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

CONTENTS

SECTION A. General description of project activity

A.1 Title of the project activity:

Monte Rosa Bagasse Cogeneration Project (MRBCP)

A.2. Description of the project activity:

Monte Rosa Bagasse Cogeneration Project (MRBCP) activity aims to increase its energy efficiency and cogeneration capacity in order to supply electricity to the grid, therefore adding value to the bagasse produced by the company.

Currently, the total installed electric power capacity is 26 MW, but only 18 MW are actually used, leaving 8 MW as standby. Through phased installation of substantially more capacity, improved energy efficiency in its processes, and generation of sufficient bagasse around the harvest season, Monte Rosa has generated surplus electricity of about 94.000 MWh during the 2001 – 2003 period, and will generate surplus electricity of approximately 93.000 MWh in 2004, increasing to 120.000 MWh in 2008. These sales of electricity to the grid allow it to participate in the emissions reduction market. Monte Rosa does not have a power purchase agreement. Instead, it opted to commercialize its surplus electricity in the spot market, known in Nicaragua as "mercado de ocasión".

There are 2 phases for this project. The first expansion (1st phase) was in cane season 2001-2002 with the installation of an extraction turbogenerator of 15 MW. At that time, Monte Rosa started to sell energy to the grid. The second expansion (2nd phase) consists of the phased addition of steam turbogenerators and a 900 psi (62 bar) high-pressure boiler which will burn the sugar cane residue produced in the mill to generate steam. The steam will be directed to the turbogenerators, generating electricity at a voltage of 13.800 volts. The steam leaving the turbines is condensed in a cooling tower, and the condensate is recycled and redirected to the boilers (a simple steam cycle). The electricity voltage is increased to 69.000 volts at an on-site substation. It is then transmitted to another sub-station 15 km away, located in the city of El Viejo, Nicaragua.

The main investments of this 2nd phase project will be:

- Installation of a new 900-psi (62 bar) high-pressure boiler,
- Installation of three new turbogenerators. (1 condensing type of 15 MW, and 2 extraction type of 20 MW each)
- Installation of a new cooling tower.
- Installation of 2 new transformers and other equipment at the sub-station.

These new investments will be staged over a five-year period. As the new turbogenerators are installed, old turbogenerators will be retired.

The Monte Rosa is concerned that bagasse cogeneration is a sustainable source of energy that brings not only advantages for mitigating global warming, but also creates a sustainable competitive advantage for the agricultural production in the sugarcane industry in Nicaragua. Monte Rosa also believes that bagasse cogeneration is very important for the energy strategy of the country in that cogeneration is an alternative to postpone the installation and/or dispatch of thermal energy generation utilities. It is expected that the sale of

the CER generated by the project will boost the attractiveness of bagasse cogeneration projects, helping to increase the production of this energy and decrease dependency on fossil fuel

The project participant also considers the following as benefits of the project:

1. The creation of 35 direct jobs at the industrial area, and also indirect jobs.

2. Increasing biomass use will diminish the need to import fossil fuel and thus improve Nicaragua's balance of payments. In other words, the 98.200 MWh annually that the Monte Rosa expansion project will provide to the grid (average over 14 years) will reduce Nicaraguan imports of approximately 119.800 barrels/yr of fuel oil #6 (bunker), thus saving about US$3,5 million per year in imported fuel costs.

3. Technological development due to use of bagasse cogeneration as a source of renewable energy. Monte Rosa could also serve as an example for encouraging other bagasse cogeneration projects, by starting to consider CERs revenue to reach their financial feasibility.

Environmental Contribution

Besides reducing the GHG emissions by implementing its expansion projects, Monte Rosa has implemented, in August of 2004, an Environmental Management System. Its name is *Plan de Gestión Ambiental* (Environmental Management Plan). The system controls the following environmental aspects of the plant:

- Residual water
- Gas emissions
- Solid Waste
- Noise
- Dust
- Air quality

A.3. Project participants:

Monte Rosa S.A (Monte Rosa) a Nicaraguan private entity.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

Sugar mill Monte Rosa is located five km away from El Viejo City, at Km 148 Way to Potosí, Municipio El Viejo, Chinandega, Nicaragua, Central America.

A.4.1.1. Host Party(ies):

Nicaragua.

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

Chinandega

A.4.1.3. City/Town/Community etc:

City: El Viejo

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

El Viejo City is located in the northwestern region of the country. Km.148 1/2 Way to Potosí, Municipio El Viejo, Dpto. Chinandega, Nicaragua, (12º42' north latitude, 87º12' west longitude). The project will be built on the site of the Monte Rosa Sugar mill, five km away from El Viejo City.

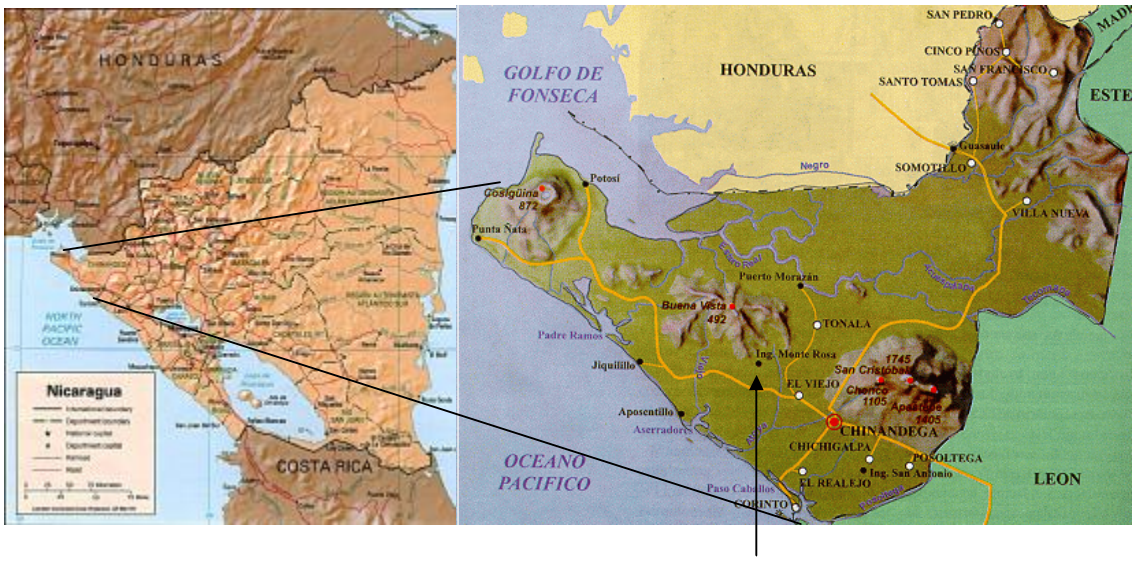


Figure 1: Monte Rosa Sugar Mill site overview

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

Sectorial Scope: 1-Energy industries (renewable - / non-renewable sources)

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

The predominant technology in all parts of the world today for generating megawatt (MW) levels of electricity from biomass is the steam-Rankine cycle, which consists of direct combustion of biomass in a boiler to generate steam, which is then expanded through a turbine. The steam-Rankine technology is a mature technology, having been introduced into commercial use about 100 years ago. Most steam cycle plants are located at industrial sites, where the waste heat from the steam turbine is recovered and used for meeting industrial-process heat needs. Such combined heat and power (CHP), or cogeneration, systems provide greater levels of energy services per unit of biomass consumed than systems that generate electric power only.

The steam-Rankine cycle involves heating pressurized water, with the resulting steam expanding to drive a turbine-generator, and then condensing back to water for partial or full recycling to the boiler. A heat exchanger is used in some cases to recover heat from flue gases to preheat combustion air, and a de-aerator must be used to remove dissolved oxygen from water before it enters the boiler.

Steam turbines are designed as either "backpressure" or "condensing" turbines. CHP applications typically employ backpressure turbines, wherein steam expands to a pressure that is still substantially above ambient pressure. It leaves the turbine still as a vapor and is sent to satisfy industrial heating needs, where it condenses back to water. It is then partially or fully returned to the boiler. Alternatively, if process steam demands can be met using only a portion of the available steam, a condensing-extraction steam turbine (CEST) might be used. This design includes the capability for some steam to be extracted at one or more points along the expansion path for meeting process needs). Steam that is not extracted continues to expand to sub-atmospheric pressures, thereby increasing the amount of electricity generated per unit of steam compared to the backpressure turbine. The non-extracted steam is converted back to liquid water in a condenser that utilizes ambient air and/or a cold water source as the coolant[1].

