CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

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Annexes

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

San José de Minas Hydroelectric Project
Version 1
Completed on 30/04/2007

A.2. Description of the small-scale project activity:

The San José de Minas Project consists of installing an electricity generation plant using natural hydro resources, and the subsequent sale of electricity to the national interconnected system (SIN). The project will reduce CO_2 emissions, avoiding the electricity generation from the burning of fossil fuels in other plants connected to the national interconnected system.

The project will be located 60 kilometers northeast from Quito, capital of Ecuador, in the locality called San José de Minas, a municipality of Quito.

The San José de Minas Project will be a hydroelectric plant with an installed capacity of 5.7 MW, generating around 40,000 MWh annually, considering an 80% of utilization factor.

The project will use water from Perlabí and Cubí rivers, taking the water (in the elevation 1,734 m.a.s.l) at Perlabí River with a Caucasian intake and a desander. It will continue through the left border with a channel of 4,740 m long designed so as to have a flow of 0.96 m^3/s until the pressure tank. At Cubí River a run of river stealing work will be constructed (in the elevation 1,738 m.a.s.l) where a flow of 1.8 m^3/s will be caught.

After the intake, the stone trap and the desander will be placed, in order to continue with the 4,536m-long open channel until the pressure tank, where the two channels converge. A pressure pipe comes from the pressure tank with a diameter of 0.90 m and a length of 550 m, which reached the powerhouse located in the right border of Guayllabamba River, where a Pelton turbine of 5,700 kW is placed and waters are restored to Guayllabamba River, in the elevation 1,435 m.a.s.l. The substation is located next to the powerhouse, from which electric energy produced by the plant will be evacuated until the substation existing near Perucho, by means of a transmission line of 4.50 km length and 22.8 kV.

The works comprising the Project are the following:

- Diverting and intake works at Cubí River.
- Stone trap and desander.
- Intake at Perlabí River.
- Open channels in the left border of Perlabí River and at right border of Cubí River.
- Common pressure tank.
- Pressure Pipe.
- Powerhouse and annex works.
- Transmission line of 22.8 kV until Perucho with a length of 4.50 km.

The powerhouse will be equipped with a turbo-generator group with Pelton turbine with horizontal axis, with the following features:

Net fall	280.84 m
Power	5,700 kW
Flow	2.40 m³/s
System frequency	60 Hz
Speed	514.30 r.p.m.

The synchronic three-phase generator will have a horizontal axis, connected to the Pelton turbine and will have the following mail features:

Nominal power	5,700 kVA
Nominal power factor	0.80
Frequency	60.0 Hz
Nominal tension	6.6 kV
Nominal speed	514.30 r.p.m.

The purpose of the project is to supply, in a safety and economical way, the increase of the power and energy demand of the country, especially for big industrial consumers from Pichincha Province, avoiding the supply of this demand by thermal generation.

The project will contribute to sustainable development of the region since the project operation will help satisfying electric energy demand of the national interconnected system for the north area of Pichincha Province, which considerably reduces the fees for users and generates direct and indirect job sources in the area. It also contributes to the improvement of air quality by reducing the burn of fossil fuels so as to generate electricity. Likewise, a part of the benefits obtained from the sale of Certified Emission Reductions will be assigned for the conservation of the hydrographic basin, with the participation of different organizations in charge of managing it and entities interested in the sustainable development of the area where the project will be located.

A.3. Project participants:

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Ecuador (Host)	Empresa Hidroeléctrica San José de Minas S.A. (Private)	No
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party (ies) involved is required.		

Note: When the PDD is filled in support of a proposed new methodology at least the host Party(ies) and any known project participant (e.g. those proposing a new methodology) shall be identified.

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

A.4.1.1. Host Party(ies):

