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

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

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

Santa Rosa ("the project")
22/12/2011
Version 06

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

The proposed project is a bundle of 3 small run-of-river hydropower plants located in Lima-Peru in the Santa Rosa Irrigation[1]in the Sayán District. The purpose of the project is renewable electricity generation to be supplied to the National Interconnected Electric Grid ("*SEIN")*. The project's installed capacity and projected yearly average generation are 4.218 MW and 30.1 Gigawatts hours ("GWh"), respectively[2].

	Installed Capacity (MW)	Expected Electricity Generation (GWh/yr)
Santa Rosa I	1.063	7.9
Santa Rosa II	1.655	12.0
Santa Rosa III	1.500	10.2
The project	4.218	30.1

Source: The project's technical report.

The project is expected to displace 94,584 tons of carbon dioxide equivalent ("tCO_2e") in the second 7-year crediting period, generating an equivalent amount of certified emission reductions ("CERs"). The project takes advantage of 3 canal rapids in the 30-km water channel[3] derived from the Huara[4] River by means of the Santa Rosa irrigation water intake, to the irrigation site. Santa Rosa I, II and III are in a cascade, located in three slopes of 29.05 meters, 50 meters, and 50 meters net head; with a nominal water flow of 4.57m^3/s, 4.24 m^3/s, and 4.00 m^3/s, respectively. The design of the project provides for a power house for each turbine (1.063MW, 1.655MW and 1.5MW). The water flow used by Santa Rosa I is almost the same as the water that has been captured by the Santa Rosa derivation channel. Santa Rosa II and III will use less water as they are located downstream and there is more agricultural irrigation outflow in between. These plants work in sequence, i.e. Santa Rosa III will use water already turbinated by Santa Rosa II, and the latter will use water already turbinated by Santa Rosa I.

The project will supply electricity to the SEIN by connecting to the 22.9 KV transmission line that belongs to the privately-owned energy distributor for the north of Lima, EDELNOR. Each of the 3 small hydropower plants will use its own 22.9/2.3 KV substation and transmission line for this purpose.

The project contributes to sustainable development by:

a) Assisting the SEIN to keep thermal plants shut and use them only as stand-by power generation, therefore, displacing expensive heavy fuel, diesel, coal and gas fired generation and at the same time; reducing CO_2 emissions to the atmosphere by generating energy without greenhouse gases ("GHGs") emissions.

[1]Which has more than 40 years in operation.

[2]When the 3 small run-of-river hydropower plants are in operation.

[3]Santa Rosa derivation channel.

[4]Which is one of the largest rivers on the Peruvian coast.

b) Employing local labor in construction and plant management.
c) Purifying/cleaning of the water for irrigation.
d) Facilitating electricity access by serving demand that otherwise would suffer blackouts in the zone, due to failures in the already existing EDELNOR 66 KV transmission line.
e) Influencing population to buy electricity from the grid due to reliable electricity service quality in the zone instead of opting to continue living in the dark or continue using generation sources that emit GHGs.
f) Serving as a small demonstration project for clean renewable electricity generation in the country, functioning as an independent power producer ("IPP").
g) Contributing to Peru's fiscal accounts through the payment of taxes.
h) Helping the country improve the hydrocarbons trade balance through reduction of oil imports to be used for electricity generation.
i) The project's sponsor ("the sponsor") agreed to share part of the CERs income with the community of La Merced and also to provide free electricity to the neighboring orphanage, which is run by a non-governmental organization named Asociación Achalay.

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)
Peru (host)	Eléctrica Santa Rosa SAC	No
Italy	International Bank for Reconstruction and Development as Trustee of the Community Development Carbon Fund ("CDCF")	Yes
Denmark	Danish Ministry of Climate and Energy / Danish Energy Agency; Nordjysk Elhandel A/S; Maersk Olie og Gas AS; DONG Naturgas A/S; Aalborg Portland A/S	Yes
Japan	Idemitsu Kosan Co., Ltd; The Okinawa Electric Power Company, Inc.; JX Nippon Oil & Energy Corporation.; Fujifilm Corporation; Daiwa Securities Capital Markets Co. Ltd.	No
Spain	Kingdom of Spain - Ministry of Environment and Rural and Marine Affairs & Ministry of Economy and Finance; Endesa Generación S.A.; Hidroeléctrica del Cantábrico, S.A.; Gas Natural SDG, S.A.;	Yes
Norway	Statoil ASA; Statkraft Carbon Invest AS	No
The Netherlands	Netherlands' Ministry of Infrastructure and the Environment (IenM); Energias de Portugal S.A. (EDP);	Yes

Sweden	Göteborg Energi AB	No
Austria	Kommunalkredit Public Consulting GmbH	Yes
Finland	Ruukki Metals Oy	No
Switzerland	Schweizerische Rückversicherungsgesellschaft AG - Swiss Re	No
Italy	Government of Italy - Ministry for the Environment, Land and Sea	Yes
Belgium	Brussels - Capital Region; Kingdom of Belgium – Walloon Region Ministry of the Environment;	Yes
Canada	Government of Canada - Ministry of Foreign Affairs and International Trade	Yes
Luxembourg	Government of Luxembourg -Ministry of the Environment	Yes
Germany	KfW Bankengruppe, BASF SE	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 (forms CDM-NBM and CDM-NMM),* at least the host Party (ies) and any known project participants (e.g. those proposing a new methodology) shall be identified.		

The Official Contact Person for the Clean Development Mechanism ("CDM") project activity:
Joëlle Chassard
Manager
Carbon Finance Unit IBRD as the Trustee of the CDCF and DCF
Washington DC. USA
Contact information is listed in Annex 1.

A.4. Technical description of the small-scaleproject activity:

A.4.1. Location of the small-scaleproject activity:

Andean Region, South America, Peru, Lima

A.4.1.1. Host Party(ies):

Republic of Peru

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

Department of Lima/Huara Province/Sayán District

A.4.1.3. City/Town/Community etc:

Sayán Town

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 Department of Lima in the Santa Rosa irrigation in the Sayán District approximately 130 km north east of Lima. The access from Lima is reached by following the Panamericana Norte highway until the deviation to Sayán (located approximately 2 hours drive from

Lima). Santa Rosa I is located at a relatively short distance from the deviation to Sayán (approximately 20 minutes driving); Santa Rosa II is located 2 km downstream and Santa Rosa III is located 2 km downstream Santa Rosa II.

The coordinates of the project are as follows:

Santa Rosa I
Catchment: Latitude: -11.188456 Longitude: -77.305122
Tailrace: Latitude: -11.188558 Longitude: -77.305853
Altitude: 650 meters above sea level.

Santa Rosa II
Catchment: Latitude: -11.199203 Longitude: -77.312500
Tailrace: Latitude: -11.199692 Longitude: -77.313278
Altitude: 600 meters above sea level

Santa Rosa III
Catchment: Latitude: -11.209231 Longitude: -77.314575
Tailrace: Latitude: -11.209619 Longitude: -77.314742

Satellite picture of the project site

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

The project falls into:
-Type I: Renewable Energy Projects.
-Category D Version 17 EB 61: Renewable electricity generation for a grid.

The project conforms with this category because it is a hydropower plant that will supply electricity to a grid. The project installed capacity is 4.218 MW and will not increase its capacity beyond 15 MW; complying with the limits for small-scale project activities every year over the 14-year crediting period. That the small-scale project activity is not a debundled component of a larger project activity is further analyzed under A.4.5.

The technology to be used is traditional run-of-the-river hydropower plants, low impact water intakes, small canals, and penstocks leading turbines. The project will benefit from the existing irrigation infrastructure, reducing civil works costs. All turbinated water is discharged back to the existing canals in unaltered conditions other than cleaner.

The project has transferred environmentally safe and sound technology and know-how to Peru by:

-Serving as a small demonstrative project for clean renewable electricity generation in the country, functioning as an IPP. This is only possible in Peru after the Electric Concessions Law of 1992 ("ECL"), which separated the electricity business in generation, transmission and distribution. The ECL aimed at breaking the monopolistic conception of the electricity business in Peru and at welcoming private investment. The project constitutes a model that, if successful, can be replicated in other locations of the country.

-Hiring local labor in all of its implementation phases, including the design and execution of civil works. During operation, all the staff working in operation and maintenance of the project will be local people, previously trained if necessary.

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

The first crediting period is of 7 years: from 01/08/2004 until 31/07/2011 with the option of renewing the crediting period twice. The second crediting period goes from 01/08/2011 until 31/07/2018 with the option of renewing the crediting period one more time.

Following baseline methodology AMS-ID, the project is estimated to reduce 94,584 ERs for the duration of the second 7-year crediting period and 13,512 estimated ERs every year[5].

Years	Estimation of annual emissions reductions in tonnes of CO_{2e}
Year 2011*	5,630
Year 2012	13,512
Year 2013	13,512
Year 2014	13,512
Year 2015	13,512

[5] These are estimates. For each crediting period, the baseline and emission reductions will be recalculated each time.

Year 2016	13,512
Year 2017	13,512
Year 2018**	7,882
Total Estimated Reductions (tonnes of CO_{2e})	94,584
Total number of crediting years	7
Annual average of the estimated reductions over the crediting period (tCO_{2e})	13,512

*Five months of operation

** Seven months of operation

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

The project has not received and will not receive any type of public funding or public financial help.

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

Following Annex C, the project is not deemed to be a debundled component of a large project activity because there is not a registered small-scale CDM project activity or an application to register another small-scale CDM project:

-With the same project participants
-In the same project category and technology/measure;
-Registered within the previous 2 years; and
-Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.

Hence, the project is eligible as a small-scale CDM project and can use the simplified modalities and procedures for small-scale CDM project activities.

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:

The type and category of the project activity for the project is as follows:
-Type I: Renewable Energy Project
-Category D: Renewable electricity generation for a grid

The project falls into project category I.D. because it is a hydropower plant that will supply renewable electricity to a grid. Hence, the applicable baseline and monitoring methodology for the project is AMS-ID version 17, EB 61.
The project refers also to the "Tool to calculate the emission factor for an electricity system" Version 02.2.1, EB 63.

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

The small scale methodology AMS-I.D version 17 has been chosen because it applies to grid connected renewable power generation project activities. In particular, this methodology is applicable because:

1. It comprises renewable energy generation units, such as hydro that will supply electricity to a national grid. The project falls into project category I.D. because it is a hydropower plant that will supply renewable electricity to a grid
2. This methodology is applicable to project activities that (a) install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant), which is the case of the Project activity.

3. The project involves no reservoir installation or change in the existing reservoir volume as the project is a run-of-river project activity.

4. The geographic and system boundaries for the electricity grid are clearly identified and information on the grid characteristics is available, and

5. The eligibility limit of 15 MW for a small-scale CDM project activity applies as the project's installed capacity is 4.218 MW. .