[1] Williams & Larson, 1993 and Kartha & Larson, 2000, p.101

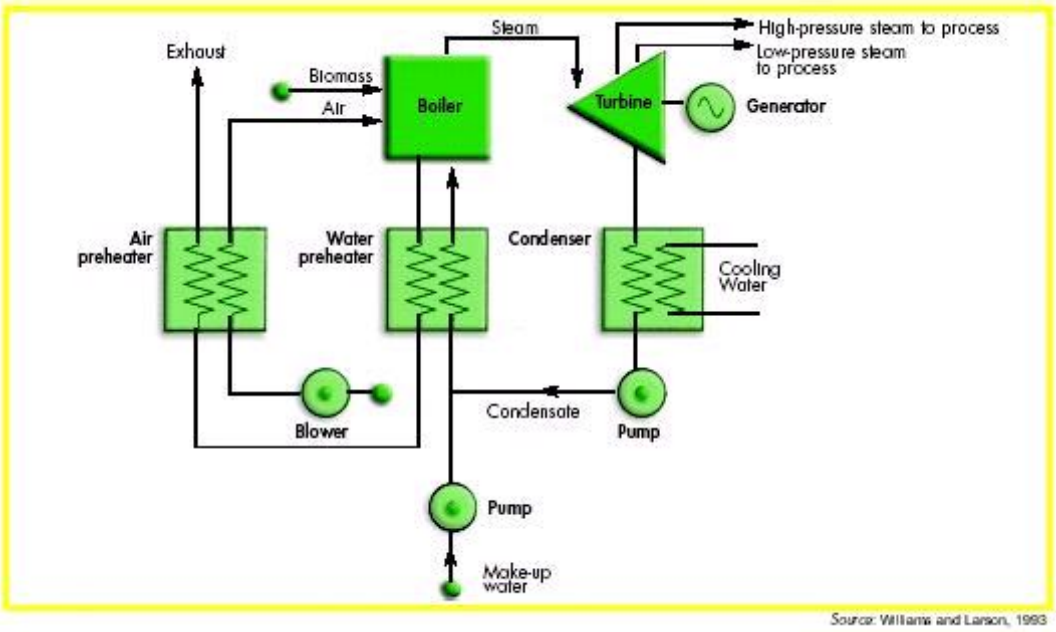


Figure 2: Schematic diagram of a biomass-fired steam-rankine cycle for cogeneration using a condensing-extraction steam turbine

The steam-Rankine cycle uses different boiler designs, depending on the scale of the facility and the characteristics of the fuel being used. The initial pressure and temperature of the steam, together with the pressure to which it is expanded, determine the amount of electricity that can be generated per kilogram of steam. In general, the higher the peak pressure and temperature of the steam, the more efficient, sophisticated, and costly the cycle.

Using steam-rankine cycle as the basic technology of its cogeneration system, for achieving an increasing amount of surplus electricity to be generated, Monte Rosa began its efforts in two phases, which are:

4 **Phase 1 (2001):**

The first expansion was from cane season 2001-2002 to cane season 2003-2004. It consisted of the installation of an extraction turbogenerator of 15 MW and of new high – pressure boilers. At that time, Monte Rosa started to sell energy to the grid through the spot market, known in Nicaragua as "mercado de ocasión". The total amount of energy produced sold to the grid, from 2001-2002 to 2003-2004 seasons, was approximately 94.000 MWh.

The main investments of the 1st Phase of the project were:

- Installation of new 900-psi (62 bar) high-pressure boilers (Caldema)
- Installation of a 15 MW extraction turbogenerator
- Installation of a Sub-station

4 **Phase 2 (2004):**

This phase consists of the phased addition of steam turbogenerators and a 900 psi (62 bar) high-pressure boiler which will burn the sugar cane residue produced in the mill to generate steam. The steam will be directed to the turbogenerators, generating electricity at a voltage of 13800 volts. The steam leaving the turbines is condensed in a cooling tower, and the condensate is recycled and redirected to the boilers (a simple steam cycle). The electricity voltage is increased to 69.000 volts at an on-site substation. It is then transmitted to another sub-station 15 km away, located in the city of El Viejo.

The main investments of this 2nd phase project will be:

- Installation of a new 900-psi (62 bar) high-pressure boiler,
- Installation of three new turbogenerators. (1 condensing type of 15 MW, and 2 extraction type of 20 MW each)
- Installation of a new cooling tower.
- Installation of 2 new transformers and other equipment at the sub-station.

These new investments will be staged over a five-year period. As the new turbogenerators are installed, old turbogenerators will be retired. The following summarizes the staging of the project:

- Cane season 2004 - 2005 – one old extraction type turbogenerator of 15 MW will be operated at only 7 MW and two new turbogenerators will be added for a net expansion of capacity to 42 MW: 20 MW from a new extraction type turbogenerator, 15 MW from a new condensing type turbogenerator, and 7 MW from the old extraction type turbogenerator.
- Cane season 2005 - 2006 – The old extraction type turbogenerator of cane season 2004 - 2005 will be retired and another new extraction type turbogenerator will further expand capacity to 46,4 MW. At this time the generation will be 15,5 MW from the condensing type turbogenerator, and 15,45 from each of the 2 extraction type turbogenerators.
- Cane season 2006 - 2007 – operation will be the same as cane season 2005 – 2006.
- Cane season 2007 - 2008 – further efficiency improvements will increase capacity to 49,9 MW.

The expected amount of energy that will be sold to the grid in 2004 is approximately 93,000 MWh, increasing to 120.000 MWh in 2008.

The investment to increase efficiency is dependent also on the expansion of sugar production; therefore the financial support from certified emission reductions (CERs) will be helpful to improve the mill competitiveness and so to enhance the sustainability of the rural areas in Nicaragua.

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

By dispatching renewable electricity to a grid, electricity that would otherwise be produced using fossil fuel is displaced. This electricity displacement will occur in the system's margin, i.e. this CDM project will displace electricity that is produced by marginal sources (mainly fossil fueled thermal plants), which have higher electricity dispatching costs and are solicited only over the hours that base-load sources (low-cost or must-run sources) cannot supply the grid (due to higher marginal dispatching costs or fuel storage – in case of hydro sources – constraints).

Bagasse is a fibrous biomass by-product from sugarcane processing, which accounts for about 25 percent of the weight of fresh cane and approximately one third of the cane's energy content. In a typical sugarcane mill, burning bagasse for generation of process heat and power production is a practice already established. Most of the energy produced from these facilities is consumed on-site while the surplus is normally delivered to the grid. Because Monte Rosa will use bagasse as fuel to generate heat and electricity, the electric energy delivered by Monte Rosa to the grid will displace the energy generated by marginal fossil-fuelled sources (i.e. diesel or fuel oil-fired thermal plants), thus avoiding GHG emissions from fossil fuel combustion.

Increasing biomass use at MRBCP will diminish the need to import fossil fuel and also improve Nicaragua's balance of payments. In other words, the 98.200 MWh annually that the Monte Rosa expansion project will provide to the grid (average over 14 years) will reduce Nicaraguan imports of approximately 119.800 barrels/yr of fuel oil #6 (bunker) and also save about US$3,5 million per year in imported fuel costs.

Because of the high cost of fossil fuel, Nicaragua has planned for some time to increase its base load capacity from renewables.

The Nicaraguan government, through the National Energy Commission (CNE), is formulating a new energy policy that has as main objectives: increase the confidence of foreign and domestic investors; increase rural electrification (Nicaragua has the lowest electrification index in Latin America, 50%); and finally permanently promote the use of renewable and clean sources.

The Nicaraguan electricity system comprises the national inter-connected system (SIN), which supplies the entire Pacific, Central and north zone of Nicaragua. It covers more than 90% of the territory where the population of the country lives. The other regions are covered by small isolated generation systems. SIN is composed of 16 central generators, including thermal power plants, gas turbines, geothermal, diesel motors, hydroelectric and two bagasse-fuelled plants. The generating mix in Nicaragua in 2004 was comprised of 71% from fuel oil, 1% from diesel oil, 11% from hydro, 9% from geothermal and 8% from bagasse-fired thermal plants. The current total nominal installed capacity in Nicaragua is 642 MW. The annual average growth rate in electricity demand is expected to be 6% per year for the next 10 years.

The Nicaraguan Electric market provides renewable energy projects with the opportunity to sell all of their surplus electricity, since the decision criterion is the price of dispatch. By having lowered their variable costs to become competitive with the fossil fuel-fired power plants, biomass-fired power plants have opportunity to sell all of their electricity.

Nevertheless, economic and other barriers pose a challenge for implementation of this kind of projects. In most cases, the sponsors' culture in the sugar industry is very much influenced by the commodity – sugar – market. Therefore, they need an extra incentive to invest in electricity production due to the fact that it is a product that can never be stored in order to speculate in price. For that reason, the revenue from GHG emission reductions and other benefits associated with CDM certification offer a sound investment opportunity for some sugar mills, like Monte Rosa.

Finally, due to the fact that more than 70% of the energy produced in Nicaragua is generated by fossil fuel sources and that the Nicaraguan energy demand growth rate is expected to be 6% per year for the next 10 years, an increase in the amount of CO_2 emissions by the Nicaraguan energy sector is expected in the next

years. Indeed, the MRBCP expansion project will definitely contribute to reduce emissions of CO_2 from the energy sector.

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

1st Crediting Period	(Phase 1) 2001	2002	2003	(Phase 2) 2004	2005	2006	2007	Total CERs
Total CO_2 emissions reductions, tCO2e/year	11.160	24.860	30.345	65.735	80.212	80.685	85.294	**378.291**

2nd Crediting Period	2008	2009	2010	2011	2012	2013	2014	Total CERs
Total CO_2 emissions reductions, tCO2e/year	85.294	85.294	85.294	85.294	85.294	85.294	85.294	**975.350***

3rd Crediting Period	2015	2016	2017	2018	2019	2020	2021	Total CERs
Total CO_2 emissions reductions, tCO2e/year	85.294	85.294	85.294	85.294	85.294	85.294	85.294	**1,572,409***

* Assuming that baseline emission factor does not change throughout the crediting periods.