Ecuador

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

Pichincha Province

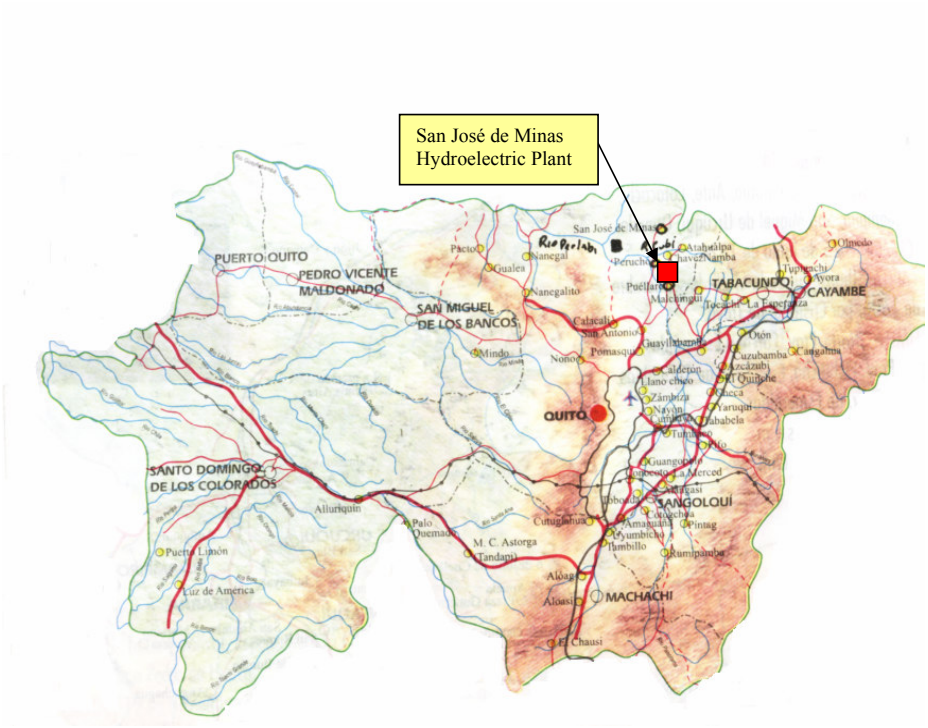
A.4.1.3. City/Town/Community etc:

Quito, Municipality of San José de Minas

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

The project is located in the Municipality of San José de Minas, at the northeast Pichincha Province, Ecuador, 60 km from Quito, and two hours by the road Quito/San José de Minas. Such road is in the vicinity of Cubí River.

The following map of Pichincha Province shows where the project will be located.



A.4.2. Type and category (ies) and technology/measure of the small-scale project activity:

In accordance with the List of Categories for Small-Scale CDM Projects included on Annex B of the Methodologies and Procedures for Small-Scale CDM Projects, the San José de Minas Project corresponds to:

Type I: Renewable Energy Project
Category D: Generation of electric energy for a system

San José de Minas Hydroelectric Plant relies on commercial, environmentally safe, and sounds technological packages as well as the required know-how for implementation. Equipment required for the implementation of the project activity (turbine, generator, etc.) are transferred to the host party since they are imported from Germany.

Hydroelectric energy is considered as clean and environment friendly, because it does not contributes to greenhouse gases emissions or to the mission of other contaminant gases such as SO_2 and NO_x.

This project will contribute to the reduction of emissions generated by fossil fuels, which would occur in absence of the project since thermoelectric generation is an important part of the baseline of the electric generation of the country.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

Years	Estimation of annual emission reductions in tonnes of CO_2e
August – December 2008	11,089
2009	26,612
2010	26,612
2011	26,612
2012	26,612
2013	26,612
2014	26,612
2015	26,612
2016	26,612
2017	26,612
January – July 2018	15,524
Total estimated reductions (tonnes of CO_2e)	**266,124**
Total number of crediting years	**10**
Annual average of the estimated reductions over the crediting period (tCO_2e)	**26,612**

A.4.4. Public funding of the small-scale project activity:

No public funds are involved in the San José de Minas Hydroelectric Project.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

In accordance with Annex C of the Methodologies and Procedures for Small-Scale CDM Projects, San José de Minas Hydroelectric Project is not a de-bundled component of a larger CDM project activity.

The project activity is an independent hydro power plant generating electricity and supplying the grid. The project participant does not have any other CDM project registered or to be registered:

- in the same project category,
- registered in the previous 2 years, or
- with project boundaries inside a radius of 1 km from the proposed project activity.

SECTION B. Application of a baseline and monitoring methodology

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

As mentioned before, according to the List of Categories for Small-Scale CDM Projects included on Annex B of the Methodologies and Procedures for Small-Scale CDM Projects, the San José de Minas Project corresponds to:

Type I: Renewable Energy Project
Category D: Generation of electric energy for a system

Therefore, the methodology selected is the AMS ID (version 11) applicable to electricity generation projects from renewable sources connected to the transmission and distribution grid.