The project falls into project category I.D. because it is a hydropower plant that will supply renewable electricity to a grid. Hence, the applicable baseline methodology for the project is AMS-ID, Version 17.

The chosen baseline calculation following AMS-ID is the average of the "approximate operating margin" and the "build margin". The baseline calculation chosen was deemed to be superior on its compliance with the Marrakech Accords ("MA")'s baseline definition[6], than the weighted average emissions of the current generation mix for two reasons:
a) The project is more likely to mitigate fossil fuel-based electricity generation than hydro electricity generation given the *SEIN* dispatch characteristics[7]; this operational fact of the *SEIN*, would have been completely ignored if the weighted average emissions (in $KgCO_2/KWh$) of the current generation mix had been considered the project's baseline. However, it is taken into account (with a weight of 25%)[8] in the baseline chosen as the approximate operating margin excludes hydro sources[9];

b) The build margin is a more dynamic component for the baseline than the weighted average emissions (in $KgCO_2/KWh$) of the current generation mix, since the build margin focuses on the emission from the most recently-built plants[10]. At the same time, the build margin is also conservative as it is based on emissions (in $KgCO_2/KWh$) of a generation mix that do not exclude any type of electricity generation technology. In summary, it was deemed that 0.25OM + 0.75BM combination of both margins (approximate operating margin and build margin) following AMS-ID and the "Tool to calculate the emission factor for an electricity system" explained better what would happen in the absence of the project activity than the weighted average emissions (in $KgCO_2/KWh$) of the current generation mix.

[6] The definition for baseline of the Marrakech Accords ("MA"), is: "The baseline for a CDM project activity is the scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed project activity".

[7] Which assigns less dispatch merit order to fossil fuel-based generation than to hydropower plant generation (the project's technology).Geothermal, wind, low-cost biomass, nuclear and solar generation are inexistent in the *SEIN*.

[8] Given the Annex 12 "Tool to calculate the emission factor for an electricity system" (Ver 02.2.1) where it is recommended to use Wom=0.25 and WBm=0.75 for the second and third crediting period

[9] Geothermal, wind, low-cost biomass, nuclear and solar generation are inexistent in the *SEIN*.

[10] The latest capacity addition's generation up to 20% of the *NIS* generation takes new units added from 2007.

B.3. Description of the project boundary:

According to methodology AMS-ID, the project boundary encompasses the physical, geographical site of the renewable electricity generation source. Hence, the project boundary is the area in the Santa Rosa Irrigation where Santa Rosa I, II and III powerhouses and transmission lines are placed. As the transmission lines reach the SEIN by interconnecting to EDELNOR transmission line, the SEIN will also be included in the project's boundary.

B.4. Description of baseline and its development:

The project falls into project category I.D. because it is a hydropower plant that will supply renewable electricity to a grid. Hence, the applicable baseline methodology for the project is AMS-ID version 17.

According to the Procedures for renewal of the crediting period of a registered CDM project activity (version 06, EB 63), project participants shall update the sections of the PDD relating to the baseline, estimated emission reductions and the monitoring plan using an approved baseline and monitoring methodology.

Baseline Update

The "*Tool to assess the validity of the original/current baseline and to update the baseline at the renewal of a crediting period*" version 02, EB63, was used and includes the following steps:

Step 1: Assess the validity of the current baseline for the next crediting period

As per the methodology, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the electricity delivered to the grid by the project activity that otherwise would have been generated by the operation of grid-connected power plants and by the addition of new generation sources. As the project is the grid connected renewable power plant, the above mentioned baseline is applicable.

The "Procedures for the renewal of the crediting period of a registered CDM project activity" approved by the CDM Executive Board require assessing the impact of new relevant national and/or sectoral policies and circumstances on the current applied baseline.

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

The Peruvian electricity regulatory system is based on three main principles:

a) the segmentation of the electricity business into generation, transmission and distribution/commercialization;
b) generation is considered a competitive segment of the business, where prices are determined mainly by "free" negotiated transactions, and transmission and distribution/commercialization are regulated; and
c) prices to the regulated segments are determined by cost-causation and/or benefit-causation.

The legal framework of the electricity sector is the Electricity Concession Law DL 25844 of 1992 (ECL), complemented by the Law 28832 of 2006, and their main regulations.

The following table mentions Peru's Regulatory framework for the electricity sector:

Law/ Policy	Key Elements / requirements	Does this law/policy exist during initial registration? Yes/No	Are there any changes since then? If yes, explain.	Does the project baseline comply ? Yes/No	How it complies
Electricity concessions law (Decree-Law Number 25844) and its regulatory supreme Decree No. 009 – 93 – EM.	-Establish the legal provisions with respect to the regulatory issues on generation, transmission, distribution and commercialization of electricity. -The Ministry of Energy & Mining, and OSINER Gon behalf of Peru's government, shall oversee compliance of this law. -Generation, transmission &distribution activities could be carried out by national or international individuals or companies.	Yes	No	Yes	The application of the Electricity Concessions law prevails, as this law mostly defines the regulatory framework for the electricity sector in Peru. The project baseline is in compliance with this law.
Promotion of natural gas industry: Law N° 27133 and its regulatory decree N° 040-99-EM	-Establish specific conditions in order to enhance the development of natural gas industry. -Promotes competitiveness and diversification of energy resources, increasing electricity supply reliability and boosting competitiveness of the industrial sector in the country.	Yes	No	Yes	The same circumstances apply, as when the project was registered, in terms of incentives for the development of natural gas projects.
Regulatory decree in cogeneration. (D.S. N° 064-2005-EM) and its substitution (D. S N° 037-2006-EM)	-Regulatory framework for cogeneration to promote deployment of this technology. -Conditions and requirements in which cogeneration developers can participate in the electricity market	No	No	Yes	Provides a legal framework for cogeneration projects. It doesn't affect the project's baseline.
Efficient electricity generation development law. (Law N° 28832, 2006)[11]	Electricity concessions law has been improved through the efficient electricity generation development law with the following objectives: a) Ensure that efficient electricity generation will be sufficient to: •Reduce risk exposure to highly volatile prices in Peru's electricity system •Reduce long rationing periods consequence of limited energy offer •Guarantee the most competitive electric tariff for end users. b) Reduce administrative intervention in setting generation prices, promoting a market mechanism approach. c) Adopt all necessary measures to foster effective competitiveness in generation market. d) Introduce compensation mechanisms between SEIN and isolated systems so that prices from the latter include benefits from natural gas and reduce exposure to fuel markets volatility.	No	No	Yes	Provides a clearer framework to promote a better investment environment for a more efficient electricity generation. Conditions for electricity generation are improved, still the project is not being business as usual, and thus the project baseline complies.
Supreme Decree (SD) No 037-2007 – EF (SD 037)[12]	-Extends the anticipated recovery regimen of the general sales tax ("Impuesto General a las Ventas – IGV") to the hydro electrical generation companies.	No	No	Yes	This Decree applies only to hydros>20 MW, thus it doesn't affect the project baseline.

[11] http://www.minem.gob.pe/minem/archivos/file/Electricidad/legislacion/002subsectorelectricidad/ley28832.pdf

[12] http://www.minem.gob.pe/archivos/dge/publicaciones/compendio/ds037-2007.pdf

	- Applies for companies with concessions (complying Law Decree No 25844) for hydropower plants, therefore it only applies for project activities over 20 MW[13].				
Legislative Decree No 1002[14] (LD 1002) (May 2008) and Supreme Decree No.050-2008-EM (October 2008)[15]	Promotion of investment in electricity generation using renewable energy (RE), the key provisions as follows: -Every five years MEM is charged with issuing a target ceiling for RE. For the first five years (until 2013), the ceiling is set at 5 percent of total national electricity consumption - Acknowledges CDM to promote the development of renewable energy projects and obtain CERs. -Wind, solar, geothermic, biomass and tidal/wave energy are considered RE sources, as well as small hydro (<20 MW) -Small hydro is not considered in the 5 percent ceiling, but will benefit fully from the incentives - RE will have priority in the daily dispatch and RE plants will sell their energy production to the spot market -RE plants will receive the marginal spot price of energy plus a premium in case the spot price is lower than the tariff established by OSINERGMIN[16] - The premium and tariff will be calculated depending on the type of technology and other characteristics of the installations, and will be guaranteed a rate of return of no less than that for electricity concessions, currently 12%. - The premiums will be auctioned by OSINGERMIN - Transmission cost to connect the RE plant to the grid will be considered part of the investment cost of the plant for the premium calculation. -The incremental costs will be recovered by a user charge.	No	No	Yes	While the RE Decree is an important step forward, there are many practical details to be settled as part of the process of developing the regulations that will permit implementation of the Decree. Only after these details are decided would it be possible to make judgments about the extent to which the new Decree will significantly assist small hydro (and renewable energy) producers. The new Decree, once it is regulated and effective, is an important first step to unlock the small hydro potential of Peru.However, because of the high subsidies on natural gas, at present small hydro is not financially viable. The removal of the gas price subsidy or a preferential tariff for small hydropower would unlock significant small hydro potential.[17] The New Decree is based on incentives and improving the general conditions of investment for RE projects. However, it is not mandatory to develop renewable energy projects and thus project baseline complies.
Creation of the Ministry of the Environment (2008)	The management of environmental safeguards in the case of energy remains within the environmental department of the MEM. - For hydro projects, INRENA[18] has to review the environmental study (ES) before it is approved. -Small hydros (<20 MW) do not require a full ES but an Environmental Impact Declaration and if mitigation measures are required an Environmental Management	No	No	Yes	The project baseline complies. Even though the project is <20 MW, an EIA was developed and the conclusions were an overall low negative environmental impact.

[13] According to the Article 3o of LD 25844, a concession is required for generation activities using hydro or geothermal resources when their installed capacity >20 MW.

[14] http://www.minem.gob.pe/minem/archivos/file/Electricidad/legislacion/002subsectorelectricidad/dleg1002.pdf

[15] http://www.minem.gob.pe/minem/archivos/file/Electricidad/legislacion/002subsectorelectricidad/ds050-2008-em.pdf

[16] OSINERGMIN stands for "Organismo Supervisor de la Inversión en Energía y Minería".

[17] The Decree represents an important step forward. If the implementing rules provide some degree of certainty in the preferential tariff, then one can expect that many small hydro projects currently installed for lack of an adequate tariff and the related financing difficulties (despite carbon revenues) move to implementation. Whether the decree will in fact encourage small hydro projects depends critically on its implementation details. Another downside is that the decree sets no penalties upon any entity in the case of noncompliance (unlike in Chile), the decree is much weaker than in other countries that have set specific targets.

[18] INRENA stands for National Institute for Natural Resources

	Plan				

From the table above it can be inferred that investment conditions have improved for developing renewable energy projects. However, the low price of natural gas and the resulting low tariff for power generation has made it very difficult for most small hydro projects to compete in the marketplace. The main challenge includes the tariff premium to be given to qualifying facilities and finance as it makes a significant difference to developers' cash flows and enhances debt service cover ratios required for non-recourse financing.