A.4.5. Public funding of the project activity:

There was no public funding for this project activity

SECTION B. Application of a baseline methodology

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

AM0015: Bagasse-based cogeneration connected to an electricity grid.

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

This methodology is applicable to MRBCP displacing grid electricity because all the bagasse utilized by Monte Rosa is produced internally as a by-product from sugarcane processing; the clean development mechanism encouraged the project owners to proceed with the project, as the CDM has been considered a desirable benefit sought by the project's sponsors since the initial designing phase; bagasse production shall change only if sugar production is also increased; this project activity is also based on the efficient use of

bagasse, not on its increase, therefore this project activity does not increase the bagasse production; and finally, no bagasse will be stored for more than one year. Actually, the maximal period over which bagasse will be stored is during off-season (approximately 6 months).

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

The chosen methodology has been applied in the context of the project through the determination of the emissions factor for the inter-connected system (SIN) of the Nicaraguan grid; which covers more than 90% of the territory where the population of the country lives.

Operating and Build Margins have been used to calculate the Combined Margin emission factor for the electrical system. The emission factor for the Combined Margin is the average of the emission factors for both Operating and Build Margin (OM and BM, respectively). The CM was calculated using the most recent data available from the Nicaraguan Institute of Energy (INE), for 2004.

The OM emission factor is the system-weighted average emission factor, excluding low-cost/must-run resources. The generating mix in Nicaragua is 71% from fuel oil, 1% from diesel oil, 11% from hydro, 9% from geothermal and 8% from bagasse-fired thermal plants. The hydro, geothermal and biomass thermal plants are low-cost/must-run resources and are therefore excluded from the OM calculation because these plants will not generate less energy once Monte Rosa starts delivering more energy to SIN. Fossil fuel-fired power plants, which have higher fuel costs, are most likely to be displaced by the project. The calculated OM emission factor is 0,7446 tCO_2/MWh.

The same procedure is done for the BM emission factor, but in this case, only the 5 most recent power plants are considered, in order to estimate the emission rate of plants that the project will displace in the long term. The calculated BM emission factor is 0,6741 tCO2/MWh.

The resulting Combined Margin (CM) emission factor for the grid is the arithmetic average of the OM and BM emissions factors. The CM emissions factor is 0,7094 tCO2/MWh, which will be used to calculate the GHG emissions reductions that Monte Rosa will generate, and also to know "what would happen otherwise", in terms of GHG emissions.

The project activity follows the steps provided by the methodology taking into account the (a) Simple OM calculation for the STEP 1, since there would be no available data for applying to the preferred option – *(c) Dispatch Data Analysis OM.*. For STEP 2, the option 1 was chosen. The following table presents the key information and data used to determine the baseline scenario.

ID number	Data type	Value	Unit	Data Source
1. EG_y	Electricity supplied to the grid by the Project.	Obtained throughout project activity lifetime.	MWh	Monte Rosa
2. EF*y*	CO_2 emission factor of the Grid.	0,7094	tCO_2e/MWh	Calculated

3. $EF_{OM,y}$	CO_2 Operating Margin emission factor of the grid.	0,7446	tCO_2e/MWh	This value was calculated using information provided in the Baseline Information section (Annex 3) of this PDD
4. $EF_{BM,y}$	CO_2 Build Margin emission factor of the Grid.	0,6741	tCO_2e/MWh	This value was calculated using information provided in the Baseline Information section (Annex 3) of this PDD.

B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity:

Application of the Tool for the demonstration and assessment of additionality of Monte Rosa.

Step 0. Preliminary screening based on the starting date of the project activity

1. (a) The starting date of this project activity occurred in November of 2001, in the beginning of 2001/2001 harvest season, which is evidenced by the purchase of the first equipment in the year of 2000. Evidence can be confirmed by checking the receipt of the major equipment that constitutes the project described in this document.

(b) Pantaleon Sugar Holdings acquired Monte Rosa in 1998 and at approximately the same time, Pantaleon was carrying out a cogeneration expansion project at its largest mill, the Pantaleon, in Guatemala. As part of this expansion project, Pantaleon obtained financing from the International Finance Corporation (IFC) of the World Bank Group. Mr. Erasmo Gonzalez-Holmann was the loan officer at the time in the agribusiness department at the IFC and he inquired as to the eligibility of this project in Guatemala for carbon credits (this would have been during the AIJ pilot phase, but in any case pre-dating the CDM). At this point in time in 1998, Pantaleon Sugar Holdings became aware of the incentives derived from carbon credits, and they incorporated these incentives into the planning for the Monte Rosa sugar mill cogeneration expansion project in Nicaragua in the years following 1998, and prior to the start of the project activity in the year 2001. Mr. Mauricio Cabarrus, now General Director for Pantaleon was involved in these negotiations and discussions with the IFC. All of these carbon considerations were not formally inserted into loan documentation by the IFC, but email and other correspondence between Pantaleon and the IFC is on file and it is considered confidential. Mr. Erasmo Gonzalez-Holmann (today he is on secondment to another fund, but can be reached at egonzalezholmann@ifc.org) and Ms. Sid Embree (sembree@ifc.org) can confirm these considerations occurred prior to the start of the project activity at Monte Rosa in Nicaragua.

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations.

Sub-step 1a: Define alternatives to the project activity

Alternatives to the project activity are:

- Electricity generation using fuel oil;
- Year-round generation;
- Continuation of the situation without the project activity.

Sub-step 1b: Enforcement of applicable laws and regulations

2. All the alternatives above would comply with legislation in Nicaragua. As stated before, more than 70% of electricity generation in the country comes from fuel oil generation, which means the country has supportive legislation towards this source of energy. On the other hand, bagasse cogeneration has been practiced without legal hurdles, meaning year-round generation would face no legilative problems as well. Purchase of electricity is a normal procedure in industrial facilities and no legal barriers would be imposed under this scenario. Finally, the continuation of the situation without the project would also be in compliance with the Nicaraguan law.
3. Non applicable.
4. All alternatives are in compliance with all regulations.

Step 3. Barrier analysis

Sub-step 3a: **Identify barriers that would prevent the implementation of type of the proposed project activity**

1+2

I. Technological Barriers

Technological barriers represent a very important issue for increasing bagasse cogeneration in Nicaragua and Central America, for despite of the fact that Rankine-cycle is a well known technology, the cogeneration units still operate in a low-efficient manner and are not competitive comparing to other generation options. In this way there is a tricky issue about technology and economic value for such technology. Although this technology is well developed, the economic value for its application is not for projects on the scale similar to the sugar mills in Nicaragua. **COELHO (1999)[2] justifies that by highlighting that the unitary costs ($/installed MW) are significantly influenced by scale-effect.** As the bagasse cogeneration unit should have a small scale due to the high cost for transportation of the fuel (bagasse), investments are high. Therefore, as a lower cost of capital is wanted, the result is a simplified installation and lower efficiency.

The great majority of the sugar mills in Nicaragua and Central America still rely on inefficient technology, such as on 22 bar pressure boilers. Moreover, when there is a necessity to change equipments, it is usual to not consider purchasing high-efficiency boilers due to conservativeness, lack of knowledge or even lack of interest to generate surplus steam for electricity sales purposes. Furthermore, the fact that there are only four sugar mills in Nicaragua does not create a very competitive environment, which reduces even more the incentives to invest in more efficient technology.

2 Coelho, S. T. ‘’Mecanismos para Implementação da Cogeração de Eletricidade a partir de biomassa. Um Modelo para os Estado de São Paulo”. Programa Interunidades de pós-graduação em Energia. São Paulo, Agosto de 1999.

Another common barrier, which is discussed by the Nicaraguan National Energy Commission - CNE (2003)[3], relates to the long time period it takes to develop a cogeneration plant compared to the time period required to develop a thermal plant.

II. Institutional and Political Barriers

From the electric sector point of view, acquiring seasonal electricity – which is the case of MRBCP because it only uses bagasse as fuel and therefore generates electricity only during the harvest season – would not be a priority because the electricity is generated only during the harvest season and therefore no firm energy can be offered. That creates a barrier for projects like MRBCP to sign long-term contracts (PPAs) with local electricity distributors, which leaves those projects with no option but to sell their surplus electricity in the spot market; increasing considerably the risk associated with project activity and therefore reducing the motivation to develop this type of project activity. RODRIGUEZ (2004)[4] mentions the limited availability of commercial energy contracts as a relevant barrier to entry for projects like MRBCP. According to Quiroz & Asociados (2004)[5], the lack of interest from Nicaraguan utilities to sign new energy contracts with energy generators makes even more difficult for developers of renewable energy projects to finance their projects.