B.2 Justification of the choice of the project category:

The San Jose de Minas Project meets the applicability conditions of the selected methodology, namely:

1. The project activity is a run of river hydroelectric power plant.
2. The project will supply electricity to the distribution system that is or would have been supplied by at least one fossil fuel fired generating unit as it is stated in AMS I.D
3. The installed capacity of the project is 5.7 MW, lower than 15 MW (the maximum allowed limit for being considered as a small-scale project).

B.3. Description of the project boundary:

The project boundaries include the physical and geographical limits of the hydroelectric plant.

However, for calculation of the grid emission factor, all power sources connected to the National Interconnected Grid are also included in the spatial extent of the project boundary.

B.4. Description of baseline and its development:

According to the abovementioned methodology, baseline emissions are calculated by multiplying the energy generated by the hydroelectric plant (in MWh) by the emission factor of the interconnected grid (in tCO_2e/MWh) calculated in a transparent and conservative manner using one of the following methods:

(a) A combined margin emission factor (CM), which consists of combining the operating margin (OM) and the build margin (BM) according to procedures of methodology ACM0002. Any of the four procedures to calculate the operating margin can be chosen, but the restrictions to use the Simple OM and the Average OM calculations must be considered.
(b) The weighted average emissions (in tCO_2e/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.

For this project activity, option (a) was selected. In order to calculate the baseline emissions of the project, an emission factor determined according to ACM0002 by the CDM Projects Promotion Bureau of Ecuador, CORDELIM, will be used.

When calculating the operating margin emission factor, the calculation method used is the Simple Adjusted method described by ACM0002, using data corresponding to the period 2003-2005.

On the other hand, the build margin emission factor was determined using data from year 2005.

Finally, the combined margin emission factor was calculated using the default weighting values proposed by ACM0002 (50%).

The emission factor established in such study is 0.66531 tCO_2e/MWh. This factor will remain fixed during the selected crediting period.

The detailed calculation of the emission factor will be available for the Designed Operational Entity (DOE) during the project's validation process.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

According to the methodology selected, a barrier analysis is conducted so as to demonstrate the project additionality.

National Energy Market

The CONELEC (National Electricity Council) of Ecuador, organization that governs policies and controls the energy produced in the country, points out that the national electricity system has a shortage of 150 MW/year, considering an average growth of the demand of a 5% annually.

The national interconnected system is supplied in a 46% by thermal generation plants that consume fossil fuels imported with high cost.

Another source of supply to the interconnected system is the eventual purchase of electricity from neighbor countries (Colombia and Peru) at a price of approximately 8 cents per kWh.

The electricity sector in Ecuador has been declared by national government as priority, within the strategic vision of the country, but due to several barriers, the situation of the sector have not being able of improving.

Only 5 to 6% is currently being used from existing hydroelectric resources in Ecuador. This is a clear demonstration that hydroelectric energy is an energy source not developed in the country. On the other hand, from all hydroelectric plants of Ecuador only 20% are small-scale plants.

From the 3,159 MW of the National Interconnected System (SIN) –by December 2006– 46% corresponds to thermal energy, which not only puts up the price of electricity fees for users, but consumes resources for purchase of fuels for its generation, as well as contaminates the environment due to the combustion of fossil fuels.

On year 2001, for thermal generation of energy, 184,315,000 gallons of bunker, 88,460,000 gallons of diesel, and 9,807,000 gallons of gasoline were burnt, equivalent to 240 million dollars.

According to data from the CONELEC presented in the National Plan of Electrification in force, the country has the following installed nominal capacity:

System	Hydroelectric (MW)	Thermal (MW)	Total (MW)
S.N.I.	1,704.40	1,455.0	3,159.4
Not incorporated	2.40	37.7	40.1
Self-generators	41.70	618.8	660.5
Total	**1,748.50**	**2,111.5**	**3,860.0**

The growth of electricity demand for the period between years 2002 and 2011 will be as follows:

Projection of the annual demand on generation terminals						
Year	Power demand (MW)			Energy demand (GWh)		
	Lower	Medium	Higher	Lower	Medium	Higher
2002	2,045	2,065	2,086	11,110	11,238	11,365
2003	2,094	2,131	2,174	11,409	11,655	11,909
2004	2,190	2,248	2,310	11,977	12,357	12,746
2005	2,275	2,354	2,440	12,483	13,011	13,544
2006	2,359	2,463	2,574	12,994	13,682	14,373
2007	2,445	2,576	2,714	13,505	14,366	15,229
2008	2,530	2,690	2,858	14,013	15,062	16,111
2009	2,614	2,804	3,004	14,518	15,770	17,018
2010	2,697	2,920	3,154	15,025	16,494	17,957
2011	2,781	3,039	3,309	15,543	17,241	18,935

Growth					
Power demand			Energy demand		
Lower	Medium	Higher	Lower	Medium	Higher
3.50%	4.40%	5.30%	3.80%	4.90%	5.80%

The following chart provided by CONELEC shows the historical evolution of demand from 1990 to 2001.