The Electric market in Peru is known for its constant change. From the last modifications affecting generation units the one limiting the marginal costs or obligating the generators to sell electricity to distributor at lower tariffs reduce the attractiveness of the sector, and adding risks to hydro projects, especially smalls ones. It is important to mention that small companies with small projects have no major participation in the development of the market, then is more vulnerable to modifications that may favor or stimulate other technologies (e.g. thermoelectric).

From this analysis it is concluded that the current baseline complies with all relevant mandatory national and/or sectoral policies which have come into effect after the submission of the project activity for validation or the submission of the previous request for renewal of the crediting period and are applicable at the time of requesting renewal of the crediting period.

Step 1.2: Assess the impact of circumstances

Assess the impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions, without reassessing the baseline scenario.

As mentioned in the table above, the new circumstances related to electricity generation have improved for renewable energy projects. However, there are still many barriers to overcome for the renewable energy sector to unlock. The 2008 World Bank Study of small hydro power plants considers that the main barriers of small hydro in Peru are regulatory measures that have a negative impact in the financial viability of the projects (including the subsidies of the natural gas that reduce the tariff for hydros). As a consequence of the regulatory framework, most of the hydro projects are not financially viable even with carbon incomes. Project activities below 20 MW also have barriers for their implementation.

It is important to mention that frequent variation in the regulatory framework is also a risk for project developers of long term construction and operation projects as the hydro power plants. As stated before new laws can reduce hydro power plants income and affect their financial expectations.

The circumstances related to electricity generation (renewable energy projects not being the business as usual scenario in Peru) are similar to when the PDD was first submitted for registration although a smaller share of renewable energy is currently present. Currently renewable energies represent 41% of power generation vs. 59% from fossil fuels power generation[19].

The perspective of a scenario where the status quo remains implies a greater thermoelectric power generation instead of renewable generation in the medium run. As it has been mentioned before for the Renewable Energy Decree to be effective a couple of changes (tariffs, subsidies) have to be modified first. The different incentives for the natural gas electricity generation and its major impact in the hydro power

[19] According to "Anuario Estadístico 2009", page 11. Ministerio de Energía y Minas, Perú.

development in the country, show that for small projects the financial returns (FIRR) can be reduced in around70% because of the natural gas subsidy[20].

It remains to be seen how effective the Renewable Energy Decree will be in triggering renewable energy project development.
Due that similar circumstances prevail as when the last PDD was submitted, the continued validity of the current baseline is plausible.

Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) is technically possible

As the project activity involves a hydro power plant where in the absence of the project activity, the project participants would not have constructed the plant but where the electricity would have been generated in other existing plants and/or in new plants constructed by third parties elsewhere. It is assessed that the remaining technical lifetime of the equipment that would have continued to be used in the absence of the project activity, exceeds the crediting period for which renewal is requested.

Step 1.4: Assessment of the validity of the data and parameters

The data and parameters have been verified and some of them need to be updated. That is the case of the emission factor for the electricity grid and the corresponding IPCC default values for fuel type, therefore the baseline needs to be updated for the subsequent crediting period and we go to step 2.

Step 2: Update the current baseline and the data and parameters
As step 1.4 showed that the current baseline needs to be updated, we go to the next step:

Step 2.1: Update the current baseline

Given that the application of Steps 1.1, 1.2, 1.3 and 1.4 confirmed that the current baseline is still valid for the subsequent crediting period, then this baseline, can be used for the renewed crediting period.

Step 2.2: Update the data and parameters
If the application of Step 1.4 showed that the data and/or parameter(s) that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore, project participants should update all applicable data and parameters, following the guidance in Step 1.4. Accordingly, this step has been implemented and updated the relevant parameters in the emission factor calculations.

To look at the baseline update in terms of data and parameters estimates go to section B.6.3

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:

The project will generate electricity without emitting GHGs and supply it to the SEIN, hence the project will displace fossil-fuel based electricity generation that otherwise would be supplied to the SEIN. ERs are not likely in the absence of the project activity, because national policies are currently fostering the national use of the Camisea natural gas deposits with special emphasis on promoting the gas-fired electricity generation in Peru; and is also fostering gas exploration in the national territory (i.e. to be used by the Camisea LNG Project). The aggressive intervention of the government in the market in order to

[20]World Bank Study, June 2008, Peru "Institutional and Financial Framework for Development of Small Hydropower", page 46.

secure the success of the Camisea project and the success of the future natural gas-fired electricity generation industry started in 1998, after the exit of Shell, company that discovered the Camisea gas existence in Peru.

The formulae used to estimate the anthropogenic emissions by sources of GHG's in the baseline, which can be seen under B.6.3, is based on the project's baseline emissions calculation described in methodology AMS-ID, for a system where **not** all generators use exclusively fuel oil and/or diesel fuel. Following baseline methodology AMS-ID, the project is estimated to reduce 94,584 tCO_{2e} for the duration of the second 7-year crediting period. The baseline emissions are deemed to represent emissions that would occur in the absence of the project, and therefore emissions that will be mitigated by the project; given the project additionality detailed under Attachment A of Appendix B of the Simplified Modalities and Procedures for small-scale CDM Project Activities ("Appendix B").

The project is additional because it would not have occurred anyway due to three out of the four barriers listed in Attachment A to Appendix B.

(a) Investment Barrier: The much higher up-front investment cost needed for hydropower plants than for fossil fuel power plants makes small fossil fuel power plants a more financially viable alternative than small hydropower plants in Peru for generation. The table below shows the turnkey cost[21] per MW of the different technologies used in Peru (besides coal, which is scarce in Peru-as of now only one plant functions with coal in the SEIN: ILO2TV). This barrier is a consequence of the Peru's financial risk, high cost of capital and un-sophisticated capital market[22].

Technology Diesel Engine Simple Cycle River Comparison Gas Turbine Hydro

Technology Comparison	Diesel Engine	Simple Cycle Gas Turbine	River Hydro
Size Range (MW)	0.02 – 25	0.5 - 450	.02 - 1
Efficiency (%)	36% - 43%	21% - 45%	60-70%
Gen Set Cost ($/MW)	125,000 to 300,000	300,000 to 600,000	NA
Turnkey Cost-No Heat Recovery ($/MW)	200,000 to 500,000	300,000 to 650,000	750,000 to 1,200,000

Source: Meherwan P. Boyce, Ph.D, P.E (2002); "Gas Turbine Engineering Handbook", p.8

The Project Cost ($)	Santa Rosa I	Santa Rosa II	Santa Rosa III
Size Range (MW)	1.063	1.655	1.5
Civil Works	150,000	430,000	450,000
Equipment Supplies	600,000	620,000	650,000
Installation, Commissioning	100,000	150,000	150,000
Total	850,000	1,200,000	1,250,000
Turnkey Cost ($/MW)	799,624	725,076	833,333

Source: The project's feasibility study and the sponsor

The fact that funding is not available for this type of **innovative** project activities, and that small projects have restricted access to international capital markets strengthen this investment barrier that small

[21] Turnkey meaning the investment needed to put a power plant in operation.

[22] Recently, the Economist Intelligence Unit Limited (February 8, 2005), EIU Riskwire – commented on Peru's financial risk and cost of capital, as follows: "Corporate finance is widely available, but costly, with average commercial interest rates for dollar loans around 10%, and for local currency loans around 15-20%"; It added that "Banks remain wary of lending to small and medium-sized businesses, and will do so until the economy shows strong signs of growth and the bad-debt ratio falls further."

hydropower plants face. i.e. several local private banks were approached by the sponsors, but did not offer any interest rate and rather refused any lending to the project, unless the sponsor provided liquid monetary guarantees to collateralize 100% of the total project's investment cost; multilateral agencies and international private equity funds have also been presented the project but the sponsor has not received any proposal of funding from these agencies and funds. For 2 years the sponsor unsuccessfully looked for any amount and type of debt-financing for the project, at any cost.

In this scenario, only the prospects of carbon finance revenue were capable of lower the barriers investments faced by the project. To illustrate, carbon finance could reduce the hydropower plant turnkey cost of US$975,000/MW in 9%[23]. Depending upon the load factor, the impact of carbon finance on the financial viability of the project could be even greater.

In COES there are only 4 smaller-than-or-equal-to-15-MW ("small") hydropower plants out of a total of 14 small power plants[24].

(b)Technological barrier: There is one technologically more viable option identified that would have lead to higher emissions: Fossil fuel-fired power plants.

- Santa Rosa is the only small-scale hydropower plant less-than-5MW that has been built in SEIN since 1918[25]. Evidently, small hydropower plants are not a common practice and as a result there is no broad experience to emulate, increasing technological risks due to performance uncertainty. The lack of experience was a strong concern among local financiers and a major contributor to the project's financial risk.

-Regardless of size, fossil fuel-fired plants are a less technological advanced option. Apart from the equipment, they do not need require other major investment and can be placed almost everywhere (as close as necessary to the final client reducing transmission-line investment costs considerably). Given that the particular hydrological and geological conditions and possible design failures only can be fully known ex-post, hydropower plants constitute a much more challenging investment than fossil fuel-fired plants, in terms of technology. Moreover, hydropower plants' are more vulnerable to natural events including earthquakes and droughts, which increase probabilities of technical inconveniences.

(c) Barrier due to prevailing practice: Existing pro-Camisea[26]policies would have led and will led to the implementation of a technology with higher emissions, which is natural gas-fired electricity generation. It is envisaged that the existing regulatory framework favoring gas-fired electricity generation will impact Peru's overall generation prevailing practice towards gas as gas pipelines spread in the country and as more gas is discovered.

After the exit of Shell, in mid 1998, the Government decided to aggressively promote thermal technology based on natural gas. Beginning that same year, it halted the definitive and temporal concessions for hydropower plants through Law 26980 issued in September 1998, Law 27133 issued in June 1999, and

[23]Taking a 65% load factor, 1 MW will generate 5,694 MWh, which could reduce 5,694 times 0.57787 (baseline emission factor, which calculation can be seen under E.1.2) , or 3,290 tCO2 (ERs). Considering a price of $3.5 per ER in 21 years, the 1 MW would receive $87,076 in net present value at 12% discount rate. Hence out of an average turnkey cost per MW ($975,000/MW) a 9% turnkey cost reduction will be achieved, approximately

[24]Source: *COES* Statistics 2003 Table 12.1

[25]As of December 2003, only 4 plants out of 59 plants in that are smaller than 5 MW. Out of these 4 plants, only HERCA (1.02 MW), built in 1918 by the government, is a renewable energy activity.

