds, Conceptual layout for new cane fields 26 April 2002; Map in cost estimate for infrastructure in Manarabisi Pasture

Social analysis of alternatives

In 2002 GuySuCo offered the farmers access to a section of Block 10 west of the Halcrow Conservancy, but this offer was rejected by the Farmers' Association which said that the area is too far from their homes and made it difficult to provide adequate security against theft of their cattle. Mr. Panday, former President of the Cattle Farmers Association, also states that in this area there are jaguars and other wildlife that are threatening to cattle, the water in some areas is 3 feet high, and there is no resting ground for the cattle.

Since this offer was refused in 2003, various attempts have been made by the Association and by Guysuco to resolve the problem. The Cattle Farmers Association also in January 2006 requested relocation to Blocks 3 and 4, which are also earmarked under the cane field expansion plan.

At present, the cattle farmers have been given temporary grazing rights in other Blocks.

Given the shortage of suitable land, and the Government's having made the increased sugar cane production (also leading to increased bagasse for much needed electricity generation) a national priority, the current proposal to resettle the farmers in Manarabisi Pasture, with the concurrence of the cattle farmers currently grazing their cattle there, seems to be the most equitable solution. The Chairman of the Select Committee, Nicholas Waldron, is trusted by all stakeholders (confirmed in interviews with stakeholders), and the Government and Guysuco, through the provision of cash resources and construction equipment and manpower, has shown willingness to understand and resolve the farmers' concerns.

LAND ACQUISITION PROCEDURES AND IMPLEMENTING RESPONSIBILITIES

Principles of land and asset acquisition

The project affected populations (PAPs) should be assisted insofar as possible to retain their livelihoods to a level at least equal to pre-project levels. Specific principles that apply include:

- Develop fair and transparent procedures to determine compensation or substitution of land, or protection of livestock on new grazing area. (This principle has been adopted).

- Keep affected people and communities fully informed about the project, the process that will be followed to determine compensation, and their related rights and avenues for redress. The minutes to the meetings are summarized below (detailed minutes of meetings are available in Project Files):

- The strategy of merging the No. 67 - 74 Association with the No. 52 - 66 Association was promoted by the Minister of Agriculture at a meeting held 22 September 2006 attended by representatives of the two associations, GuySuCo, National Dairy Development Programme (NDLP), and Guyana Land Survey Commission (GLSC).

- A follow-up meeting was held 28 September 2006 chaired by Dr Nicholas Waldron of NDDP and attended by the two associations, GuySuCo, GLSC and Region 6.

- Meeting 12 October 2006 and site visit 19 October 2006. The site visit was facilitated by GuySuCo and attended by GuySuCo and the two associations. It was agreed at the site meeting that GuySuCo would produce a cost estimate to clear, drain, and fence additional area within the Cattle Pasture.(See attached estimates).

- Meeting 15 November 2006. A cost estimate of G$239.5 million to clear, drain, and fence additional area between Whittaker Cross and Sookram's Cross of the Cattle Pasture for allocation to the No. 67 - 74 Association was presented. A cost estimate of G$29.1 million to rehabilitate the area between the Fowler Canal and the Whittaker Cross for the No. 52 - 66 Association was presented. Both associations accepted the estimates. Further refinement of estimates and formal documentation was requested.

- Jan 2007. GuySuCo was requested by NDDP to assist with a survey of trees suitable for logging within the Cattle Pasture. It did an initial survey 05 and 09 January in Block 4 which indicated suitable trees. This information was passed to NDDP and GuySuCo participated in a survey of the forested area of the Cattle Pasture 11 January, together with NDDP and Forestry Commission representatives.

- 4 May 2007. Meeting held with the H.E. The President of Guyana, Bharat Jagdeo, The Minister of Agriculture, The Hon. Robert Persaud, representatives of GuySuCo and the Cattle Farmers' Associations that the Government of Guyana shall provide GuySuCo with G$ 82 million to purchase two excavators and one D6 bulldozer to assist the Associations to rehabilitate the land within the Pasture.

- 3 September 2007. MOU signed (as detailed above).

- Develop a fair and accessible grievance redress mechanism.

- The Project Affected People (PAP) will receive support from the Govt of Guyana and GuySuCo through the rehabilitation and upgrade of Manarabisi Pasture.