Historical evolution of electrical energy demand in generation terminals					
Year	Demand (GWh)			Growth (%)	
	Historical	Rationing	Total Demand	Historical	With rationing
1990	6,333	0	6,333	10.2	10.2
1991	6,957	0	6,957	9.9	9.9
1992	7,178	129	7,307	3.2	5.0
1993	7,392	0	7,392	3.0	1.2
1994	8,122	0	8,122	9.9	9.9
1995	8,383	497	8,880	3.2	9.3
1996	9,623	180	9,803	14.8	10.4
1997	10,298	125	10,423	7.0	6.3
1998	10,816	0	10,816	5.0	3.8
1999	10,236	0	10,236	-5.4	-5.4
2000	10,521	0	10,521	2.8	2.8
2001	10,860	0	10,860	3.2	3.2

From the balance conducted by the CONELEC between offer and demand of maximum power is inferred that, if new plants are not included in the National Interconnected System, more than those foreseen in the mentioned expansion plan, there would be a shortage of active power from 2007 and after 2009 in the growth scenarios with higher, medium, and lower demand, respectively.

The most critical situation is the energy demand present in periods of ebb tide of the east slope of Los Andes Mountain Chain, from October to March. This shortage would increase as the demand for economic reactivation grows, which is expected to occur in the next years. Likewise, the backup reserves would be lower than 10% in several months. If the hydroelectric generation does not increase, the option for the short and middle term would be the installation of new thermoelectric plants, which would make the socioeconomic problem of the country even worse due to the rising of electricity fees and the import of diesel not produced in Ecuador.

The most convenient solution for the generation expansion problem of the National Interconnected System would be to take full advantage of renewable natural resources, specially the hydro-energy. With this purpose, the possible effects of hydroelectric projects that may provide clean and cheap energy to the country have been assessed. Nevertheless, the characteristics of the national electricity sector and the barriers described below have as result, the existence of about 90 hydroelectric projects that still have not being started.

Background of Electricity Market

The Electricity Sector of Ecuador is in a period of transition when important changes are being carried out, with a free market of sale-purchase of energy, a energy dispatch system depending on the marginal production of plants, and with the responsibility of financing with private funds the growth and maintenance of electric generation and distribution.

At the beginning of the electricity industry in Ecuador, private companies built and operated the first energy generation and distribution systems. By the middle of the 50's, private companies handed the responsibility of developing the electricity sector over to City Councils.

In 1961 the INECEL, Ecuadorian Institute of Electrification, was created being a government entity responsible of the electrification of the country in all its stages.

In that time, with important incomes coming from oil, Ecuadorian Institute of Electrification build up Pisayambo, Paute, and Agoyán hydroelectric projects, as well as the Quito, Guayaquil, and Esmeraldas thermal projects. It also formulated the Main Plan for the Electrification of Ecuador, which conducted and inventory of hydro-energy resources of the country, with results published in different Catalogues. In addition, it integrated the country with the transmission ring, known as the National Interconnected System (SIN), and had an important contribution to the expansion of the urban and rural electrification through electricity companies.

Current Legal Framework of the Electricity Sector

With the Law for the Electricity Sector from 1996, the INECEL grants its shares of the distribution company to the Solidarity Fund, with the purpose of leading them to the privatization. From its electricity generation plants the INECEL constitute 6 companies as public limited corporations so that they can comprise the portfolio of the Solidarity Fund.

These electricity generation companies are:

- Termo Esmeraldas (132.5 MW)
- Termo Pichincha (85.2 MW)
- Termo Guayas (412 MW)
- Hidro Paute (1,075 MW)
- Hidro Agoyán (156 MW)
- Hidro Pisayambo (70 MW)

A public limited corporation was created with the assets of the National Interconnected System (SIN) known as Empresa Nacional de Transmisión Transelectric S.A. the shares of this company were transferred to be controlled by the Solidarity Fund.

The new law expressly divides the generation, transmission, and distribution business in independent business units. An agent from the new electricity market cannot generate energy and being a distributor.