[26]"The San Martin and Cashiriari fields, jointly known as Block-88 ("Camisea") are home to one of the most important non-associated natural gas reserves in Latin America. The Camisea reserves are ten times greater than all other existing natural gas reserves in Peru"-Source: www.camisea.com.pe. Camisea was discovered between 1983 and 1987, but the Camisea project only recently became operational, in August 2004. Moreover, the acquisition of the concession rights for the block 56 (Pagoreni), which would enlarge the proven reserves of Natural Gas in Peru has been granted already for exploration and exploitation.

Law 27239 issued in December 1999[27].No hydropower plants definite concessions were granted in 1999 to 2000[28], showing the clear impact and determination of President Fujimori's laws against hydropower plants developments and in favor of gas-fired electricity generation. This procedure had two main impacts, less new experience with hydropower development in Peru and increased risk in Peru's hydropower generation industry as perceived by foreigners as well as by locals due to biased sectoral political interventions in the market.

Around August 2004, the date of the Camisea project commissioning, the government released laws DS 019-2004 on June 25th, 2004[29] and DS 041-2004-EM on November 24th, 2004[30]; and DS 107-2004-EF on August 5th, 2004[31]; to promote natural gas based electricity generation and to exempt the selective consumption tax to gas, respectively. These three laws released aimed at making gas an even more competitive option for generation.

Furthermore, the government has recently completed the technical studies of the "Country Gasification Project", which considers the installation of regional natural gas pipelines to transport the Camisea gas to Ayacucho, Cuzco, Ica, and Junin; and announced that the next step would be the selection of investors to build those natural gas pipelines. On promoting investment on gas pipelines, the government gave Supreme Decree 038-2004 on October 21st, 2004, Supreme Decree 016-2004-EM on June 10th, 2004; Supreme Decree 018-2004-EM on June 16th, 2004. These 3 laws clarified gas pipeline installations' security measures and ownership requirements, paving the way for new investments.

The impact of this government-driven project on electricity prices is devastating for hydropower developers who now have to compete not only with a cheaper technology available (combined cycle plants), but also with a much cheaper fuel to be locally available.

According to MINEM[32], the two expected Camisea impact scenarios for Peru's electricity industry are: 1) Hydro-thermal Scenario: At the end of 2027, the SEIN will have an installed capacity of 66% thermal and 34% hydro. The current situation of the installed capacity of the SEIN is 40% thermal and 60% hydro. 2) Thermal Scenario: If all the additions in electricity generation would be natural gas-fired thermal plants, at the end of 2027 the SEIN would have an installed capacity 75% thermal and 25% hydro. In both scenarios, the electric sector would be the main consumer of the Peruvian natural gas industry. In the hydro-thermal scenario the demand would be 800 million cubic feet per day ("MMCFPD") and in the thermal scenario would be 1000 MMCFPD by 2027.

It is foreseen that small gas-fired power plants will start been built/accommodated by a change from oil to gas, because of the existing gas governmental promotional laws and regulations as gas pipeline installations spread in the country and as more gas-wells get discovered in the national territory i.e. recently, BPZ

[27](1)September 27th, 1998: Law 26980 – "Law that modified several articles and definitions annexed to ECL". On its third Transitory Disposition mandated the suspension for 9 months in the presentation of requests for temporal and definite concessions for hydropower plants. (2)June 4th,1999: Law 27133 – "Law of Promotion of the Natural Gas Industry" – On its Unique Complementary Disposition extended the suspension of hydropower plants for 12 additional months from June 1999. (3)December 22nd, 1999: Law 27239 – "Law that modified several articles of the ECL" - On its Unique Complementary Disposition mandated that priorities to admit new temporal and definitive concession in hydropower plants would be determined as a function of the national development.

[28]Source: Last-10-year list of definite concessions granted by Peru's Department Energy and Mines ("*MINEM*").

[29]Indicates that for the next 2 years from June 25th, 2004, the guarantee required by article 66 of the ECL Rules will be reduced to 0.25% (before 1%) of total project budget with a ceiling of 200 UIT("*UnidadImpositivaTributaria*") (before 500 UIT), when the request for Authorization is for natural gas-based electricity generation.

[30]Supreme Decree that promotes the installation of thermal plants that use natural gas as fuel.

[31]Clarifies that natural gas on its gassy-state will not be comprised in the New Appendix III , which attains Selective Consumption Tax ("ISC") affection only, of the Value Added Tax's *TextoUnicoOrdenado*and ISC Law.

[32]*MINEM*-Electricity General Directive, http://www.minem.gob.pe/electricidad/estadisticas/informativo/informativo8.pdf.

Energy Inc. has discovered gas in the north of the country and is planning to build a 150 MW gas power plant by using the discovered gas at the same time- the financing of this project is closed with the International Financial Corporation.

The fact that there are 3 small gas-fired power plants in the country (reported in the MINEM):

-1 MW CTGAS - of Aguaytia Energy del Peru, located in Aguaytia and uses gas extracted in the area. -7.85 MW Pavayacu - of Pluspetrol, located in Loreto and uses gas extracted in Lote 8.

-13.41 MW Corrientes - of Pluspetrol, located in Loreto and uses gas extracted in Lote 8.

Shows that gas-fired small power plants are a preferred choice where gas is locally and reliably available.

The prevailing practice of the gas-fired option for generation is starting to show more dramatically and faster in large plants. As of today, there are 3 large plants that are functioning with the Camisea gas, which have started to operate:

-Etevensa TG3: 164.1 MW from September 2004
-Etenvesa TG4: 160.5 MW from September 2004
-Santa Rosa TG7: 121.3 MW from June 2005.

The three of them used to operate with oil but have converted to gas when the Camisea-gas became available in their location.

There are 2 large Camisea gas-fired power plants projects already in construction:
Chilca TG1: 165 to be commissioned in November 2006
Chilca TG2: 165 to be commissioned in November 2006
The conversion to combined cycle ("cc") of these two plants will add to an installed capacity of 520 MW, and as cc they both are to be commissioned in April 2007.

Tractebel's request of 360 MW approximately installed capacity (not yet in construction) and EGECHILCA's request of 520 MW installed capacity (mentioned above) are two of the most publicly known natural gas-fired-power-plant concession requested to the MINEM.

(d) Other barriers: Options for hydropower development are limited in Peru today because almost all the best locations have been already given in concession to private firms. Identify geographical appropriate features take longer time nowadays.

In summary, the available information clearly shows that ERs will not be generated in the absence of the proposed project activity because (a) fossil fuel-fired-plants are more financially viable than hydropower plants in Peru given limited funding available in Peru (b) fossil-fuel fired plants are a less technologically advanced alternative involving lower risks, (c)national policies, sectoral policies and the particular circumstance created by Camisea fosters fossil-fuel based power-generation technology by using Camisea natural gas and (d) other barriers. Because opting for more viable alternatives than the project would have led to higher emissions the project is additional under Attachment A to Appendix B.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

This section describes the procedures and methodology choices followed as per the approved small scale baseline methodology "grid connected renewable electricity generation" (AMS-ID version 17).

CDM – Executive Board

As stated in section B.2, the project complies with all the requirements that qualify it for the use of the simplified baseline and simplified monitoring for small-scale project activities. In particular the project:

a) Falls into project category I.D, listed in Appendix B, and uses the baseline methodology calculation AMS-ID version 17, the parameters and emission factors have been updated as per the "*Tool to assess the validity of the original/current baseline and to update the baseline at the renewal of a crediting period*" version 02, EB63.

b) Would otherwise not be implemented due to the existence of one or more of the barriers listed in Attachment A of Appendix B.

c) Is a renewable energy project activity with 4.218 MW of installed capacity[33]

d) Is not a debundled component of a larger project activity, as determined by Annex C.

e) Aims at complying with Annex II of the simplified modalities and procedures for small-scale CDM project activities, which states that "an overall monitoring plan shall apply for the bundled projects, as determined by the designated operational entity ("DOE") at validation to reflect good monitoring practice appropriate to the bundled project activities and to provide for collection and archiving of the data needed to calculate the ERs achieved by the bundled project activities"

The MP created for the project can be found in Annex 5 of this document.

According to AMS I.D version 17, Emission reductions are calculated as follows:

$ER_y = BE_y - PE_y - LE_y$

Where:

ER_y	Emission reductions in year *y* (t CO_{2e}/y).
BE_y	Baseline Emissions in year *y* (t CO_{2e}/y).
PE_y	Project emissions in year *y* (t CO_2/y).
LE_y	Leakage emissions in year *y* (t CO_2/y).

Baseline Emissions

The formulae used to estimate the anthropogenic emissions by sources of GHG's in the baseline is based on the project's baseline calculation described in methodology AMS I.D. Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants.

The baseline emissions are the product of electrical energy baseline $EG_{BL,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by an emission factor.

$BEy = EG_{BL,y} * EF_{CO2,grid,y}$

Where:

BEy	Baseline Emissions in year y; t CO_2
$EG_{BL,y}$	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year *y* (MWh)
$EF_{CO2,grid,y}$	CO_2 Emission Factor in year y; t CO_{2e}/MWh

The Emission Factor can be calculated in a transparent and conservative manner as follows:

[33] 15 MW is the limit stipulated in paragraphs 6(c) of decision 17/CP.7 – which clears the use of Appendix B for baseline and monitoring.

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the Emission Factor for an electricity system' version 02.2.1 EB 63.

The Operating Margin in the project is calculated using method (a) Simple OM, and employing the ex-ante data vintage option; the Build Margin is also calculated using the ex-ante Option1. The cohort of power plants used correspond to the set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

The data for calculation of the Operating Margin and Build Margin Emissions Factors are collected from official sources such as the Economic Operation Comittee (COES SINAC) and the National Interconnected Electricity System (SEIN). COES is a private entity, it is formed by all the Agents from SEIN (Generators, transmisors, distributors and free users) and its decisions are compulsory for the Agents. Its aim is to coordinate the short, medium and long term operation of SEIN at a minimum cost, preserving the system's security, the better use of energy resources as well as the planning of the transmission development of the SEIN and management of the short term market.
Please refer to Annex 3 for detailed data used for calculation of the emission factor.

Project emissions

As per the methodology, the project emissions for hydro electric projects like this with no water reservoirs construction are zero. Hence *PEy*= 0.

Leakage
As per AMS I.D. version 17, it is stated that as there is no transfer of the energy generating equipment from another activity, no leakage is required to be considered. Hence *LEy*= 0.

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

Data / Parameter:	**EF_{CO2},grid,y**
Data unit:	tCO_2/MWh
Description:	Emission factor of the grid, Combined Margin
Source of data used:	Calculated. Official statistics from *COES* for electricity generation clustered by technology 2006, 2007, 2008, 2009, 2010
Value applied:	0.4489 tCO_2/MWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	This value was calculated according to "Tool to calculate the emission factor for an electricity system (version 02.2.1)." Applied value was calculated by referring to Official *COES* Statistics for electricity generation (2006, 2007, 2008, 2009, 2010).
Any comment:	This value will be calculated ex-ante and fixed for the entire crediting period.