- PAP have been notified of the project implementation schedule and consulted regarding the principles of land acquisition and loss of/ damage to assets.

- The Resettlement Action Plan (RAP) continues to be revised as per this document and Bank OP 4.12 as well as Guyanese legislation as appropriate.

ANNEX 14: MAJOR RELATED PROJECTS FINANCED BY THE BANK

Guyana: Bagasse Cogeneration project

Numerous World Bank Carbon Finance projects in the LAC Region are currently under preparation and/or implementation. The most utilized technologies in these projects are landfill gas, hydro and wind power, although cogeneration, biomass, and geothermal projects are also represented.

The first CF project in LAC to reach the stage of a negotiated Emissions Reductions Purchase Agreement (ERPA) is the **Chacabuquito Hydropower** project in **Chile**. Chacabuquito is a 25 MW run-of-river hydro power plant. It will generate 175 GWh to replace coal/gas energy that would otherwise produce greenhouse gas emissions. The project entails the largest purchase of CERs for the NCDCF so far with $6.7 million over the next 14 years.

Construction started in July 2001; PAD was approved in November 2001 and the plant was commissioned in May 2002. In June 2003 it was the first CDM project in history receiving its first ER payment.

Additional recent projects are shown below:

Project Name	ID	Product Line	Country	Status	Approved
Brazil Alta Mogiana Bagasse Cogeneration Project	P081023	Carbon Offset	Brazil	Active	24 June 2005
Brazil Lages Wood Waste Cogeneration Facility	P091407	Carbon Offset	Brazil	Active	19 Sept 2005
CTSAV Bagasse – Fuelled Cogeneration Project	P103467	Carbon Offset	Mauritius	PDD under review	
Kakira Sugar Works Cogeneration Project	P098743	Carbon Offset	Uganda	PDD under review	

ANNEX 15: MONITORING AND EVALUATION OF RESULTS/OUTCOMES

Guyana: Bagasse Cogeneration Project

A carbon finance project is initially evaluated on the basis of an ex-ante analysis of the emissions baseline (conventional generation and emissions that would have occurred in the absence of the project) and determination of project additionality. Project performance – (including payment for ERs) – is then monitored as per a Monitoring Plan (MP) annexed to the ERPA and evaluated on the basis of achieving the expected ERs. Monitoring and evaluation of ERs is implicit in the project as a function of electricity generation as it occurs, with payment based on megawatt hours of generation as invoiced to the customer purchasing the electricity.

To increase the likelihood that ERs acquired through ERPAs will satisfy the requirements of the UNFCCC and the KP, the CDCF retained the services of internationally-recognized, fully independent third party to: a) provide Validation of the sector-wide baseline; b) provide Validation of the project design, project specific Baseline Study (test of additionality against the sector-wide baseline), and MP. The validator then has presented the Project Design Document or PDD (see the project files for the cogeneration project's PDD, along with a description of the methodology chosen to measure the ERs and to demonstrate additionality) to the Executive Board of CDM, for its approval and registry under international rules.

An independent third party will also undertake periodic verification and certification of the ERs generated by the project and issue a Verification and Certification Report that includes:

- a statement of the amount of verified and certified ERs the project has generated in the relevant period,
- other matters as may be required by the UNFCCC or KP, and
- verification of compliance with Bank's Safeguard Policies.

The project is reviewed by the Bank during the project's construction phase to address areas of possible implementation weaknesses, especially concerning the Environmental Management Plan and social mitigation measures, to accommodate changes in priorities, and to ensure compliance with relevant policies and procedures.

ANNEX 16: COUNTRY AND SECTOR OR PROGRAM BACKGROUND

Guyana: Bagasse Cogeneration Project

Power Sector Background: The principal sources of energy in Guyana are imported petroleum products, bagasse and fuelwood. They accounted for nearly 49%, 26% and 25%, respectively, of energy produced in 1992. Petroleum imports take up significant amounts of foreign currency resources (National Development Strategy, 1996).

Bagasse is used for the cogeneration of steam and electricity for self-use in the sugar industry. Potential barriers to expanding the supply of electricity based on bagasse for grid supply include lack of year-round cane supplies and the cost of converting installed machinery in sugar mills.