From the Nicaraguan and Central American sugar mill point of view, save rare exceptions, the great majority of sugar mills do not consider investments in cogeneration (for electricity sale) as a priority. The sector does not seem to have motivation to invest in a process that it sees, especially because of the political and regulatory uncertainty (another barrier mentioned by RODRIGUEZ 2004), with mistrust and no guarantees that the product will have a safe market in the future. According to Quiroz & Asociados (2004), the risk-return relationship of a renewable energy project is probably the biggest obstacle to more investments in that type of projects. From MRBCP point of view, especially, the fact that there was no benchmark available at the time of the development phase of the expansion project in that MRBCP would be first sugar mill in Nicaragua to sell electricity in the spot market, created another uncertainty and consequently barrier to the implementation of the project activity. In addition, the sugar mill sector overall has not developed yet the capabilities required to manage the risks associated with a cogeneration project focused on electricity sales, which definitely creates a barrier to the development of cogeneration projects with that focus.

Although the government, through the Designated National Authority (Oficina Nacional de Desarrollo Limpio y Cambio Climatico), provides institutional support to the development of renewable energy projects, this support is still not considered reliable by executives of the private sector to support cogeneration expansion in the sugar mills. CNE (2003) contends that Nicaragua, in order to incentive the development of renewable energy projects, needs a law that promotes renewable energy generation in the country; Quiroz & Asociados (2004) consider the lack of such law as a barrier to the development of projects like MRBCP in Nicaragua. The Law discussed in the CNE (2003) document (reference number 4 of this PDD) has not entered into force yet. According to Quiroz & Asociados (2004), the Nicaraguan

[3] Comision Nacional de Energia – Direccion de Politicas Energetica ''Anteproyecto - Ley Para La Promocion de Generacion Electrica con Fuentes Renovables''. Septiembre, 2003.

[4] Rodriguez, P.''Matriz de Barreras Identificadas dentro de un Marco Legal Vigente''. 2004

[5] Quiroz & Asociados, R.V. ''Análisis de las Barreras Fiscales Y Tributarias para el Desarrollo de Proyectos de Energia Renovable''. November, 2004

Legislation only provides specific fiscal incentives to thermal, hydroelectric and geothermal generators. It does not provide any specific fiscal incentive to wind and biomass generators, which is considered a barrier to the development of wind and biomass projects in Nicaragua. Quiroz & Asociados (2004) mention that Renewable Energy projects in Nicaragua, except for geothermal and hydroelectric projects, are not eligible to any tax benefit that could attract investments to this segment.

Another barrier to the development of bagasse cogeneration projects in Nicaragua is related to the fact that there are only four sugar mills in Nicaragua, which creates a hurdle to the fully utilization of the biomass potential of the country, and consequently of the emission reductions potential associated with that, if the owners of the four sugar mills do not take the initiative to develop bagasse cogeneration projects. Because of the high investments (also mentioned by RODRIGUEZ 2004) required to develop a project like MRBCP and the uncertainties this type of project faces (already mentioned above), the owners of the four sugar mills in Nicaragua have no natural incentives to develop this type of project activity. Under the current regulatory and fiscal framework, only the potential revenues associated with the CERs sales could work as an incentive for the sugar mill owners to develop this type of project activity; which in turn could allow Nicaragua, as a country, to be as efficient as it could be, in terms of reducing its anthropogenic emissions of GHG.

From the point of view of the economic agents, the excessive level of guarantees required to financing this type of projects, especially because of all uncertainties and risks associated with them (also mentioned by RODRIGUEZ 2004), is commonly a barrier to achieve a financial feasibility stage. Another relevant barrier has to do with the fact that not having a PPA with a local distributor makes more difficult to obtain a long-term financing from any bank.

Some other financing barriers occur simply due to prohibitively high transaction costs, which include the bureaucracy to secure the environmental license.

From the point of view of the public sector, because the annual average growth rate in electricity demand is expected to be 6% per year for the next 10 years, Nicaragua's public sector energy investments are not focusing on renewable energy but on ready to use technology. Moreover, the Nicaraguan government is not owner of sugar mills and therefore any project like MRBCP could only be privately initiated.

III. Economic and Investment Barriers

CNE (2003) contends that Renewable Energy projects (like the MRBCP) require fiscal and economic incentives, especially in the first years of operation, to overcome some of the barriers to the development of this type of projects. CNE (2003) mentions that the higher investments required by Renewable Energy projects (compared to conventional energy projects) lead to longer debt financing periods which in turn makes more difficult to obtain financing from any bank. CNE (2003) also mentions that the economic value paid to the renewable energy generators should be enhanced by fiscal and economic incentives.

Therefore, one of the major problems of selling surplus energy in the spot market is the economic value paid to the generators which is not enough to remunerate the capital invested in the expansion of a sugar mill cogeneration project. It simply does not make a bagasse cogeneration project feasible. Furthermore, the fee for accessing the grid does not contribute for making feasible the sale of the surplus energy in the spot market.

Quiroz & Asociados (2004) consider, as another barrier to the development of this type of project activity, the high costs associated with the studies required to define the viability of a renewable energy project. Quiroz & Asociados (2004) also state that the priority for the renewable energy industry is to become a competitive source of energy but that will be a very hard task in the short-term. The reason, according to Quiroz & Asociados (2004), is that the only two comparison factors between conventional energy projects and renewable energy projects are the investment cost and operational costs of those types of projects.

Moreover, the recently published energy stability and emergency law – *Ley de Emergencia y Estabilidad Energética* – from the 20th of July 2005, added additional barriers to projects like MRBCP, and can therefore consolidate the view that the uncertainty of the regulatory scheme in Nicaragua are a major barrier to projects like MRBCP. The law capped the price of the electricity to paid by the two distributors to no more than 10% of the generators variable costs, plus transportation fees. This is no doubt a considerable barrier to MRBCP.

IV. Cultural Barrier

The sponsors' culture in the sugar industry is very much influenced by the commodity – sugar – market. Therefore, they need an extra incentive to invest in electricity production due to the fact that it is a product that can never be stored in order to speculate in price.

Another cultural barrier to the development of cogeneration plants has to do with the fact that the Nicaraguan approach to develop power plants is narrowed focused on thermal plants. Therefore, a cogeneration project like MRBCP would only be undertaken by the private sector if it represented an attractive investment opportunity from the economic perspective, which is not the case with this type of project activity in Nicaragua.

Sub-step 3b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity).

3. The alternative of generating electricity with fossil fuel, for instance, would not be prevented by the barriers considered. It would be able to generate year-round, therefore capable to establish a PPA with the local distributors; it would face no scale effect problems; it would not be susceptible to regulatory effects in the spot market regulation; and even the cultural effect would be surpassed, as the approach in Nicaragua to energy generation is through fossil-fuelled thermal power plants.

Step 4. Common practice analysis.

Sub-step 4a: Analyze other activities similar to the proposed project activity

1. The sugar sector in Nicaragua and Central America, historically, always exploited its biomass (bagasse) in an inefficient manner by making use of low-pressure boilers. Although they consume almost all of their bagasse for self-energy generation purposes, it is done in such a manner that no surplus electric energy is available for sale, and no sugar company has ventured in the electricity market until the recent years.

Two similar project activities were implemented by two other sugar mills in Nicaragua – Santo Antonio sugar mill and Victoria de Julio sugar mill. The last one went bankruptcy in 2000. Therefore, currently, there is only one similar project activity under operation.

Sub-step 4b: Discuss any similar options that are occurring

2+3. Due to the fact that currently there are only four sugar mills in Nicaragua and that two have operated similar project activities, one may argue that the project activity in question is a widely spread activity in Nicaragua. But there are three major distinctions between MRBCP and the other similar activity (Santo Antonio sugar mill), which may make one argues that the two project activities are not similar at all from the CDM perspective:

1. Santo Antonio sugar mill cogeneration project uses eucalyptus as fuel to generate electricity during the off-season. MRBCP uses only bagasse as fuel and does not generate electricity during the off-season.
2. The use of eucalyptus, as fuel during the off-season by Santo Antonio mill, enables it to generate electricity year-round.
3. Being able to generate electricity year-round allowed Santo Antonio cogeneration project to sign a PPA with a local electricity distributor. MRBCP was not able to sign a PPA and currently sells electricity in the local spot market.

The three distinctions above creates a fundamental change between the two projects in that one has not faced what should probably be considered the major barrier faced by the other, which was the unavailability of a long-term contract (PPA) to sell the electricity produced by MRBCP.

Step 5. Impact of CDM registration

The impact of registration of this CDM project activity will contribute to overcome all the barriers described in this Tool: technological, institutional and political, economic and investment and cultural barriers by bringing more solidity to the investment itself and, therefore, fostering and supporting the project owners' decision to the breakthrough on their business model. In this way, the project activity is already engaged in negotiation to sell its expected CERs.

Moreover, the CDM project registration must influence other similar projects to move toward the use of CER sales as economic benefits, which may create another environmental benefit by having all of those followers working strictly on the sustainable environmental management, as this is requested by any project intending to registry.

In addition to the benefits and incentives mentioned in the text of the Additionality Tool published by the CDM-EB, the project activity will also provide other benefits such as: the project will achieve the aim of anthropogenic GHG reductions; financial benefit of the revenue obtained by selling CERs will bring more robustness to the economics of the project; and its likely to attract new players and new technology (there are companies currently developing new type of boilers – extra-efficient – and the purchase of such equipment is to be fostered due to CER sales revenue), reducing the investor's risk and increasing efficiency.