Data / Parameter:	EFOM, y
Data unit:	tCO_2/MWh
Description:	Operating Margin emission factor
Source of data used:	Calculated
Value applied:	0.2145 tCO_2/MWh
Justification of the	This value was calculated according to "Tool to calculate the emission factor

choice of data or description of measurement methods and procedures actually applied :	for an electricity system (version 02.2.1)." Applied value was calculated by referring Official *COES* Statistics for electricity generation (2008, 2009, 2010).
Any comment:	-This data will be calculated at the time of PDD submission and will not be changed during the second crediting period.

Data / Parameter:	**EFBM, y**
Data unit:	tCO_2/MWh
Description:	Build Margin emission factor
Source of data used:	Calculated
Value applied:	0.5271 tCO_2/MWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	This value was calculated according to "Tool to calculate the emission factor for an electricity system (version 02.2.1)." Applied value was calculated by referring Official *COES* Statistics for electricity generation (2006, 2007, 2008, 2009, 2010).
Any comment:	This data will be calculated at the time of PDD submission and will not be changed during the second crediting period.

Data / Parameter:	**FCi,m,y**
Data unit:	mass or volume unit
Description:	Amount of fossil fuel type i consumed by power plant / unit m in year y
Source of data used:	Official statistics from *COES* for electricity generation clustered by technology 2006, 2007, 2008, 2009, 2010
Value applied:	See the <Table Annex-3>
Justification of the choice of data or description of measurement methods and procedures actually applied :	Applied value was calculated by referring to Official *COES* Statistics for electricity generation (2006, 2007, 2008, 2009, 2010).
Any comment:	The same value will be applied during the second crediting period without updating.

Data / Parameter:	**$NCV_{i,v}$**
Data unit:	GJ/mass or volume unit
Description:	Net calorific value (energy content) of fossil fuel type *i* in year *y*
Source of data used:	For diesel, residual 5, residual 6 and coking coal: IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. For Natural Gas: Norma Tecnica de Peru: NTP 111.002:2003 "Peru Natural Gas Specification"
Value applied:	Default values
Justification of the choice of data or description of	By means of the net calorific values is calculated the apparent fuel consumed during each year by the generating units.

measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	**$EFCO_{2},i,y$**
Data unit:	tCO_2/TJ
Description:	CO_2 emission factor of fossil fuel type i in year y
Source of data used:	2006 IPCC Guidelines on National GHG Inventories
Value applied:	See the < Annex-3>
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC default values at the lower limit of the uncertainty at 95% confidence interval as provided in table 1.4 of Chapter1 of Vol.2 (Energy)
Any comment:	The same value will be applied during the second crediting period without updating.

Data / Parameter:	**$EG_{m,y}$**
Data unit:	MWh
Description:	Net electricity generated and delivered to the grid by power plant / unit *m* in year *y*
Source of data used:	Official statistics from *COES* for electricity generation clustered by technology 2008, 2009, 2010.
Value applied:	See the < Annex-3>
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistics from *COES* for electricity generation clustered by technology for years 2008, 2009, 2010 is used. Electricity generated by the plants data is used to calculate the apparent fuel consumed per plant and Operating Margin and Build Margin. Electricity is measured through equipment measurement installed in each plant.
Any comment:	

The calculation of the OM and BM emission factors were submitted to DOE as an excel file. It Includes the following information:

• Information to clearly identify the plant
• The date of commissioning
• The fuel type(s) used
• The quantity of net electricity generation in the relevant year(s)
• The fuel consumption of each fuel type in the relevant year(s)

B.6.3 Ex-ante calculation of emission reductions:

According to AMS I.D version 17, Emission reductions are calculated as follows:

$ER_y = BE_y - PE_y - LE_y$

Where:

ER_y	Emission reductions in year *y* (t CO_{2e}/y).
BE_y	Baseline Emissions in year *y* (t CO_{2e}/y).
PE_y	Project emissions in year *y* (t CO_2/y).
LE_y	Leakage emissions in year *y* (t CO_2/y).

Baseline Emissions

The baseline emissions are the product of electrical energy baseline $EG_{BL,\ y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by an emission factor.

$BEy = EG_{BL,y} * EF_{CO2,grid,y}$

Where:

BEy	Baseline Emissions in year y; t CO_2
$EG_{BL,y}$	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year *y* (MWh)
$EF_{CO2,grid,y}$	CO_2 Emission Factor in year y; t CO_{2e}/MWh

The Emission Factor can be calculated in a transparent and conservative manner as follows:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the Emission Factor for an electricity system' version 02.2.1 EB 63.

CO_2 EMISSION FACTOR CALCULATION PROCEDURE

As per the 'Tool to calculate the Emission Factor for an electricity system' version 02.2.1 EB 63, Project participants shall apply the following six steps to calculate the CO_2 emission factor of the electricity system connected:

STEP 1. Identify the relevant electricity systems.
STEP 2. Choose whether to include off-grid power plants in the project electricity system (optional).
STEP 3. Select a method to determine the operating margin (OM).
STEP 4. Calculate the operating margin emission factor according to the selected method.
STEP 5. Calculate the build margin emission factor.
STEP 6. Calculate the combined margin (CM) emissions factor.

Step 1. Identify the relevant electric power system

Peru's electric sector infrastructure is mainly constituted by the National Interconnected Electric System (SEIN), that covers almost the total of the national territory. However, due to technical and economic reasons some of the rural or very isolated zones are covered by small isolated systems.
Thus the SEIN is identified as the relevant electricity system.

For determining the electricity emission factors, the project electricity system is the spatial extent of the power plants connected to the National Interconnected system and dispatched without significant transmission constraints. The spatial extent of the project boundary includes the project site and all power plants connected physically to the electricity system.

STEP 2. Choose whether to include off-grid power plants in the project electricity system (optional).

PE has chosen not to include off-grid power plants in project electricity system because as per the methodological tool (version 02.2.1), "Tool to calculate the emission factor for an electricity system",
Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, the conditions specified in Annex 2 - Procedures related to off-grid power generation should be met. Namely the total capacity of off grid power plants (in MW) should be at least 10% of the total capacity of grid power plants in the electricity system;

In the case of Peru, one of the main aspects that characterizes the country's electricity generation is that 38% of the interconnected plants have generated 93% of the total energy at the national level, while the 62% of the smaller isolated plants only generate **7%** of the total[34]. Given that the 7% is less than the 10% required, off-grid power plants have been left out, and hence this step does not apply.

STEP 3. Select a method to determine the operating margin (OM).

The calculation of the operating margin emission factor (*EFgrid,OM,y*) is based on one of the following methods:

(a) Simple OM, or

(b) Simple adjusted OM, or

(c) Dispatch data analysis OM, or

(d) Average OM.

The simple OM method (option a) can only be used if low-cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

Based on data on Peru grid's total generation from 2006 to 2010, low-cost must-run facilities make up more than 50% of the generation during the last five years, and therefore the choice of option (a) is not appropriate for this project activity (see Table 1).

Table 1. Energy Generation by Source, during the five most recent years (2006-2010) in %

	2006 (a) Gen. Elect.	2007 (b) Gen. Elect.	2008 (c) Gen. Elect.	2009(d) Gen. Elect.	2010(e) Gen. Elect.	Average Gen. Elect.	Low Cost Must Run.
Thermal*	24.60%	31.80%	39.07%	37.09%	41.52%	**34.82%**	**34.82%**
Hydroelectric	75.40%	68.20%	60.93%	62.91%	58.48%	**65.18%**	**65.18%**

*Includes Carbon, Natural Gas, Diesel
a http://www.coes.org.pe/wcoes/coes/estadistica/estadanual.aspx, page 10
b http://www.coes.org.pe/wcoes/coes/estadistica/estadanual.aspx , page 10
c http://www.coes.org.pe/wcoes/coes/estadistica/estadanual.aspx, page 10
d http://www.coes.org.pe/wcoes/coes/estadistica/estadanual.aspx, page 9
e http://www.coes.org.pe/test/coes/estadistica/estadanual.aspx page 9
Source: WorldBank's ownestimates based on COES "Estadistica Anual de Operaciones"

[34] According to "Anuario Estadístico 2009", page 54. Ministerio de Energía y Minas, Perú.

As there is not enough data available for calculating the OM using option (b) in Peru, this option is eliminated. As per the methodological tool (version 02.2.1), "Tool to calculate the emission factor for an electricity system", when choosing the data vintages it mentions that *The data vintage chosen should be documented in the CDM-PDD and not be changed during the crediting periods*, as option (c) requires the emission factor to be updated annually during monitoring and Santa Rosa chose an *Ex ante* option, option (c) is eliminated and finally, Option (d) – Average OM is chosen for the project activity.

For the average OM, the emissions factor was calculated using the following data vintage:

- Ex ante option: A 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period,

Step 4. Calculate the operating margin emission factor according to the selected method

The average OM emission factor ($EF_{grid,OM\text{-}ave,y}$) is calculated as the average emission rate of all power plants serving the grid, using the methodological guidance as described under (a) for the simple OM, but including in all equations also low-cost/must-run power plants.

Therefore, the average OM can be calculated using the following options:

Option A: Based on the net electricity generation and a CO_2 emission factor of each power unit; or

Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Accordingly, Option A is used to calculate the OM emission factor based on the electricity generation of each power unit and an emission factor for each power unit, as follows:

Option A - Calculation based on average efficiency and electricity generation of each plant
Under this option, the simple OM emission factor is calculated based on the net electricity generation of each power unit and an emission factor for each power unit, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_{m} EG_{m,y} \cdot EF_{EL,m,y}}{\sum_{m} EG_{m,y}}$$

Where:
$EF_{grid,OMsimple,y}$= Simple operating margin CO_2emission factor in year *y* (tCO_2/MWh)
$EG_{m,y}$= Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
$EF_{EL,m,y}$= CO_2emission factor of power unit *m* in year *y* (tCO_2/MWh)
m = All power units serving the grid in year *y* including low-cost / must-run power units
y = The relevant year as per the data vintage chosen in Step 3

Determination of $EF_{EL,m,y}$

The emission factor of each power unit *m*is determined using Option A1as follows:

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Option A1. If for a power unit *m* data on fuel consumption and electricity generation is available, the emission factor (*EFEL,m,y*) should be determined as follows:

$$EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_{m,y}}$$

Where:
$EF_{EL,m,y}$= CO_2emission factor of power unit *m* in year *y* (tCO_2 /MWh)

FCi,m,y = Amount of fossil fuel type *i* consumed by power unit *m* in year *y* (Mass or volume unit)
NCVi,y = Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ/mass or volume unit)
$EF_{CO2,i,y}$= CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2/GJ)
EGm,y = Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)

m = All power units serving the grid in year *y* except low-cost/must-run power units
i = All fossil fuel types combusted in power unit *m* in year *y*
y = The relevant year as per the data vintage chosen in Step 3
y = The three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex ante option) following the guidance on data vintage in step 3

EGm,y is sourced from the official data sources available in the country. As ex-ante option is used for this, the most recent three historical years (i.e. 2008, 2009 and 2010) for which data is available at the time of submission of the CDM-PDD to the DOE for validation is used.