With the purpose of allowing the free competence among generators, any generator can pay a transmission or distribution fee and send their energy to the point they want because the National Transmission System is obligated to allow the free to its transmission lines.

The law created two entities so as to support the electricity market.

- CONELEC (National Council for Electrification): it is created in order to represent the State and plan, regulate, and control the electricity market, as well as establish the fees for regulated consumers. Other functions of the CONELEC are to give licenses, permits, and awarding for generators and distributors, as well as “guarantee the operation of electricity market in a new competitive scheme".
- CENACE (National Corporation for Energy Control): it is responsible of the dispatch of generation units in the whole country, and of the technical, commercial, and financial operations of the Wholesaler Electricity Market.

The distributors will have to acquire and pay for electric energy to different sources, if considered as required. Such companies, just like big consumers, can accede to negotiate contracts with any generator providing them advantages.

There are two ways of entering in the Wholesaler Electricity Market for distributors as well as for big consumers so as to buy energy: in the Term market or in the Spot Market.

The Term Market is that where parties enter by means of a formal contract in which the generator commits to supply as much energy as to be paid at such price by the distributor during a period of more than one year. These contracts are safe, since the generation supply is controlled by the CENACE and, in case of the generator cannot supply the energy committed, the CENACE, with other generator, will supply the energy contracted and subsequently invoice the cost of it to the generator. Thus, the term market has a high safety and confidence in the fulfillment of contracts agreed that by law must be informed to the CENACE and the CONELEC.

The Spot market is the one that occurs in any moment. If a big consumer registered in the CONELEC as such starts consuming energy without having a long term firm contract with a generator, the CENACE will invoice the energy on the "spot" price, that is, the market price valid for that hour and that day. This spot price is the marginal cost of the last generation unit dispatched in the system. This way a purchase in the Wholesaler Electricity Market is being carried out; nevertheless, there is no certainty about the invoicing price for the energy consumption.

The Big Consumers are mainly industrials requiring a capacity of more than 1 MW. These companies can directly accede to transaction in the wholesaler electricity market in order to obtain the price advantages arising from the direct wholesaler market purchase. It is important to point out that currently many big consumers have self-generation plants and receive energy from electricity companies and they are invoiced for that.

San José de Minas, as Self-producer Company, does not participate as market and therefore in the wholesaler electricity market; it sells to its investors 100% of firm energy with term contracts (PPA's) with their respective guarantees, and the surplus (or secondary energy) with terms contracts with Empresa Eléctrica Quito.

Institutional Barrier

The mechanism and institutional requirements in Ecuador do not favor the development of the project. Bureaucratic processes in order to obtain licenses and permits (such as licenses for water, land use,

CONELEC, etc.) are not very developed and it takes more than 2 years in case of hydroelectric projects. This discourage investments and generate important delays in the implementation of this kind of projects, which subsequently entails additional costs due to delays in furnishing documents and permit required so as to operate, while that for thermal projects, the average time required so as to obtain all licenses is just a few months.

Technological Barrier

Small hydroelectric projects entail a high risk due to the uncertainty of water availability required for the normal operation of the plant, since they do not have reservoirs as large hydroelectric plants do. This situation must be considered because it may produce negative effects during the operation of the hydroelectric plant. This risk does not exist in thermal generation units.

Furthermore, mostly large hydroelectric power plants have been developed in Ecuador. Thus, lack of experience in the country regarding the implementation of small-scale hydroelectric projects is a barrier that must be overcome.

Financial Barrier

Small projects such as San José de Minas hydroelectric plant face significant barriers in order to identify and obtain funds for its implementation. It is very difficult to get national or international loans with convenient interest rates due to the risk involved and because of being long term and small projects.
Ecuador has not private financing mechanisms for infrastructure projects since they were implemented by the State of Ecuador using funds from national budget. When private companies were allowed to generate clean energy, this official decision was not supported with long term financing plans. Private banks require excessive guarantees (not accepting the developing project itself) in order to provide financing.

As consequence of this barrier, the San José de Minas project has not obtained all its financing, delaying 9 months its construction regarding to the initial implementation schedule.

From the financial analysis of the project is possible to see that incomes due to the sale in advance of Certified Emission Reductions (CER) contribute to reduce the risk associated to the project implementation and to achieve the cash flow closure, due to the financial leverage they provide. Without the income from CER, the financial closure would not be possible and it would be necessary to look for more loans and equity, which could be a big barrier to the implementation of the project, in case of not having the benefits provided by the CDM.