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

The definition of the project boundary related to the baseline methodology is applied to the project activity in the following way:

Baseline energy grid: For MRBCP, the national inter-connected system (SIN) of the Nicaraguan grid is considered as a boundary, since it is the system to which Monte Rosa is connected and therefore receives all the bagasse-based produced electricity.

Bagasse cogeneration plant: The bagasse cogeneration plant considered as boundary comprises the whole site where the cogeneration facility is located.

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

Date of Completion of the baseline study: 01/11/2004.

Name of person/entity determining the baseline: ECONERGY (for further information, please refer to Annex 1. Contact: Mr. Marcelo Junqueira. Email: junqueira@econergy.com.br, phone +55 (11) 3219-0068 ext. 25), which is not a project participant, is responsible for the technical services related to GHG emission reductions, and is therefore, in behalf of Monte Rosa, the developer of this document, and all its contents.

SECTION C. Duration of the project activity / Crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

November, 2001

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

25y-0m.

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

C.2.1. Renewable crediting period

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

November, 2001

C.2.1.2. Length of the first crediting period:

7-y0m

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

Not Applicable

C.2.2.2. Length:

Not Applicable

SECTION D. Application of a monitoring methodology and plan

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

Approved monitoring methodology AM0015: "Bagasse-based cogeneration connected to an electricity grid"

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

The monitoring methodology was designed to be applied to the Vale do Rosario CDM Project, however, due to the great project similarity, the same methodology was chosen in order to monitor the emissions reduction of this project activity.

The applicability of the methodology is described in the paragraph B1.1 of this document.

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

D.2.1.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:								
ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording Frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

Not Applicable

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

Not Applicable

D.2.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived :								
ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording Frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

1. EGy	Electricity supplied to the grid by the Project.	Readings of the energy metering connected to the grid and Receipt of Sales.	MWh	*M*	Monthly	*100%*	During the crediting period and two years after.	Double check by receipt of sales.
2. EF*y*	CO_2 emission factor of the Grid.	Calculated	tCO_2e/MWh	*C*	At the validation and baseline renewal	*0%*	During the crediting period and two years after.	-
3. $EF_{OM,y}$	CO_2 OperatingMargin emission factor of the grid.	This value was calculated using information provided in the Baseline Information (Annex 3) section of this PDD	tCO_2e/MWh	*C*	At the validation and baseline renewal	*0%*	During the crediting period and two years after.	-
4. $EF_{BM,y}$	CO2 Build Margin emission factor of the Grid.	This value was calculated using information provided in the Baseline Information section (Annex 3) of this PDD	tCO_2e/MWh	*C*	At the validation and baseline renewal	*0%*	During the crediting period and two years after.	-

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

$$EF_{OM,simple,y} = \frac{\sum_{i,j} F_{i,j,y}.COEF_{i,j}}{\sum_{j} GEN_{j,y}} \text{ (tCO}_2\text{e/GWh)}$$

$$EF_{BM} = \frac{\sum_{i,m} F_{i,m,y}.COEF_{i,m}}{\sum_{m} GEN_{m,y}} \text{ (tCO}_2\text{e/GWh)}$$

$$EF_{electricity} = \frac{EF_{OM} + EF_{BM}}{2} \text{ (tCO}_2\text{e/GWh)}$$

$BE_{electricity,y} = EF_{electricity} \cdot EG_y$

$F_{i,j(or\ m),y}$ Is the amount of fuel *i* (in a mass or volume unit) consumed by relevant power sources *j* in year(s) *y*

j,m Refers to the power sources delivering electricity to the grid, not including low-operating cost and must-run power plants, and including imports[4] from the grid

$COEF_{i,j(or\ m),y}$ Is the CO2 emission coefficient of fuel *i* (tCO2 / mass or volume unit of the fuel), taking intoaccount the carbon content of the fuels used by relevant power sources j (or m) and the percent oxidation of the fuel in year(s) y

$GEN_{j(or\ m),y}$ Is the electricity (MWh) delivered to the grid by source *j (or m)*

$BE_{electricity,y}$ Are the baseline emissions due to displacement of electricity during the year y in tons of CO_2

EG_y Is the net quantity of electricity generated in the bagasse-based cogeneration plant due to the project activity during the year y in MWh, and

$EF_{electricity,y}$ Is the CO_2 baseline emission factor for the electricity.

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

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

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

Not Applicable

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

Not Applicable

D.2.3. Treatment of leakage in the monitoring plan

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

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

There is no leakage associated with this project activity in that Monte Rosa has never sold bagasse before it starts to generate power

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

Not Applicable.

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

$ER_y = BE_{thermal,\,y} + BE_{electricity,\,y} - PE_y - L_y$ $BE_{thermal,\,y} = 0$ $PE_y = 0$ $L_y = 0$ $BE_{electricity,\,y} = EF_{electricity} \cdot EG_y$	ER_y: are the emissions reductions of the project activity during the year y in tons of CO_2 $BE_{electricity,y}$: Are the baseline emissions due to displacement of electricity during the year y in tons of CO_2 $BE_{thermal,y}$: Are the baseline emissions due to displacement of thermal energy during the year y in tons of CO_2 PE_y: Are the project emissions during the year y in tons of CO_2. L_y: Are the leakage emissions during the year y in tons of CO_2.

D.3. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored

Data *(Indicate table and ID number e.g. 3.-1.; 3.2.)*	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
1	*Low*	These data will be directly used for calculation of emission reductions. Sales record and other records are used to ensure the consistency.
2	*Low*	Data does not need to be monitored
3	*Low*	Data does not need to be monitored
4	*Low*	Data does not need to be monitored
10	*Low*	Data does not need to be monitored

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

The structure for monitoring this project activity will basically consist of registering the amount of energy sold to the grid (EGy). There are two operations that the project operators must perform in order to ensure data consistency, despite of the fact that this will actually consist of the monitoring of one single variable.

1. The monthly readings of the calibrated meter equipment must be recorded in an electronic spreadsheet
2. Energy sales receipt must be archived and registerd in an electronic spreadsheet. (for EG_y only).

For 1 and 2, internal procedures were created in order to ensure data consistency.

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

ECONERGY (for further information, please refer to Annex 1. Contact: Mr. Marcelo Junqueira. Email: junqueira@econergy.com.br, phone +55 (11) 3219-0068 ext. 25), which is not a project participant, is responsible for the technical services related to GHG emission reductions, and is therefore, in behalf of Monte Rosa, the developer of this document, and all its contents.

SECTION E. Estimation of GHG emissions by sources

E.1. Estimate of GHG emissions by sources:

This project activity does not burn any additional quantity of fossil fuel due to the project implementation, the variable PEy, presented in the methodology, does not need to be monitored.

Thus, PEy = 0

E.2. Estimated leakage:

No leakage is considered to happen in this project activity, therefore: $\mathbf{L_y = 0}$

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

The sum of E.1 and E.2 is zero

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

The baseline methodology considers the determination of the emissions factor for the grid to which the project activity is connected as the core data to be determined in the baseline scenario. In Nicaragua, there is one main grid, the national inter-connected system (SIN), which covers more than 90% of the territory where the population of the country lives. The other regions are covered by small isolated generation systems. Therefore the national inter-connected system (SIN) is the relevant one for this project.

The method that will be chosen to calculate the Operating Margin (OM) for the electricity baseline emission factor is the option (a) *Simple OM*, since the preferable choice (c) *Dispatch Data Analysis OM* would face the barrier of data availability in Nicaragua.

Since, according to the chosen methodology, the project is to determine the Simple OM Emission Factor ($EF_{OM,\,simple,\,y}$), the following equation is to be solved:

$$EF_{OM,simple,y} = \frac{\sum_{i,j} F_{i,j,y}.COEF_{i,j}}{\sum_{j} GEN_{j,y}} \text{ (tCO}_2\text{e/GWh)}$$

$$\frac{\sum_{i,j} F_{i,j,y}.COEF_{i,j}}{\sum_{j} GEN_{j,y}} = 0{,}7446 \text{ (tCO}_2\text{e/MWh)}$$

Build Margin Emission Factor Calculation

The Projects Participants opt for *Option 1* presented in the AM0015, to calculate the EF_{BM} in an *ex-ante* basis. Thus, the emission factor can be calculated, as the combined margin (CM), considering the build margin table in Annex 3.

$$EF_{electricity} = \frac{EF_{OM} + EF_{BM}}{2} = \frac{0,7446 + 0,6741}{2} = 0,7094 \text{ tCO}_2\text{e/MWh}$$

The baseline emission would be then proportional to the electricity delivered to the grid throughout the project's lifetime. Baseline emissions due to displacement of electricity are calculated by multiplying the electricity baseline emissions factor (EFelectricity,y) with the electricity generation of the project activity.