OPERATING MARGIN:

Operating Margin	A	B	C	D
	Total Emissions	**Total Generation**	**OM by year:**	**OM Average**
	(tCO_2)	**(MWh)**	**(tCO_2 / MWh)**	**(tCO_2 / MWh)**
2010	7,253,855	32,426,510	0.2237	**0.2145**
2009	6,068,564	29,805,435	0.2036	
2008	6,393,836	29,558,709	0.2163	

Considering the above factors, assumptions, and the operation of the Peru power system from 2008 to 2010, and applying the Average OM method, the result is:

OM = 0.2145 tCO_2 /MWh

(Annex 3 includes the OM estimates)

Step 5. Calculate the build margin (BM) emission factor

In terms of vintage of data Option 1 is chosen:

Option 1. For the first crediting period, calculate the build margin emission factor *ex-ante* based on the most recent information available on units already built for sample group *m* at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

The sample group of power units *m* used to calculate the build margin consists of either:
The sample group of power units m used to calculate the build margin should be determined as per the following procedure, consistent with the data vintage selected:

(a) Identify the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently ($SET_{5\text{-units}}$) and determine their annual electricity generation ($AEG_{SET\text{-}5\text{-}units}$, in MWh);
(b) Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities (AEGtotal, in MWh). Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of AEGtotal (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) (SET≥20%) and determine their annual electricity generation (AEGSET-≥20%, in MWh);

(c) From SET5-units and SET≥20% select the set of power units that comprises the larger annual electricity generation (SETsample); Identify the date when the power units in SETsample started to supply electricity to the grid. If none of the power units in SETsample started to supply electricity to the grid more than 10 years ago, then use SETsample to calculate the build margin. Ignore steps (d), (e) and (f).

The following table shows the list of plants from the electricity system that comprise 20% of the system generation and that have been built most recently:

Build Margin Emission factor for 20% of System Generation

Table 4A. Build Margin Emission factor for 20% of System Generation

SEIN Annual Generation 2010 GWh :	**29,820.36**	**(GWh)**
Build Margin Emission factor for 20% of grid :	**5,964.07**	**(GWh)**
5 Most recent units generation :	**1,118.10**	**(GWh)**

A	B	C	D	E	F	G	H
POWER PLANT	TYPE	START	Effective Power (MW)	Generation 2010 (GWh)	5 Most recent Units (GWh)	20% Gen. 2010 (Excluding CDM) (GWh)	20% Gen. 2010 (Excluding CDM) (%)
Independencia	Gas turbine Natural Gas	Sep-10	5.7	5.27	5.27	5.27	0.02%
Pisco	Gas turbine Natural Gas	Aug-10	36.7	13.8	19.07	19.07	0.06%
Poechos II (*)	Hydro	May-10	10	28.29			
Roncador	Hydro	May-10	3.5	7.65	26.72	26.72	0.09%
Las Flores	Gas turbine Natural Gas	May-10	198.4	13.08	39.8	39.8	0.13%
Kallpa TG3	Gas turbine Natural Gas	Mar-10	192.6	1078.3	1118.1	1118.1	3.75%
AIPSA (Paramonga)	Bagasse	Mar-10	20	77.48		1195.58	4.01%
El Platanal(*)	Hydro	Feb-10	217.40	720.56			
Santa Cruz II(*)	Hydro	Jan-10	6.91	52.97			
La Joya(*)	Hydro	Oct-09	5.00	18.02			
Santa Rosa II (TG8)	Gas turbine Natural Gas	Sep-09	193.18	763.86		1,959.44	6.57%
Chilca I (TG3)	Thermal	Aug-09	199.80	930.46		2,889.90	9.69%
Emergencia de Trujillo NORTE	Thermal	Jul-09	64.00	120.97		3,010.87	10.10%
Kallpa (TG 2)	Gas turbine Natural Gas	Jun-09	216.00	1,252.34		4,263.21	14.30%
Santa Cruz I (Unidad 2)(*)	Hydro	May-09	6.91	22.49			
Oquendo (TG1)	Cogeneracion	Mar-09	31.00	203.60		4,466.81	14.98%
Caña Brava (*)	Hydro	Feb-09	5.31	29.08			
Chilca TG2	Gas turbine Natural Gas	Jul-07	175.97	406.19		4,873.00	16.34%
Kallpa TG1	Gas turbine Natural Gas	Jul-07	180.00	880.43		5,753.43	19.29%
Ventanilla C.C.(*)	Gas turbine Natural Gas	Mar-07	457.00	3,255.29			
Chilca 1 (TG1)	Gas turbine Natural Gas	Dec-06	171.68	1,092.95		6,846.38	22.96%
Santa Rosa UTI 5 y 6	Gas turbine Natural Gas	Aug-06	119.20	149.77			
YUNCAN	Hydro	Aug-05	133.50	692.59			
Santa Rosa(Westinghouse)	Gas turbine Natural Gas	Jun-05	127.50	217.59			
Yarinacocha	Diesel 2 / Residual	Feb-03	25.36	2.59			
Arcata	Hydro	Apr-03	3.15	30.14			
Huanchor	Hydro	Nov-02	18.36	146.83			
Machupichu	Hydro	Oct-01	90.45	722.01			
San Nicolas Cummins	Diesel 2 / Residual	Jul-01	1.25	1.19			
Tumbes	Diesel 2 / Residual	Feb-01	18.68	47.57			

Chimay	Hydro	Oct-00	142.80	800.14			
Ilo2	Steam Turbine / Coal	Aug-00	135.20	1,066.92			
San Gaban II	Hydro	Feb-00	107.96	590.98			
SEIN Annual Generation 2010 (Excluding CDM) GWh : 29,820.69 (GWh)							
(*) These projects are registered as CDM projects and thus excluded as per the "Tool to calculate the emission factor for an electricity system" (Version 2.2.1)							

The plant built in 2006 that enters the latest 20% added installed capacity (in generation) sample for the BM is Chilca 1 (TG1) (Gas turbine Natural Gas).

The 5 most recently built capacity addition up to 2010 were Independencia, Pisc, Poechos II, Roncador and Las Flores with a total generation of 1,118.10 GWh in 2010. The 20% most recently built capacity addition, in generation, comprise the plants listed above from year 2006 and this sample comprises a total generation of 6,846.38 GWh in 2010. Hence, the selected sample for the BM was composed by the latter group, as its generation output was greater. Therefore steps, (d), (e) and (f) are ignored.

The build margin emissions factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units *m* during the most recent year *y* for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

Where:
$EF_{grid,BM,y}$= Build margin CO_2 emission factor in year *y* (tCO_2/MWh)
$EG_{m,y}$= Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
$EF_{EL,m,y}$= CO_2emission factor of power unit *m* in year *y* (tCO_2/MWh)
m = Power units included in the build margin
y = Most recent historical year for which power generation data is available

The CO2 emission factor of each power unit *m* (EFEL,m,y) should be determined as per the guidance in Step 4 (a) for the simple OM, using options A1, A2 or A3, using for *y* the most recent historical year for which power generation data is available, and using for *m* the power units included in the build margin.

The table below shows the weighted average emissions of the most recent 20% of power plants built in generation (selected sample for the BM):

BUILD MARGIN:

A	B	C	D	E	F	G	H	I
POWER PLANT	TYPE	START	Effective Power (MW)	Generation 2010 (GWh)	20% Gen. 2010 (Excluding CDM) (GWh)	20% Cumulative Generation. 2010 (Excluding CDM) (GWh)	20% Cum. Gen. 2010 (Excluding CDM) (%)	Emission (tCO2) (CO2 ton)
Independencia	Gas turbine Natural Gas	Sep-10	5.7	5.27	5.27	5.27	0.02%	2,383.06
Pisco	Gas turbine Natural Gas	Aug-10	36.7	13.8	13.8	19.07	0.06%	8,847.83
Poechos II	Hydro	May-10	10	28.29				
Roncador	Hydro	May-10	3.5	7.65	7.65	26.72	0.09%	
Las Flores	Gas turbine Natural Gas	May-10	198.4	13.08	13.08	39.8	0.13%	3,398.85
Kallpa TG3	Gas turbine Natural Gas	Mar-10	192.6	1078.3	1078.3	1118.1	3.75%	568,857.37
AIPSA (Paramonga)	Bagasse	Mar-10	20	77.48	77.48	1195.58	4.01%	0.00
El Platanal	Hydro	Feb-10	217.40	720.56				
Santa Cruz II	Hydro	Jan-10	6.91	52.97				
La Joya	Hydro	Oct-09	5.00	18.02				
Santa Rosa II (TG8)	Gas turbine Natural Gas	Sep-09	193.18	763.86	763.86	1,959.44	6.57%	410,098.63
Chilca I (TG3)	Thermal	Aug-09	199.80	930.46	930.46	2,889.90	9.69%	497,936.10
Emergencia de Trujillo NORTE	Thermal	Jul-09	64.00	120.97	120.97	3,010.87	10.10%	86,679.08
Kallpa (TG 2)	Gas turbine Natural Gas	Jun-09	216.00	1,252.34	1252.34	4,263.21	14.30%	663,559.27
Santa Cruz I (Unidad 2)	Hydro	May-09	6.91	22.49				
Oquendo (TG1)	Cogeneracion	Mar-09	31.00	203.60	203.6	4,466.81	14.98%	113,073.81
Caña Brava	Hydro	Feb-09	5.31	29.08				
Chilca TG2	Gas turbine Natural Gas	Jul-07	175.97	406.19	406.19	4,873.00	16.34%	218,846.86
Kallpa TG1	Gas turbine Natural Gas	Jul-07	180.00	880.43	880.43	5,753.43	19.29%	461,633.59
Ventanilla C.C.	Gas turbine Natural Gas	Mar-07	457.00	3,255.29				
Chilca 1 (TG1)	Gas turbine Natural Gas	Dec-06	171.68	1,092.95	1092.95	6,846.38	22.96%	573,145.15
Total					6,846.38			3,608,459.58

The World Bank, with *COES –Comité de OperaciónEconómicadelSistemaInterconectadoNacional*(Dispatch Center) data.

BM 2010		
Emissions:	**3,608,459.58**	**(tCO_2)**
Generation:	**6,846,380**	**(MWh)**
BM	**0.5271**	**(tCO_2 / MWh)**

Step 6. Calculate the combined margin emissions factor

The calculation of the combined margin (CM) emission factor (*EFgrid,CM,y*) is based on one of the following methods:
(a) Weighted average CM; or
(b) Simplified CM.

The weighted average CM method (option A) should be used as the preferred option.