The "Energy Policy of Guyana," completed in 1994, advocates the replacement of imported petroleum, as far as possible, by indigenous renewable energy sources. Increased and more efficient use of domestic energy resources, primarily hydropower and bagasse for electricity generation, is envisaged to contribute significantly in this regard. More recently, the *System Development Plan* prepared by GPL in 2000 reflects the official government policy of utilizing Guyana's renewable energy resources such as biomass and hydropower. In a 2000 Press Release, the Prime Minister Samuel Hinds cited bagasse-cogeneration in the GuySuCo sugar mills as a viable national option to pursue and one that could attract global climate change benefit support. Meanwhile, the sector policy has also relied on the encouragement of private sector participation in building a healthy market-oriented economy. The policy envisaged that Independent Power Producers (IPPs), which are investor-owned enterprises involved in power generation, will be encouraged. Additional policies are certainly needed to strengthen the energy sector.

The electricity sector plays a strategic role in the development of the economy. The main policy objective of the National Development Strategy with regard to the energy sector is to assure that an adequate and dependable supply of electricity is available for the country's future economic development. This includes improving both the quantity and quality of the electricity supply. Achieving this objective will require substantial capital outlays and also improvements in the management of the sector.

Institutional Framework: The legal, regulatory and institutional framework for the electricity sector includes:

Guyana Energy Agency (GEA): is the successor of the Guyana National Energy Authority (GEA). The GEA came into operation on 1st June 1998 by appointment of the Minister; it is responsible for all energy related matters. It is the mandate of the GEA "To ensure the rational and efficient use of imported petroleum-based energy sources, while

encouraging, where economically feasible and environmentally acceptable, increased utilization of indigenous new and renewable sources of energy."

Guyana Power & Light (GPL): is the official electricity supply company of Guyana. Its franchise area covers the three counties of Demerara, Berbice, and Essequibo. It was originally named the Guyana Electricity Corporation, wholly owned by the Government of Guyana. In late 1999, a 50/50 equity partnership was established between the Government of Guyana and a consortium comprising the Commonwealth Development Corporation (CDC) of the United Kingdom, and the Electricity Supply Board International (ESBI) of Ireland which created the new Company, GPL. This partnership was dissolved in 2003 and GPL reverted to 100 percent ownership by the Government of Guyana.

Hydrometeorological Service of Guyana: is the Designated National Authority for CDM activities in the country.

ANNEX 17: COMMUNITY BENEFITS QUESTIONNAIRE

Guyana: Bagasse Cogeneration Project

1. QUESTIONS TO ASSESS COMMUNITY BENEFITS ARISING FROM CDCF PROJECTS

July 2004[6]

1. **Please identify and describe the communities that will benefit from this project, giving details about their location, population, social composition, economic activities, and major problems.**

- The general population of Corriverton (the town where the Skeldon Sugar Estate and the factory are located) and its environs; approx. population 25,000
- Small-scale traders in Corriverton
- Business operators in Corriverton
- Private farmers in the Corriverton area who will be supplying sugar cane to the new factory
- Cooperatives in the Corriverton area who will be supplying sugar cane to the new factory
- Existing domestic power consumers in the Berbice region; approx. population 175,000
- Existing industrial power consumers in the Berbice region
- Potential domestic power consumers in the Berbice region
- Potential industrial power consumers in the Berbice region
- Workers currently engaged in sugar production at Skeldon
- Low-income groups who may benefit from future employment in expanded sugar production at Skeldon, or other downstream activities
- Professionals in GuySuCo across the entire company
- The population of Guyana; approx. population 750,000

(Population figures approx. are not official.)

2. **Please list and describe the direct community benefits that will result from this project.**

Transient benefits

- The two year construction period for the factory and the four year construction period for the agricultural expansion will see a large increase in volumes of local trade, supply of goods, supply of services and temporary employment in construction.

[6]This questionnaire addresses the direct benefits accruing from the project. The indirect benefits (provision of a grass-cutter, and funds for community improvements) are described in Annex 17.)

- Skills passed on to artisan workers during the construction period will benefit these individuals.