$BE_{electricity,y} = EF_{electricity} . EG_y$

Therefore, for the first crediting period, the Emissions Reduction (or the baseline emissions) will be calculated as follows:

$BE_{electricity,y}$ = 0,7094 tCO_2/MWh . EG_y (in tCO_2e)

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

The emissions reduction of this project activity is

$BE_{electricity,y} – (L_y + PE_y)$ = 0,7094 tCO_2/MWh . EG_y – (0 + 0) = **0,7094 tCO_2/MWh . EG_y** (in tCO_2e)

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

1st Crediting Period	(Phase 1) 2001	2002	2003	(Phase 4) 2004	2005	2006	2007	Total CERs
Total CO_2 emissions reductions, tCO2e/year	11.160	24.860	30.345	65.735	80.212	80.685	85.294	**378.291**

2nd Crediting Period	2008	2009	2010	2011	2012	2013	2014	Total CERs
Total CO_2 emissions reductions, tCO2e/year	85.294	85.294	85.294	85.294	85.294	85.294	85.294	**975.350***

3rd Crediting Period	2015	2016	2017	2018	2019	2020	2021	Total CERs

Total CO_2 emissions reductions, tCO2e/year	85.294	85.294	85.294	85.294	85.294	85.294	85.294	**1,572,409***

* Assuming that baseline emission factor does not change throughout the crediting periods.

SECTION F. Environmental impacts

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

The activity of electricity generation in Nicaragua is open to private enterprises via authorization issues by the Nicaraguan Energy Institute (INE in Spanish). Monte Rosa has already obtained the generation license for the expansion (Phase 2) project from the Nicaraguan Energy Institute (INE). The generation license is for 60 MW.

The environmental impact assessment (EIA) for the proposed cogeneration expansion (Phase 2) project has been done, submitted to MARENA (Ministry of Environment and Natural Resources) and approved by MARENA in April of 2005. It is also important to mention to that MARENA has previously approved the EIA for Phase 1 of MRBCP.

In addition, Monte Rosa works with IFC´s Environmental & Social Guidelines guidelines because Pantaleon (the holding company of the business group of which Monte Rosa is part of) is the recipient of an IFC loan.

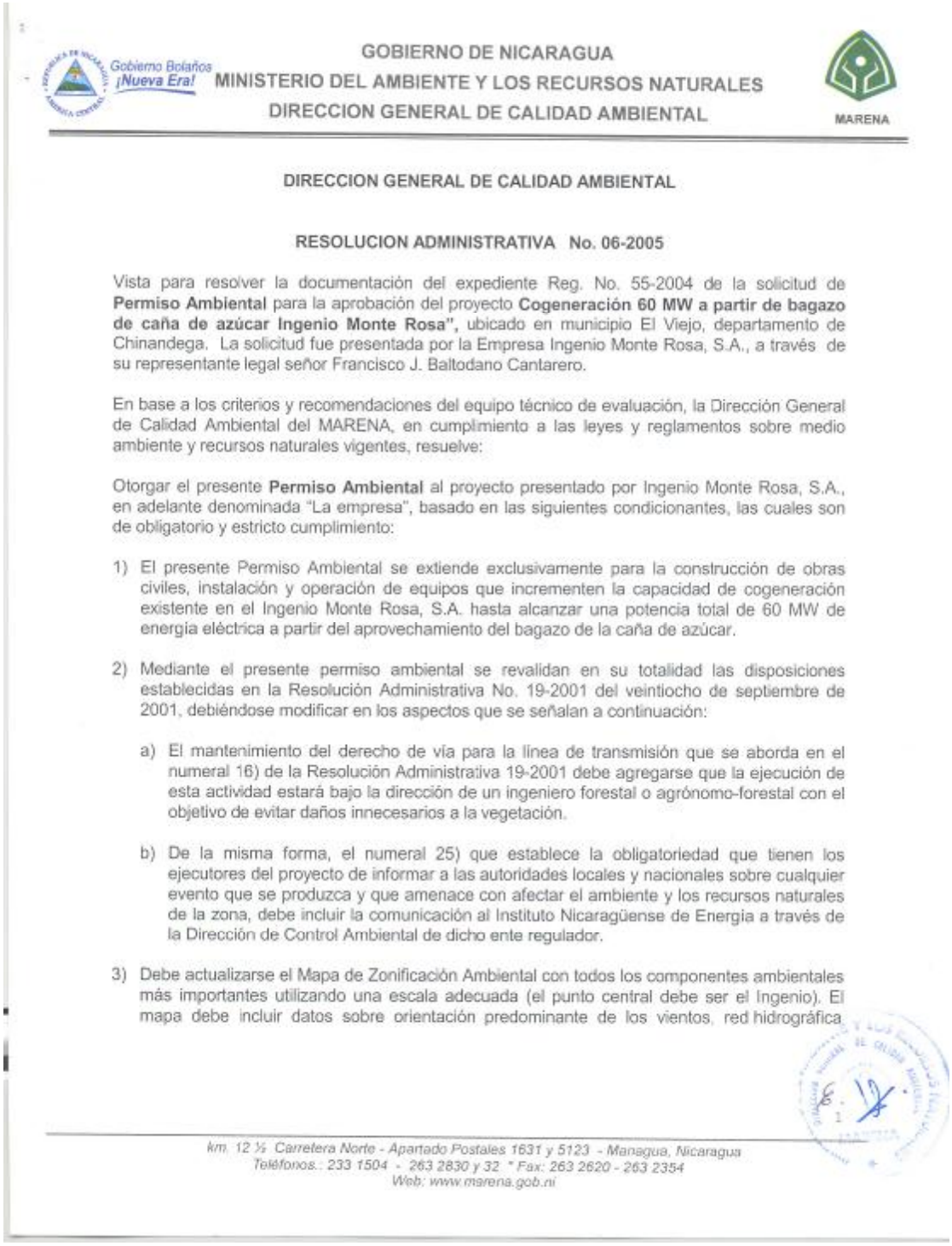
Regarding the out-of-boundary impacts, the MRBCP project activity will not affect the expansion of the national electricity grid supply due to its small size in power generation capacity. Since Monte Rosa has always cared about other environmental issues, including preservation of local environment, constant improvement of preservation areas, adequate treatment of effluents and other residues, and is therefore in compliance with any applicable environmental regulation in Nicaragua, no other environmental impact assessment or documentation should be necessary for MRBCP project activity.

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

According to the Nicaraguan laws, the possible environmental impacts are to be analyzed by MARENA (Ministry of Environment and Natural Resources). The environmental impact assessment (EIA) for the proposed cogeneration expansion (Phase 2) project has been done, submitted to MARENA (Ministry of Environment and Natural Resources) and approved by MARENA in April of 2005.

In addition, Monte Rosa works with IFC´s Environmental & Social Guidelines guidelines because Pantaleon (the holding company of the business group of which Monte Rosa is part of) is the recipient of an IFC loan.

Figure 3: MRBCP Phase 2 Environmental Permit



GOBIERNO DE NICARAGUA
MINISTERIO DEL AMBIENTE Y LOS RECURSOS NATURALES
DIRECCION GENERAL DE CALIDAD AMBIENTAL

Gobierno Bolaños ¡Nueva Era!

MARENA

DIRECCION GENERAL DE CALIDAD AMBIENTAL

RESOLUCION ADMINISTRATIVA No. 06-2005

Vista para resolver la documentación del expediente Reg. No. 55-2004 de la solicitud de **Permiso Ambiental** para la aprobación del proyecto **Cogeneración 60 MW a partir de bagazo de caña de azúcar Ingenio Monte Rosa",** ubicado en municipio El Viejo, departamento de Chinandega. La solicitud fue presentada por la Empresa Ingenio Monte Rosa, S.A., a través de su representante legal señor Francisco J. Baltodano Cantarero.

En base a los criterios y recomendaciones del equipo técnico de evaluación, la Dirección General de Calidad Ambiental del MARENA, en cumplimiento a las leyes y reglamentos sobre medio ambiente y recursos naturales vigentes, resuelve:

Otorgar el presente **Permiso Ambiental** al proyecto presentado por Ingenio Monte Rosa, S.A., en adelante denominada "La empresa", basado en las siguientes condicionantes, las cuales son de obligatorio y estricto cumplimiento:

1) El presente Permiso Ambiental se extiende exclusivamente para la construcción de obras civiles, instalación y operación de equipos que incrementen la capacidad de cogeneración existente en el Ingenio Monte Rosa, S.A. hasta alcanzar una potencia total de 60 MW de energía eléctrica a partir del aprovechamiento del bagazo de la caña de azúcar.

2) Mediante el presente permiso ambiental se revalidan en su totalidad las disposiciones establecidas en la Resolución Administrativa No. 19-2001 del veintiocho de septiembre de 2001, debiéndose modificar en los aspectos que se señalan a continuación:

   a) El mantenimiento del derecho de vía para la línea de transmisión que se aborda en el numeral 16) de la Resolución Administrativa 19-2001 debe agregarse que la ejecución de esta actividad estará bajo la dirección de un ingeniero forestal o agrónomo-forestal con el objetivo de evitar daños innecesarios a la vegetación.

   b) De la misma forma, el numeral 25) que establece la obligatoriedad que tienen los ejecutores del proyecto de informar a las autoridades locales y nacionales sobre cualquier evento que se produzca y que amenace con afectar el ambiente y los recursos naturales de la zona, debe incluir la comunicación al Instituto Nicaragüense de Energía a través de la Dirección de Control Ambiental de dicho ente regulador.