(a) Weighted average CM

The combined margin emissions factor is calculated as follows:

$EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM}$

Where:
$EF_{grid,BM,y}$ = Build margin CO_2emission factor in year *y* (tCO_2/MWh)
$EF_{grid,CM,y}$= Operating margin CO_2emission factor in year *y* (tCO_2/MWh)
w_{OM}= Weighting of operating margin emissions factor (%)
w_{BM} = Weighting of build margin emissions factor (%)

The following default values should be used for wOM and wBM:

Hydro projects: w OM = 0.25 and w BM = 0.75 for the second and third crediting period, unless otherwise specified in the approved methodology which refers to this tool.

The CM was calculated as the simple average of both the resulting OM and the resulting BM. All margins expressed in tCO_2/MWh. The formula used for the CM is:

CM = 0.25 x OM + 0.75 x BM[35]

The CM obtained is:

CM = 0.25 x 0.2145 + 0.75 x 0.5271

CM =	**0.4489**	**(tCO_2e/MWh)**

Project emissions

As per the methodology, the project emissions for hydro electric projects like this with no water reservoirs construction are zero. Hence *PEy*= 0.

Leakage
As per AMS I.D. version 17, it is stated that as there is no transfer of the energy generating equipment from another activity, no leakage is required to be considered. Hence *LEy*= 0.

[35] As per Meth AMS I.D suggestion of percentages for OM and BM for the 2nd crediting period.

Ex-ante calculation of the project ERs

The estimated ERs per year for the project are equal to the baseline emissions, obtained from the following formula:

Estimated ERs per year = CM x (Estimated EGy).

Estimated ERs per year = 0.4489 tCO_2/MWh x 30,100 KWh = 13,512 tCO_2e

The ERs estimated for the second crediting period add up to **94,584 tCO_{2e}**. This calculation can be seen in the table below:

A	B	C	D	E
SECOND CREDITING PERIOD (2011 - 2018)				
	Year	**CM**	**Annual Generation**	**Emission Reduction**
				E=(D * C)
DATES OF CERS DELIVERY		($TonCO_2$ /MWh)	(MWH)	(tonnes CO_2)
1	Year 2011*	0.4489	12,542	5,630
2	Year 2012	0.4489	30,100	13,512
3	Year 2013	0.4489	30,100	13,512
4	Year 2014	0.4489	30,100	13,512
5	Year 2015	0.4489	30,100	13,512
6	Year 2016	0.4489	30,100	13,512
7	Year 2017	0.4489	30,100	13,512
8	Year 2018**	0.4489	17,588	7,882
				94,584

* Five months of operation
** Seven months of operation

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

The project does not have any emissions or leakages. The ERs estimated for the second crediting period add up to 94,584 tCO_2e.

Year	Estimation of project activity emissions (tCO_2e)	Estimation of baseline emissions (tCO2e)	Estimation of leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
Year 2011	0	5,630	0	5,630
Year 2012	0	13,512	0	13,512
Year 2013	0	13,512	0	13,512
Year 2014	0	13,512	0	13,512

Year 2015	0	13,512	0	13,512
Year 2016	0	13,512	0	13,512
Year 2017	0	13,512	0	13,512
Year 2018	0	**7,882**	0	**7,882**
Total (tonnes of CO_2e**)**	0	**94,584**	0	**94,584**

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

The monitoring methodology and plan for the project ("the MP") follows the methodology AMS-ID definition, which states that: "The monitoring shall consist of metering the electricity generated by the renewable energy technology". The project's baseline calculation follows methodology AMS-ID baseline definition for a system where **not** all generators use exclusively fuel oil and/or diesel fuel, also the data parameters and emission factors have been updated as per "*Tool to assess the validity of the original/current baseline and to update the baseline at the renewal of a crediting period*" version 02, EB63, Annex 11.
The project credit renewal includes a MP, which will be implemented. Verification and certification of the ERs achieved will cover all of the bundled project activities.

No special monitoring equipment is needed. The sponsor will count with a monitoring plan and pre-programmed spreadsheets so the sponsor will just need to collect the information as described and apply the formulas as directed in the monitoring plan. The collection sources of the data will not be in any case the project's own records but COES records (or final clients' records, being COES the preferred data provider) of hourly production to keep the highest transparency and accuracy of the data. The project staff designated will confirm these data with own records and own records will be double checked with sales receipts.

B.7.1 Data and parameters monitored:

Data / Parameter:	$EG_{BL,y}$
Data unit:	MWh
Description:	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year *y* (MWh)
Source of data to be used:	Measured; COES' electricity meter readings
Value of data	30,100MWh
Description of measurement methods and procedures to be applied:	Read from watt-hour meter. Details are as below: **Santa Rosa I, Energy Meter no.1** Accuracy class: 0.2 Calibration : at least once in three years. **Santa Rosa II, Energy Meter no.1** Accuracy class: 0.2 Calibration : at least once in three years.

	Energy Meter no.2 Accuracy class: 0.2 Calibration : at least once in three years.
QA/QC procedures to be applied:	*COES'* electricity meter will be used to account for ERs and project's own meter will be used to double check accuracy of the project electricity generation registered by *COES*' meter. The calibration of this *COES*' meter follows standard procedures established for all of *COES*' meters across Peru's national territory. The project generation registered by *COES*' meter will be checked monthly against the project generation registered by the project's own meter in order to prevent failures in *COES*' meter – this procedure will be performed by the ERCP Manager as directed in the ERCP Quality Control Procedure36. If deviation is more than the usual deviation from one meter to another, the ERCP manager will inform *COES* to repair its meter – after checking that the project's own meter is in good standing. If failure is confirmed by *COES*' then during the failure period, the project's own meter registered generation will be taken to account for ERs, until *COES*' meter is repaired. Evidence that *COES*' meter underwent repairment should be made available to the verifier (if this case happens). Every month, the ERCP manager will receive the project's registered generation from two sources: *COES*' meter and the project's own meter, and double check accuracy. The ERCP Manager should perform monthly calculation of accounted ERs to be ready for the verifier visit in any time of the year.
Any comment:	- Data will be measured hourly and recorded monthly. - Data will be kept for two years after the last issuance of CERs for this project activity. - Data will be aggregated weekly, monthly and yearly - Measured data will be double checked against receipt of sales - This data is electricity generated except electricity consumed in the plant and electricity imported for the project activity.

B.7.2 Description of the monitoring plan:

The MP created for the project can be found in Annex 4 of this document.

The monitoring methodology and plan for the project ("the MP") follows the methodology AMS-ID version 17.

No especial monitoring equipment is needed. The sponsor will count with a monitoring plan and pre-programmed spreadsheets so the sponsor will just need to collect the information as described and apply the formulas as directed in the monitoring plan. The collection sources of the data will not be in any case the project's own records but COES records (or final clients' records, being COES the preferred data provider) of hourly production to keep the highest transparency and accuracy of the data. The project staff designated will confirm these data with own records and own records will be double checked with sales receipts.

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COES and own records will be used to ensure consistency - IEA statistics (for energy data) will be used to check local data-if necessary. An ERCP Quality Control Procedure is presented under annex section of the project's monitoring plan ("MP"), which can be seen in annex 4 of this document.

Every month, the ERCP manager will receive the project's registered generation from two sources: COES meter and the project's own meter, and double check accuracy. The ERCP Manager should perform monthly calculation of accounted ERs to be ready for the verifier visit in any time of the year.
Responsibilities in the ERCP have been established in an ERCP Organizational Structure, were a hierarchy is also established. The ERCP Quality Control Procedure establishes steps to be taken in order to minimize errors in the ERCP.

The Organizational, Operational and Monitoring Obligations are detailed in Annex 4.

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 Community Development Carbon Fund is also a project participant listed in annex 1 of this document.
The Monitoring Methodology and Monitoring Plan were completed on 20/08/2009 on behalf of The Community Development Carbon Fund by:
World Bank Carbon Finance Business Unit.
MeridienCarbon
Consultant

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:

01/05/2003.

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

43y- 2m

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

C.2.1. Renewable crediting period

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

01/08/2011.

C.2.1.2. Length of the second crediting period:

7y-0m

C.2.2. Fixed crediting period:

N/A

C.2.2.1. Starting date:

N/A

C.2.2.2. Length:

N/A

SECTION D. Environmental impacts

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

According to the Electric Concession Law of 1992, an Environmental Impact Assessment is not required for hydropower-plant projects under 10 MW. However, an EIA for the project has been completed as part of World Bank due diligence policy.
The EIA's[36] conclusions were:

-During operation, the project will cause an overall low negative environmental impact.
-The project shows positive environmental impacts such as ERs – improving air quality; and direct and indirect employment of neighboring population
-The main activities of the project that could cause environmental impacts are: During operation; use of the water for electric generation purposes, operation and maintenance of the equipment, removal of waste in the water. During construction; motion in the land due to civil works, heavy duty machines in use, residuals production.
-The majority of the negative environmental impacts and risks are concentrated in health and security of the employees and people, as well as the properties, vegetation and animals of the surroundings.

In general, these impacts are low; the potential risks are of low probability as well, due to the adequate design of the installations and precautionary measures adopted.

-Adequately management of risk of accidents has been suggested in the EIA, reducing negative impacts on employees.
-The project does not harm in any case the water needs of Comision de Regantes del Subsector Santa Rosa[37].
-The project will not be affected by low-scale earthquakes.
-The water that the project uses goes back to the channel from which it comes from, in almost unaltered conditions regarding quality.
-The project mini-landfill needs to be improved to avoid soil contamination.
-Regarding the cultural environment, the project is not inside the limits of a Protected Natural Area or in the vicinity of a Protected Natural Area.
-The noise inside the power houses is louder than the permitted limit for working conditions. Hence, the EIA suggests the obligation to use auricular protection inside the power houses. Outside the power houses and in the neighboring population, the noise is practically unnoticeable.
-The electro-magnetic levels measured inside the power houses do not go over the permitted limit for working conditions.
-The project will clean the water that passes through for generation purposes, by way of a grating system to be installed in the water reception installation (load chamber).

This will benefit the Comision de Regantes del Subsector Santa Rosa; who also uses this water for human consumption.

[36] CINYDE SAC is the environmental and energy consulting firm that performed the project's EIA. CYNYDE SAC is subscribed in the official administrative registry of firms authorized to perform EIAs by the Environmental Affairs Division of *MINEM.*

[37] Neighboring accredited persons (registered in the *Padrón de Usuarios de Agua de Riego*) who use the water of the Santa Rosa derivation channel for irrigation purposes.

The most important results of the Public Consultation that formed parted of the EIA ("Public Consultation") have been stated in written agreements. The Public Consultation was done to local stakeholders, which included the Comision de Regantes del Subsector Santa Rosa, local authorities and other groups of interests. Local stakeholders had their own suggestions regarding the project. Mutual agreements have satisfied the community, gained their approval and identification with the project as a part of the community.