In accordance with all the above mentioned reasons, and considering the features of the national electricity sector and barriers described, in absence of the CDM project activity, the electric generation of San José de Minas project would have been produced by generators connected to the National Interconnected System, mainly through thermal units that generate emissions from the burn of fossil fuels.

For that reason, the proposed project activity is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

According to methodology AMS I.D, project emissions are equal to zero and leakage is considered only if the generation equipment is transferred from any other activity. Since this is not the case of the San José de Minas Hydroelectric Project, leakage associated to the project is not considered.

Therefore, the emission reductions obtained through the project are equal to baseline emissions, which are calculated from the energy generated by the hydroelectric plant multiplied by the emission factor of the electric transmission and distribution grid:

$$ER_y = EG_y \times EF_{grid}$$

ER_y Emission reductions (tCO_2e/year)
EG_y Electricity generation (MWh/year)
EF_{gris} Emission factor from electric grid (tCO_2e/MWh)

In this project, the emission factor determined according to ACM0002 by the CDM Projects Promotion Bureau of Ecuador, CORDELIM, will be used. This factor will remain fixed during the selected crediting period. Annex 3 of this PDD provides more information with this regard.

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	EF_{grid}
Data unit:	tCO_2e/MWh
Description:	Emission factor of the Interconnected System of Ecuador
Source of data used:	CORDELIM
Value applied:	0.66531
Justification of the choice of data or description of measurement methods and procedures actually applied:	The value used is the official emission factor of Ecuador's grid, calculated according to procedures described in the ACM0002 and using the updated information available at the moment of submitting this PDD.
Any comment:	This value will be used in the calculation of emission reductions.

B.6.3 Ex-ante calculation of emission reductions:

As mentioned above, since project emissions and leakage are equal to zero, baseline emissions are equal to the emission reductions of the project activity.

It is expected that electric generation of San José de Minas Hydroelectric Project will be 40,000 MWh/year. Therefore, by applying the official grid emission factor of Ecuador, the emission reductions result to be:

$$ER_y = 40{,}000\ MWh/year \times 0.66531\ tCO_2e/MWh = 26{,}612\ \text{tCO}_2\text{e/year}$$

B.6.4 Summary of the ex-ante estimation of emission reductions:

Year	Estimation of project activity emissions (tCO_2e)	Estimation of baseline emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
August – December 2008	0	11,089	0	11,089
2009	0	26,612	0	26,612
2010	0	26,612	0	26,612
2011	0	26,612	0	26,612
2012	0	26,612	0	26,612
2013	0	26,612	0	26,612
2014	0	26,612	0	26,612
2015	0	26,612	0	26,612
2016	0	26,612	0	26,612
2017	0	26,612	0	26,612
January – July 2018	0	15,524	0	15,524
Total (tonnes of CO_2e)	**0**	**266,124**	**0**	**266,124**

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data / Parameter:	EG_y
Data unit:	MWh/year
Description:	Electricity generation of the hydroelectric plant in the year *y*
Source of data to be used:	San José de Minas Hydroelectric plant
Value of data	40,000
Description of measurement methods and procedures to be applied:	Information monitored and registered on a continuous basis. The control panel and a SCDA system will be located inside the powerhouse.
QA/QC procedures to be applied:	The value monitored by San José de Minas Hydroelectric plant will be compared with the invoices of sale of electricity to the distribution grid.
Any comment:	

The data monitored will be kept until two years after finishing the selected crediting period.

B.7.2 Description of the monitoring plan:

San José de Minas Hydroelectric Plant will monitor on a continuous basis the electricity supplied to the transmission and distribution grid. The daily generation will be registered in an electronic spreadsheet specially designed for monitoring the emission reductions.

The instrument used for measuring the electricity generated will be calibrated according to the manufacturer recommendations. The values measured in the electric generation plant will be compared with those values measured with analogous equipment in the generation point as well as in the dispatch point through the Empresa Electrificadora de Quito grid, responsible for monitoring and control of the billable values.

The proper personnel of San José de Minas Hydroelectric Plant will be directly responsible for the measurement and registration of the electricity generation of the plant.

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

The application of the baseline and monitoring methodology was concluded on February 10th, 2007. The responsible person is:

Eng. Luis Endara Yepez
CDM Projects Consultant
endarale@uio.satnet.net
Quito, Ecuador

In addition, the application of the baseline and monitoring methodology was checked by MGM International SRL in March 2007.