3) Debe actualizarse el Mapa de Zonificación Ambiental con todos los componentes ambientales más importantes utilizando una escala adecuada (el punto central debe ser el Ingenio). El mapa debe incluir datos sobre orientación predominante de los vientos, red hidrográfica

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cercana al sitio (1000 metros), población, red vial, relleno sanitario, pozos de agua, zonas de riesgo identificadas y cualquier otra información de interés que sirva de referencia y control ambiental del proyecto. El mapa debe ser remitido a MARENA e INE en un plazo no mayor de 30 días a partir de otorgado el presente permiso.

4) La empresa deberá elaborar manuales de operación para el manejo y disposición de los desechos sólidos peligrosos y no peligrosos, acorde a la legislación ambiental vigente. Estos manuales deberán remitirse a MARENA para su revisión y aprobación en un plazo máximo de un mes a partir de emitido el presente permiso ambiental.

5) La empresa deberá notificar las fechas de los muestreos así como remitir copia de los resultados de estos con su debida interpretación a DGCA-MARENA, MARENA Chinandega y DCA-INE, en un plazo no mayor de 15 días una vez realizados dichos muestreos.

6) En caso que Monte Rosa realice acuerdo con la Empresa Energética Corinto u otra empresa para la incineración de las hilazas contaminadas con hidrocarburos, debe llevar un registro de las cantidades generadas y entregadas a esta Empresa, así como remitir una comunicación en que se informe sobre este particular a MARENA y DCA –INE.

7) Personal de MARENA Central, de la delegación MARENA-Chinandega y de la Dirección de Control Ambiental de INE inspeccionarán el área de trabajo cuando lo consideren conveniente, con o sin previo aviso.

8) **La empresa** debe garantizar el cumplimiento estricto de las medidas de prevención, mitigación, Programa de Gestión Ambiental y Planes de Contingencia relacionados con el Proyecto de cogeneración de energía eléctrica, descritas en el Estudio de Impacto Ambiental evaluado y aprobado por **MARENA**. Se anexa a la presente resolución el contenido de los planes señalados en la presente cláusula.

9) La empresa comunicará a MARENA la fecha de inicio de la construcción e instalación de los equipos de cogeneración así como la entrada en operación de la planta.

10) El solicitante se compromete a cumplir con las condiciones a las cuales se somete esta autorización, así mismo, notificará oportunamente a la **Dirección General de Calidad Ambiental del MARENA** sobre cualquier modificación al proyecto para su debida revisión y aprobación.

11) En el caso de incumplimiento o violación de algunas de las cláusulas anteriores, la compañía ejecutora incurrirá en amonestaciones, multas, suspensión temporal o cancelación del Permiso Ambiental conforme lo estipulado por la Legislación vigente en el país.

El presente Permiso Ambiental no exime a la empresa de la obligatoriedad y responsabilidades que la ley determine en relación a permisos de otra índole, ni del cumplimiento de la legislación vigente.

El presente Permiso Ambiental entra en vigencia a partir de la fecha de su otorgamiento. En caso de no ejecutarse el proyecto en los próximos 18 meses, este permiso pierde validez

Dado en la ciudad de Managua a los cinco días del mes de Abril de 2005.

Hilda Espinoza Urbina
Dir. Dirección General de Calidad Ambiental

c.c. Sr. Arturo Harding - Ministro MARENA
Sr. Germán Muñoz - Alcalde de El Viejo
Sr. César Chávez - Delegado MARENA-Chinandega
Sr. Giovanni Carranza - Director DCA-INE
Expediente 55-2004

The Vision of the Pantaleón Group, which owns the Monte Rosa Mill, it is to promote the development, to impel the progress and the improvement of the organization and his shareholders, clients, suppliers, collaborators and workers. The main aim is to convert or transform natural elements into products required by the clients, satisfying their needs under the concept of sustainable development. All this through a responsible conversion and conservation of the environment's natural patrimony.

The Monte Rosa Mill is an agroindustry in constant growth in its agricultural, industrial and energy goals. Every since the acquisition by the Pantaleón Group, this sugar company has maintained a program of sustained increase of investments in different productive and social areas, with the primordial objective of improving its financial profitability, allowing the company to promote its own economic development and that of its environment.

In the last two years Monte Rosa has achieved two very important certifications; the ISO 9001 for improvement in their processes administration, and the Certification in HACCP, guaranteeing the alimentary inocuidad of their product.

For next two years there's a plan to implement two administration systems that guarantee the good environmental behavior of the company and the labor security and their collaborators' occupational health; these norms are ISO 14001 and OSHAS 18001 respectively.

DESCRIPTION OF THE FACTS

Two years ago the Monte Rosa Mill began developing the environmental handling of the sugar operation. The Department of Environmental Administration was created. It's hierarchical level leads the decisions-taking process onto a high level, and gives an environmental guarantee for each process. The department works with a previously designed Environmental Administration Plan where the different tasks of each area are described in order to improve the environmental quality. This Plan includes improvements in the agrochemicals use, reduction of the use of water, reforestation, handling of solid waste, monitoring of liquid and atmospheric emissions, managerial social responsibility, water treatment systems, etc.

Advances in Monte Rosa's Environmental Administration Programs

Use of water reduction Program

With this project Monte Rosa has been able to reduce the mill's residual water index down to 45% in relation to the last harvest's one, going from 1.44 m3/ton of milled cane to 0.65 m3/ton of milled cane.

Solid waste handling Programs

With this project the consumption of water is eliminated in the alcohol filters, which was used for the haulage of this by-product. The project should also improve the structure and quantity of organic matter of the mill's agricultural floors. It is also important to mention that the separation of the alcohol means the reduction in 80% of the organic load that used to be spilled into the sedimentation lagoons of residual waters.

Programs of emissions handling

A new 900 PSI and 300,000 pounds boiler has been installed. This boiler is equipped with a gases and ashes washer in order to to maintain an acceptable level of emissions and is regulamented by a norm established by the World Bank. That is the reason why the old boilers, that didn't have technology to avoid emissions, have been discarded.

Monitoring Programs

Monitoring of atmospheric emissions and quality of air

As part of the Monitoring Program of atmospheric emissions and quality of air, two different studies were carried out. One to verify the quality of the air in the mill's surroundings and another one to measure the emissions directly in the chimneys.

Monitoring of residual waters

A result of this program is that no water stream is being contaminated by the residual effluents of the process, since this water is gathered in the lagoons of primary sedimentation to be used as irrigation in the mills surroundings.

Liquid residuals handling programs

Two Parshall grooves have been installed with the objective of measuring the amount of water that is discarted as residual water for it's analysis and control. The grooves' measurements make it posible to use data modeling for future water reduction and clean production projects.

Reforestation Program

The Reforestation Program is the newest of Monte Rosa's programs. The objective of Monte Rosa it was to reforest the mills surroundings and all those areas where the sugar cane cultivation is not possible.

Consciousness programs and support to the community

Mount Rosa assists 12 communities directly in topics of health, education, sports and cultural recreation. Likewise, through the Pantaleon Foundation projects of housing for children, patronages of schools and maternal-infantile houses have been carried out in order to achieve a better development of people in the community.

SECTION G. Stakeholders' comments

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

In Nicaragua, usually two processes are taken when considering stakeholder consultation.

The first one is when the environmental impact assessment or similar study is presented. An announcement is made through newspapers and comments are collected through specific forms available through the environmental authorities. This process is made towards more specific environmental issues.

The second process is actually the CDM process. This tries to encompass the broad CDM perspective and bring related issues to the audience. Specific entities are invited to treat the project under climate change, environmental and social perspectives. Such entities are known through the Nicaraguan DNA, and some of them are invited by the project developer.

In the case of Monte Rosa, on the 3rd of August 2005 a meeting was held in a hotel to present the CDM initiative to local stakeholders. Attended the meeting:

- Club de Jóvenes Ambientalistas;
- Centro Humboldt;
- Comisión Ambiental Municipal del Municipio de El Viejo;
- Alcadía de El Viejo;
- Oficina Ambiental de la Alcadía de El Viejo.

G.2. Summary of the comments received:

Some comments were received during the consultation. They were in fact related to other issues in the sugar cane business, than climate change itself. For instance, one comment was related to the plantation expansion plans of Monte Rosa, and its likely impacts on the environment. Other comments were related to the burning practice in sugar plantations. Some participants expressed the opinion that in the future certain areas must be delimited in order to create green harvesting areas. Finally, there was a very positive feedback towards the creation of the environmental department at Monte Rosa.

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

Monte Rosa explained that the expansion of its sugarcane plantations are contemplated in the sugar mills environmental impact assessment, and that there is an environmental management plan where the mitigation measures for such impacts are detailed. Even so, Monte Rosa explained that it will maintain an annual program in order to recover rivers' margins in the region with natural vegetation, in order to keep the water streams alive, working together with the municipality of El Viejo. Monte Rosa also explained that the expansion of the sugar cane plantation will reach former agricultural areas such as Tonala y Los Millonarios, south-west to the sugar mill.