Permanent benefits

- Anyone in Corriverton who is engaged in a business or trade stands to derive a direct benefit from the increased level of economic activity that will result from the expansion of the existing sugar estate. The general population of Corriverton will benefit from the increased prosperity.
- The private farmers and farming cooperatives who will be supplying sugar cane to the new factory will enjoy additional revenue from the sale of sugar cane to the factory. The increased circulation of money in the local economy will benefit the community as a whole.
- The whole of the Berbice region will benefit from a more stable electricity supply as a result of the export of 10 MW of power on a firm basis.
- Job security of those workers engaged in sugar production will be enhanced as a result of diversification into power supply.
- The opportunity for downstream investment (e.g. distillery) will be created providing the potential for further employment.
- A reliable power supply will enable industrial expansion in Berbice leading to an economic environment that provides stability and, therefore, job creation.
- The project will reduce the annual requirement for foreign exchange to purchase fossil fuel by a minimum of $5 million. This will have a direct impact on the national economy.
- The introduction of high technology sugar production with cogeneration of electrical power will provide an opportunity for GuySuCo technical and professional staff to raise their awareness and experience in these areas. As well as improving their technical competence, this may cause some young professionals to pursue a more satisfying career in Guyana rather than choosing to migrate to advance their careers.

3. **Please describe how these communities will be involved in planning, implementing, and managing these benefits.**

- The Skeldon sugar estate, as every other sugar estate in Guyana, is a focal point of the community and affects, either directly or indirectly, the lives of many people in the community. As a consequence, there is already an established liaison between the estate management and the local community. This extends to relationships between the estate and the Regional Administration.
- Since the project conception in 1999, there have been joint consultative meetings with the local community to discuss in detail the environmental and social impact of the project and the development of the private farmers and cooperatives (approx. 25% of total cane production).
- Regular meetings with the local community will monitor social impacts during the construction period and will identify and solve potential social impact problems before they arise.

- At national level, a steering committee has been established to provide oversight and more effective communications between the project and relevant government departments. This is chaired by the Office of the President and has amongst its members the Permanent Secretaries of the Ministries of Finance, Agriculture, Foreign Trade and International Cooperation as well as representatives from GuySuCo, Booker Tate and the Bank of Guyana.
- Internally, GuySuCo has two coordinating committees (Agriculture and Factory) that ensure good internal liaison and communications.

4. **Please describe any underprivileged or minority groups in the community and indicate how they will participate in and benefit from the project.**
   - Those who are currently unemployed, or underemployed, in the Corriverton area will have an opportunity to seek further employment from the expanded cane production in the Skeldon Estate. This will be in both the GuySuCo and the private sectors. There will be similar transient opportunities during the construction period.

5. **Please list government and/or other organizations and institutions (local, regional, national) that will participate in and contribute to the project and describe their role in providing the community benefits.**
   - Guyana Power and Light (GPL), the national power utility, and the Guyana Energy Agency (GEA) will be involved in determining energy policy for the new power supply regime that will exist after the new factory comes into production.
   - The Environment Protection Agency (EPA) has been involved, and will continue to be involved, in monitoring pollution abatement.
   - The Ministry of Education and the Ministry of Health will be involved in monitoring social impacts.
   - The Ministry of Agriculture, in addition to being the responsible ministry for the sugar industry, will be involved in the development of the private farmers and cooperatives.
   - The Guyana Office of Investment (Go-Invest) has been involved, and will continue to be involved, in providing investment guidance to the private farmers' enterprises.

6. **Please describe how the community benefits will be measured and verified.**
   - Baseline study and future monitoring of social impact and prosperity of the local community
   - Monitoring the growth in electrical power demand in Berbice as compared with recent growth

7. **Please describe how the community benefits will be maintained and sustained after the project is completed. Who will be responsible for this?**
   - It will be the responsibility of GuySuCo to ensure that the new factory and cogeneration plant are efficiently managed and that conditions of the EPA Permit are complied with.

- GuySuCo will continue to liaise with local and regional leaders.
- GuySuCo will continue to act as a good corporate citizen.

8. **Please describe any negative environmental, social or economic consequences that could arise from the community benefits component of the project and indicate how these will be addressed and managed.**
   - .Some 10,600 ha of forests, wetlands, and other natural and semi-natural habitats will be cleared and/or drained for sugar cane cultivation and replacement cattle pasture. This loss will be mitigated by GuySuCo's on-the-ground protection and management (with hunting prohibited) the biologically rich mosaic of wetland habitats (including some upland forests) within the Halcrow and GuySuCo conservancies (comprising 7,520 ha).
   - Other negative environmental impacts could arise but will be mitigated by ensuring compliance with the conditions of the EPA Permit as detailed in the EMP (see project files).