Engineer Luis Endara Yepez and MGM International are not project participants.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

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C.1.1. Starting date of the project activity:

The construction of the facility is expected to start on June 2007.

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

40 years

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:

N/A

C.2.1.2. Length of the first crediting period:

N/A

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

01/08/2008

C.2.2.2. Length:

10 years.

SECTION D. Environmental impacts

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

One of the objectives of the San José de Minas Project, besides the electric generation, is to conserve and improve the natural source, that is, the hydro resources, by means of a Environmental Management Plan, with resources coming from the sale of energy to be produced by the project, achieving on the other hand the sustainability of the project.

From the point of view of the socioeconomic development, the project will be an important core in the region, since during the construction it will make possible the use of local manpower and the improvement of life quality of the inhabitant due to the infrastructure works that will remain after the project construction.

The project scheme, due to the nature of its works, is an ecologically clean project with practically no negative impacts to environment.

Considering that 90% of project works are located over non-productive lands, the impact over them will be minimal. Nevertheless, negative impacts that may arise during the construction of project, especially those during excavations will be mitigated with actions in order to not affecting the ecosystem.

The company owner of the project will provide U$S 20,000 annually so as to preserve the conservation of the hydrographic basin, with the participation of different organisms in charge of managing it and entities interested in carrying out a sustainable development in the area where the project is located.

Environmental Analysis

The environmental analysis includes the study of relationships among the project, the environment and the socioeconomic development, determining all the basic elements required so as to have a proper assessment of impacts and elaborate an environmental management plan.

The environmental analysis characterizes the project's area of influence by means of physical, biotic and socioeconomic elements, which are subsequently included so as to identify the regional activity over which works will be conducted.

The physical component is comprised of the geologic, geomorphologic, and geotechnical issues of lands and its current use, weather and hydrology. The inclusion of theses issues results in the recommended use of lands, and therefore the criteria required so as to determine a preliminary guideline for managing the influence area.

The biotic component is characterized by different existing life areas and zoogeographic regions with different vegetal and animal species.

The socioeconomic component mainly considers aspects characteristics from human and demographic settlements of the region.

Environmental Impacts of the Project

Due to the project nature, the works to be constructed practically will not produce negative impacts in the environment.

In order to analyze the potential impacts that project activities may have to environment and vice versa, two stages have been defined: construction and operation, evaluating at the same time the importance of economic and social development. The identification of potential impacts will be carried out by means of an analysis process with regard to project's works and activities, about the different components of the environment. The process includes two aspects: potential impacts of the projects to the environment and potential impacts of environment towards the project.

The following table presents a summary of activities inherent to the project and potential impact agents.

Phase 1: construction

Activities	Impact Agents
Acquisition of lands and expropriations	Affectation to private means
Adaptation and construction of ways	Potential collapse of solid material, organic waste
Transport of equipments and materials	Increase of traffic, dust, gases, noise and danger of traffic accidents
Installation of camps and storages	Solid particles, solid and liquid waste
Cleaning, excavation, filling, leveling	Solid waste, minor and temporary noise
Evacuation and diversion of waters	Decrease of runoff water
Excavation for foundations	Solid material exceeding, dust, noise and gases
Application of concrete of works	Solid material exceeding, dust, noise and gases
Installation of equipments, piping	Personal risks

Phase 2: operation

Activities	Impact Agents
System maintenance Cleaning and repairs	Personal risks, solid and liquid waste
Operation Collection of flows Production of electric energy Transmission of electric energy	Decrease of river flows Production of electric energy; noise Danger of electrocution at towers

Environmental Management Plan

The Environmental Management Plan provides to the hydroelectric project mechanisms to be executed in the short and middle term once construction activities have been started, in order to obtain a composed operation and a rational management of natural resources and human groups, enabling the preservation and maintenance of the project's influence area.

The Environmental Management Plan will provide technical guidance to the constructor, supervisors and other environmental control entities, so as to advance in the construction, operation and maintenance of the hydroelectric plant under environmental parameters adjusted to regulations in force, with the purpose of fulfilling the Environmental Management Plan within the project's budget.

The Environmental Management Plan for Perlabí and Cubí basins, by means of an Environmental Management Unit, will have plans and programs for the conservation of the hydrographic basins. With such purpose, they will have their own budget so as to obtain the infrastructure required as well as operation and maintenance expenses.

The investments to be carried out in the Environmental Management Plan are divided in two stages:

First Stage

This stage includes the expenses to be paid during the construction of the project. It is divided in two parts:

a) Expenses for the building infrastructure so as to operate the Environmental Unit.
b) Expenses for the repair of impacts caused due to the construction of the project.