Regarding burning the sugar cane prior to harvesting, Monte Rosa explained that this is to allow a better harvesting condition for the workers, implying not only in better health conditions, but also increased productivity and therefore better income. Monte Rosa explained that burning the cane does not cause environmental problems, it is more disturbing due to the visual impacts and dirtiness caused. Such problems are being taken into account through increased green cane harvesting and wind maps.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Participant 1:

Organization:	Econergy Brasil Ltda.
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State/Region:	SP
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E-Mail:	junqueira@econergy.com.br
URL:	http://www.econergy.com.br
Represented by:	Marcelo Schunn Diniz Junqueira
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Salutation:	
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Middle Name:	Schunn
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Direct tel:	+55 (11) 3219-0068 ext 25
Personal E-Mail:	junqueira@econergy.com.br

Participant 2:

Organization:	Monte Rosa S.A.
Street/P.O.Box:	Sugar mill Monte Rosa, Km 148 Way to Potosí, Municipio El Viejo, Chinandega, Nicaragua, Central America.
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City:	El Viejo
State/Region:	Chinandega
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Represented by:	Lic. Francisco Baltodano – General Manager
Title:	Mr.
Salutation:	
Last Name:	Baltodano
Middle Name:	
First Name:	Francisco
Department:	General Management
Mobile:	
Direct FAX:	Same as above
Direct tel:	Same as above
Personal E-Mail:	Same as above

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There was no public funding for this project activity

Annex 3

BASELINE INFORMATION

Grid Emissions & Emission Factor for 2004

OPERATING MARGIN CALCULATION

Power Plant	Generation (GWh/yr)	Diesel 10^3gal/yr	Fuel oil 10^3gal/yr
. Nicaragua (GEOSA)	542,99		40.256,17
. Managua (GECSA)	235,14		18.482,38
. Censa - Amfels	327,66		19.795,32
. Empresa Energética de Corinto	526,85	93,98	29.849,61
. Tipitapa Power Company	412,40		24.640,70
. Generadora San Rafael, S.A. (G	5,60	92,38	440,47
. Chinandega (GEOSA)	0,71	97,08	
. Las Brisas (GECSA)	26,83	2.078,56	
Total	**2.078**	**2.362**	**133.465**

Fuel type	Fuel consumption	Units	Heat content (GJ/unit)	Fuel CO_2 Emis. Factor (tCO_2/GJ)	Fuel CO_2 Emis. Factor (tCO_2/unit)	CO_2 Emissions (tCO_2/yr)
Diesel	2.362.002	gallons	0,136	0,0741	0,0101	23.829
Fuel oil	133.464.662	gallons	0,147	0,0774	0,0114	1.523.640
Total						**1.547.470**

GWh/yr 2.078

OM Emission factor (tCO2/GWh) 744,6256

OM Emission factor (tCO2/MWh) 0,7446

BUILD MARGIN CALCULATION

Power Plant	Generation (GWh/yr)	Diesel 10^3gal/yr	Fuel oil 10^3gal/yr	Start of Operation (year)
. Censa - Amfels	327,66	0,00	19.795,32	1997
. Empresa Energética de Corinto	526,85	93,98	29.849,61	1999
. Tipitapa Power Company	412,40	0,00	24.640,70	1999
. Generadora San Rafael, S.A. (G	5,60	92,38	440,47	2004
. Las Brisas (GECSA)	26,83	2.078,56	-	1992
Total	**1.299**	**2.265**	**74.726**	

Fuel type	Fuel consumption	Units	Heat content (GJ/unit)	Fuel CO_2 Emis. Factor (tCO_2/GJ)	Fuel CO_2 Emis. Factor (tCO_2/unit)	CO_2 Emissions (tCO_2/yr)
Diesel	2.264.919	gallons	0,136	0,0741	0,0101	22.850
Fuel oil	74.726.106	gallons	0,147	0,0774	0,0114	853.078
Total						**875.927**

GWh/yr 1.299

BM Emission factor (tCO2/GWh) 674,1309

BM Emission factor (tCO2/MWh) 0,6741

CM Emission factor (tCO2/GWh) 709,3783

CM Emission factor (tCO2/MWh) 0,7094

Annex 4

MONITORING PLAN

Quantifying the energy sold is a fundamental responsibility of Nicaragua's Load Despatching office (Centro Nacional de Despacho de Carga in Spanish), a government company that is part of the National Transmission Company (Empresa Nacional de Transmisión Electrica S. A . in Spanish). The Load Despatching office acts as an intermediary between Monte Rosa and its electricity clients. The Load Despatching Office is responsible for the reads of the electricity meter in the sub station El Viejo and issuance of a report on the amount of electricity supplied to the grid (spot market) on a monthly basis.

According to the section D of this document, the variable that will be monitored in this project activity is the quantity of energy exported to the grid, from year 2001 up to the end of the last crediting period. Since no leakage nor any off-grid emissions change were identified in this project activity, there will be no need to monitor the variables for these cases. The monitoring will occur as follows:

The quantity of energy exported to the grid will be monitored through the monthly reports issued by the Nicaragua's Load Despatching Office. The archiving will occur up to two years after the end of the crediting period or the last issuance of CERs for this project activity, whatever occurs later. The amount of

energy will be registered in the spreadsheet "MRBCP.xls", which shall be the instrument for the further Verification.

Annex 5

LETTER OF APPROVAL

Gobierno de Nicaragua
Ministerio del Ambiente y los Recursos Naturales
MARENA

Despacho del Ministro

Managua 19 de Octubre del 2005
MD-CAHL-10-434-05

Señora
SUSHMA GERA
Presidente
Junta Ejecutiva del Mecanismo de Desarrollo Limpio
Sus Manos

Referencia: Aval Gubernamental para Proyecto Monte Rosa Cogeneración de Bagazo.

Estimado Señora Gera:

Tengo el agrado de dirigirme a usted en ocasión de informarle que la Oficina Nacional de Desarrollo Limpio (ONDL) del Ministerio del Ambiente y Recursos Naturales de Nicaragua, en su calidad de Autoridad Nacional Designada para lo ateniente al Protocolo de Kyoto, ha otorgado el aval gubernamental requerido para reclamar reducciones certificadas de gases de efecto de invernadero al Proyecto Monte Rosa Cogeneración de Bagazo, de la empresa Monte Rosa S.A.

El Gobierno de Nicaragua, habiendo firmado y ratificado el Protocolo de Kyoto y designado a la ONDL como Autoridad Nacional Designada, a través de la presente aprueba la participación voluntaria de este proyecto para los propósitos del articulo 12 del Protocolo de Kyoto.

La ONDL, después de examinar el Documento de Proyecto (PDD) y de encontrar que el mismo contribuye al desarrollo sostenible del país y se ajusta a la legislación nacional, se compromete a cooperar con los participantes del Proyecto y con la Junta Ejecutiva del Mecanismo de Desarrollo Limpio en todos los procesos que conlleven a la emisión y transferencia de las Reducciones Certificadas de Gases de Efecto de Invernadero.

A través de la presente también se expresa el apoyo del Gobierno de Nicaragua para que el Proyecto de Monte Rosa Cogeneración de Bagazo pueda hacer su registro unilateral ante el Mecanismos de Desarrollo Limpio.

Quedando a su entera disposición, le reitero las muestras de mi más alta consideración y estima personal.

Atentamente.

C. ARTURO HARDING LACAYO
Ministro de Ambiente y Recursos Naturales
Presidente de la Junta Directiva de la Oficina Nacional de Desarrollo Limpio

CC: Sr. Francisco Baltodano, Gerente General Ingenio Monte Rosa
Marina Stadthagen, Directora Oficina Nacional de Desarrollo Limpio, MARENA

Km. 12 ½ Carretera Norte
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Gobierno de Nicaragua
Ministerio del Ambiente y los Recursos Naturales
MARENA

Despacho del Ministro

Managua 19 de Octubre del 2005
MD-CAHL-10-434-05

Señor
FRANCISCO BALTODANO
Gerente
Ingenio Monte Rosa.
Su Despacho

Referencia: Aval Gubernamental para Proyecto Monte Rosa Cogeneración de Bagazo.

Estimado Señor Baltodano:

Tengo el agrado de dirigirme a usted en ocasión de informarle que la Junta Directiva de la Oficina Nacional de Desarrollo Limpio (ONDL) del Ministerio del Ambiente y Recursos Naturales de Nicaragua, me ha solicitado otorgarle el aval gubernamental requerido para que el Proyecto del Ingenio Monte Rosa pueda reclamar las reducciones certificadas de gases de efecto de invernadero que emanen del mismo.

La ONDL, después de examinar el Documento de Proyecto (PDD) y de encontrar que el mismo contribuye al desarrollo sostenible del país y se ajusta a la legislación nacional, se compromete a cooperar con el Ingenio Monte Rosa y con la Junta Ejecutiva del Mecanismo de Desarrollo Limpio en todos los procesos que conlleven a la emisión y transferencia de las Reducciones Certificadas de Gases de Efecto de Invernadero que de él emanen.

A través de la presente también se expresa el apoyo del Gobierno de Nicaragua para que dicho proyecto haga su registro unilateral ante el Mecanismo de Desarrollo Limpio.

Quedando a su entera disposición, le reitero las muestras de mi más alta consideración y estima personal.

Atentamente.

C. ARTURO HARDING LACAYO
Ministro de Ambiente y Recursos Naturales
Presidente de la Junta Directiva del la Oficina Nacional de Desarrollo Limpio

CC: Marina Stadthagen, Directora Oficina Nacional de Desarrollo Limpio/MARENA
Archivo

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