9. **Please describe how you intend to ensure effective communications and positive relations with the community, government and other partners during implementation of the project.**
   - As discussed in 3 and 7 above.

10. **Please provide a summary budget for the community benefits component of the project.**
    - GuySuCo has prepared a Community Benefits Plan detailing indirect community benefits which will be financed by an incremental payment based on emission reductions. This Plan is summarized in Annex 17.

ANNEX 18: COMMUNITY BENEFITS PLAN

Guyana: Bagasse Cogeneration Project

This plan was formulated during a December 2007 visit to Corriverton. It details the specific indirect community benefits identified and discussed with Guysuco, Municipality officials in Corriverton, school officials in Corriverton, and the medical staff at the Guysuco Dispensary. A maximum of USD 454,965 (@Guyanese Dollars 92.2 million as of January 8th 2008) will be provided for Community Benefits (based on the expected number of ERs generated by the project. USD 110,000 (@ Guyanese Dollars 22.4 million) will be provided as an advance payment for Community Benefits upon signing of the ERPA and Project registration.

List the community / social benefits the project will provide and include details such as the number of beneficiaries, their location and the time period during which each benefit will be implemented.

Benefit	Beneficiaries	Locations	Time Period
a. Provision of 45 Horsepower tractor and grass cutter for schools and religious building compounds, and other public areas.	. * Schools[7]: 7 playgrounds 4 religious compounds[8]	Corriverton town	Operational lifetime of equipment is 10-15 years depending on maintenance. To be purchased in 2008 with advance payment **Cost:** **GYD 13 million**
b. Upgrade Skeldon estate Dispensary Building (New toilets, upgrade of clinic facilities)	Skeldon workers, cane cutters, and provision of emergency services to local community	Corriverton	Upgrade to be undertaken in 2008 with some of the funds from advance payment. **Cost:** **GYD 12..5 million**
c Equipment for community centre (6 computers)	.Corriverton community	Corriverton	To be purchased in 2008 with funds from advance payment. **Cost:** **GYD 1 million**

[7] Schools to benefit include: Nursery (Race Course, Kingston, Prince Town, No 68); Primary (Crabwood Creek, Line Path, No. 68); Secondary (Line Path, Tagore)

[8] Religious compounds include: Line Path Lutheran Church Compound; No 78 Roman Catholic Church Compound; Line path Hindu Masher Church Compound; and Skeldon Hindu Madhir Church Compound. (The Muslim compounds do not have grass).

Benefit	Beneficiaries	Locations	Time Period
d. Incremental improvements to community centre. To include construction of a library, and additional equipment for skills improvement (such as sewing machines).	Corriverton community	Corriverton	To be purchased in 2008 with funds from advance payment. **Cost:** **GYD 11 million**
e. Ambulance for Skeldon dispensary to replace existing ambulance	Corriverton community	Corriverton	To be determined and confirmed with CDCF as project progresses based on need. **Cost:** **GYD 20 million**
e. Improved drainage and solid waste management along the canals.	Corriverton community	Corriverton area	To be determined and confirmed with CDCF as project progresses based on need. **Cost:** **GYD 35 million**

1. Please describe how these benefits will be provided. This should include who will do what during the planning, implementation, and operational phases of the project. Please include the roles and responsibilities of all participants in each phase.

Guysuco will purchase and maintain the tractor and grass cutter and will manage the schedule of its loan-out. It will also provide an operator to perform the grass-cutting tasks as a service to the community.

Guysuco will also oversee the purchase of equipment and improvements to the Skeldon Dispensary and Community Centre.

If it is confirmed that drainage (removal of waste currently clogging the canals) will be undertaken along the canals leading to the Corriverton river, then Guysuco will submit a plan outlining costs and an implementation schedule undertaken with the local municipality.

3. Who is responsible for gathering this information and reporting it to the CDCF?

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4. When will reports be provided to the CDCF?
Reports will be provided on a yearly basis, commencing with the delivery of the advance payment in December 2007. The verifiers of the CDM project will have as part of their TOR, the monitoring of these benefits, under the guidance of CDCF staff.

5. Who prepared this document?

Name: Paul Hough and P.A. Persaud (General Manager, Guysuco, Skeldon) with the guidance of Noreen Beg, CDCF.

Date: September 2007 (exchange rate updated January 2008).

ANNEX 14: GUYANA MAP

Guyana: Bagasse Cogeneration project