The expenses of this stage are included in the project's construction budget.

Second Stage

This stage includes the operation and maintenance of the Environmental Management Unit.

The expenses will be funded with the incomes of the project from the sale of energy and have been considered within the economic and financial analysis of the project.

D.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:

Due to the project's nature and the kind of works established in the design, construction, and operation of the San José de Minas Hydroelectric Plant, there will not be impacts considered as significant neither by the project participants nor by environmental authorities of the country.

SECTION E. Stakeholders' comments

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

From the beginning of the project a permanent dialogue was held with the sectors physically involved in the project. The results were very satisfactory.

There are acts dully signed of the different meetings with community and inhabitants of the areas surrounding the basins of rivers involved in the project.

They know the benefits obtained by the project. One of the main benefits is the improvement of the life conditions of people due to the infrastructure works that will remain after the construction of the project. The improvement of accesses will improve the conditions and reduce the time of transportation of people. For them, this is an extremely positive impact of the project.

E.2. Summary of the comments received:

The local stakeholders were consulted by means of a questionnaire. As result, no negative comments or objections were received. The inhabitants understood the importance of the project.

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

Since all comments received have been positive, it is not necessary to conduct corrective actions.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Compañía Hidroeléctrica San José de Minas S.A.
Street/P.O.Box:	Av. Amapolas N- 46 – 27 y Alondras
Building:	Sector Monteserrin 2º piso
City:	Quito
State/Region:	Pichincha
Postfix/ZIP:	
Country:	Ecuador
Telephone:	593 – 2 – 2262555
FAX:	-
E-Mail:	freilejc@uio.satnet.net
URL:	-
Represented by:	Juan Carlos Freile
Title:	General Manager
Salutation:	Doctor
Last Name:	Freile
Middle Name:	-
First Name:	Juan
Department:	General Manager
Mobile:	-
Direct FAX:	-
Direct tel:	-
Personal E-Mail:	freilejc@uio.satnet.net

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funds have been considered so as to finance the project implementation.

Annex 3

BASELINE INFORMATION

CORDELIM[1], CDM Projects Promotion Bureau of Ecuador, with the collaboration of Eco-Alianzas Estratégicas Cia Ltda., have calculated the emission factor of the national electric grid using the methodology ACM0002.

The calculation of baseline emissions of the San José de Minas Hydroelectric Project uses such emission factor, applicable to big and small-scale projects, as considered by the CDM.

The emission factor is calculated as a combined margin (CM), which consists of the combination of two factors: the operating margin (OM) and the build margin (BM).

The calculation method used for obtaining the operating margin emission factor is the Simple Adjusted Method proposed by the ACM0002. The results are the following:

Lambda (λ) 2003	0.00833333
Lambda (λ) 2004	0.01331967
Lambda (λ) 2005	0.00011416
Emission factor of the operating margin (EF_{OM}) 2003-2005	0.74783 tCO_2e/MWh
Emission factor of the build margin (EF_{BM}) 2005	0.58279 tCO_2e/MWh
Emission factor of the combined margin, using the default weights (50%)	**0.66531 tCO_2e/MWh**

The detailed calculations, as well as all the information used for it, are available in the following address: http://www.cordelim.net/cordelim.php?c=835.

[1] http://www.cordelim.net/

Annex 4

MONITORING INFORMATION

The monitoring plan of the project specifies the continuous monitoring of electric generation at San José de Minas Hydroelectric Plant.

In each vintage year, the amount of emission reductions obtained by the project activity will vary in relation to the total measured power generation. Thus, accurate measurement of the generated electricity will constitute an important aspect in claiming emission reduction once this project is implemented.

The methodology describes the procedure and equations for calculating emission reduction from monitored data. For this specific project, the methodology is applied through a spreadsheet model. The staff responsible for project monitoring must complete the electronic worksheets on a monthly basis. The spreadsheet automatically provides annual totals in terms of GHG reductions achieved by the project.

There are cells where the user is allowed to enter data. All other cells contain computed values that cannot be modified by the staff.

A color-coded key is used to facilitate data input. The key for the code is as follows*:*

- ***Input Fields:*** Pale yellow fields indicate cells where project operators are required to supply data input, as is needed to run the model;
- ***Result Fields:*** Green fields display result lines as calculated by the model.

All the monitored data will be archived for two years following the end of the crediting period.

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