After all the analysis made in the EIA, CINYDE, i.e. the firm that performed the EIA, recommended the implementation of the project given its low negative environmental impacts and positive impacts in the country and the environment. Furthermore, CYNIDE recommended emulating this type of project in the country, given both a raising energy demand and hydro resources available in Peru.

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:

N/A

SECTION E. Stakeholders' comments

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

The population living in the surroundings of the project, interest groups, and authorities were invited to participate in a Public Consultation meeting. The place, time and date of the meeting was communicated through oral notification because no newspaper is available nor is other means of mass communication in the area.

The objectives of the Public Consultation were as follows: a) to present the project and its environmental impacts as analyzed in the EIA, b) to incorporate in the EIA the community suggestions regarding both improvements in environmental impacts and improvements in the relationship with the neighboring population, c) to become familiarized with the comments of the Comision de Regantes del Subsector Santa Rosa regarding the project, and, finally, d) to initiate a communication process between enterprise and neighboring community.

The Public Consultation was focused on the Comision de Regantes del Subsector Santa Rosa, since it was the interest group most directly affected by the project. However other local stakeholders such as the non- governmental organization named Asociación Achalay, landowners of the area surrounding the project's site, and The Community of La Merced[38], were consulted about the project independently.

E.2. Summary of the comments received:

Comments and observations from the Public Consultation were focused on a) removal of the waste that falls into the water, b) economic support from the sponsor of the maintenance of the water reception system and of the Santa Rosa derivation channel; c) a call for agreements regarding an adequate coordination of the water needs for agriculture (to water the agricultural plots of lands of the *Comision de Regantes del Subsector Santa Rosa*) and water needs for generation (the project). No other major comments were received from the *Comision de Regantes del Subsector Santa Rosa.*

[38] Both *Asociacion Achalay*and La Merced are located in the indirect area of influence of the project, defined in the EIA. La Merced is the closest town to the project's site.

Asociación de Achalay was interested in accessing electricity at no charge in exchange of providing land to the sponsor. Other landowners asked the sponsor to include his responsibilities with local stakeholders in one of the project component's water rights renewal document.

La Merced was offered a donation of part of the CERs Income at the sponsor's own initiative and as part of the social contribution requirement of the CDCF. Investments requested by La Merced to be financed by the donation were the following:

-Improvements in the Public local school # 20930 Virgen de la Merced ("The school") that include: a) a fence that defines the school perimeter, b) a computer laboratory, c) accommodation for school teachers, d) 2 extra classrooms, and e) sports center.
-For the community: a) a civic center (a communal square for La Merced), b) a community library, c) an educational center to train locals for employment, and d) a park and reforestation of the main street of La Merced.

These were stated in an Act signed by the sponsor and La Merced representatives.

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

As a result of the Public Consultation, agreements about responsibilities for both the sponsor and the *Comision de Regantes del Subsector Santa Rosa* were left clearly stated in an Act signed by The Technical Administrator of the Huara Watering District and representatives of The *Comision de Regantes del Subsector Santa Rosa.* This Act was named "Joint Operational Description of the Santa Rosa Hydraulic System for hydroelectric and agricultural purposes" and it includes a description of the joint operational procedure of the hydraulic system for agricultural and generation needs, recommendations regarding the installations and operations, and responsibilities that each party was committed to perform.

Asociacion Achalay was offered free electricity for its orphanage, located in the indirect area of influence, defined in the EIA, in exchange of giving a 99-year concession of part of its territory to the sponsor.

Landowners of the area surrounding the project site were satisfied with the water rights renewed (for the particular Project component) which indeed specified the responsibilities of the sponsor with local stakeholders.

The way in which La Merced comments would be taken into account was stated in an Act. The agreements reached included:

- The social investments needed to be presented by locals in a technical profile that included the cost, description, and budgeting of labor and materials,
- The social investments would be prioritized according to social impact,
- The community would bring labor (voluntarily), at the extent that no other specialized labor was needed.

As of today, the sponsor has prioritized the following outputs. It has built the fence that defines the perimeter of the school, the Civic Center for La Merced, and the computer laboratory for the school. This decision was aligned with the desired priority expressed by La Merced, and with social impact.

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No Public Funding is involved in this project.

Annex 3

Baseline Information

Justification of the usage of COES information system data for baseline calculation:
The baseline calculation disregarded the data that is not registered by COES and deemed COES data to be the best approximation of total SEIN data about both generation and installed capacity additions, and also the best data to allow a good monitoring practice because of three reasons:

- There is not as good quality data of the SEIN production as what COES registers. The information of plants connected to the SEIN but not registered in COES regarding generation and installed capacity additions is provided by the plants' management periodically to the MINEM, but this data does not pass through a verification or validation process or is required to comply with technical standards as rigorously as COES requires from their plants members.
- Limitation on MINEM final annual reports and data availability is also an issue.
- The generation of these other plants connected to the SEIN but not registered by COES, is irrelevant, only 1% of total SEIN electricity generation in 2003, as the table bellows shows.

	SEIN (GWh)	COES (GWh)	COES/SEIN	Not recorded by COES
2003	20,999	20,689	0.99	0.01
2002	20,018	19,658	0.98	0.02
2001	18,755	18,463	0.98	0.02

Source: Anuario Estadistico MINEM (2001-03) and Estadistico de Operaciones COES (2001-03)

ADDITIONAL INFORMATION REGARDING THE BASELINE CALCULATION

Table 1. Energy Generation by Source, during the five most recent years (2006-2010) in %

	2006 (a) Gen. Elect.	2007 (b) Gen. Elect.	2008 (c) Gen. Elect.	2009(d) Gen. Elect.	2010(e) Gen. Elect.	Average Gen. Elect.	Low Cost Must Run.
Thermal*	24.60%	31.80%	39.07%	37.09%	41.52%	**34.82%**	**34.82%**
Hydroelectric	75.40%	68.20%	60.93%	62.91%	58.48%	**65.18%**	**65.18%**

* Includes Carbon, Natural Gas, Diesel

a http://www.coes.org.pe/wcoes/coes/estadistica/estadanual.aspx, page 10

b http://www.coes.org.pe/wcoes/coes/estadistica/estadanual.aspx , page 10

c http://www.coes.org.pe/wcoes/coes/estadistica/estadanual.aspx, page 10

d http://www.coes.org.pe/wcoes/coes/estadistica/estadanual.aspx, page 9

e http://www.coes.org.pe/test/coes/estadistica/estadanual.aspx page 9

Source: World Bank's own estimate based on COES "Estadistica Anual de Operaciones"

Calculations for Operating Margin (OM)

General Values according to Fuel Type

Fuel Type	Source	CO_2 Emission Factor *		Net Calorific Value **		Density***		Density		Net Calorific Value	
		IPCC 2006*		IPCC 2006 **		IPCC 2006***		Our Calculation		Our Calculation	
Diesel (2)	IPCC 2006	72.6	(tCO2/ TJ)	41.4	(MJ/kg)	1.1800	(L/kg)	0.8	(kg/L)	35.08	(Mj/ L)
Residual 5	IPCC 2006	75.5	(tCO2/ TJ)	39.8	(MJ/kg)	1.0590	(L/kg)	0.9	(kg/L)	37.58	(Mj/ L)
Residual 6	IPCC 2006	75.5	(tCO2/ TJ)	39.8	(MJ/kg)	1.0590	(L/kg)	0.9	(kg/L)	37.58	(Mj/ L)
Coking Coal	IPCC 2006	87.3	(tCO2/ TJ)	24.0	(MJ/kg)						
Natural Gas****	NTP 111.002:2003	54.3	(tCO2/ TJ)	8,450.0	(Kcal/m3)					0.0354	(Gj/ m3)

* 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 1.4 Chapter 1, Volume 2: Energy, http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

** 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 1.2 Chapter 1, Volume 2: Energy, http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

*** Good practice guidance and uncertainty management in National Greenhouse Gas Inventories, Fuel Density Values, http://www.ipcc-nggip.iges.or.jp/public/gp/bgp/2_4_Water-borne_Navigation.pdf

**** Norma Técnica de Perú: NTP 111.002:2003 "Peru Natural Gas Specification" http://www.indecopi.gob.pe/repositorioaps/0/13/jer/eve_cep_metro/Seminario%20de%20Gas%20Natural/Situaci%C3%B3n%20actual%20de%20la%20Metrolog%C3%ADa%20en%20Gas%20Natural%20en%20Peru%20-%20JOSE%20DAJES_ppt%20%5BModo%20de%20compatibilidad%5D.pdf

STEP 1. 1 Operating Margin 2010

A	B	C	D	E	F	G	H	I	J
PLANT	FUEL TYPE	GEN 2010	FUEL CONSUMPTION		FUEL CONSUMPTION		Calorifc Value		Emission CO2
		(GWh)		(unit)		(unit)		(unit)	(co2 ton)
EDEGEL		**4,121.40**							**1,691,055.45**
TG Santa Rosa UTI - Gas	GAS	55.86	737,799.2	(mpc)	20,892,142	(m3)	739	(TJ)	40,134.9
TG Santa Rosa UTI - D2	D2	0.70	10,045.6	(gal)	38,027	(L)	1.3	(TJ)	96.9
TG Santa Rosa WTG - Gas	GAS	86.41	964,837.0	(mpc)	27,321,135	(m3)	967	(TJ)	52,485.3
TG Santa Rosa WTG - D2	D2	0.04	65,376.0	(gal)	247,474	(L)	8.7	(TJ)	630.4
TG Santa RosaTG8 - Gas	GAS	763.75	7,538,844.4	(mpc)	213,476,251	(m3)	7,552	(TJ)	410,098.6
TG Ventanilla D2	D2	0.57	51,731.0	(gal)	1,464,858	(m3)	52	(TJ)	2,814.1
TG Ventanilla C.C.	GAS	3,214.07	21,780,097.5	(mpc)	616,743,536	(m3)	21,819	(TJ)	1,184,795.4
EGENOR		**71.58**							**55,734.02**
TG Chimbote	D2	8.07	900,598.0	(gal)	3,409,124	(L)	119.6	(TJ)	8,683.6
GD Chidayo Oeste	D2	23.72	135,245.0	(gal)	511,956	(L)	18.0	(TJ)	1,304.0
GD Chidayo Oeste	R6		1,562,239.4	(gal)	5,913,701	(L)	222	(TJ)	16,780.1
GD Paita	D2	0.00	0.00	(gal)	0	(L)	0.0	(TJ)	0.0
GD Piura	D2	15.74	423,398.0	(gal)	1,602,731	(L)	60	(TJ)	4,547.7
GD Piura	R6		772,393.0	(gal)	2,923,816	(L)	102.6	(TJ)	7,447.4
GD Sullana	D2	0.00	0.00	(gal)	0	(L)	0.0	(TJ)	0.0
TG Piura D2	D2	10.97	138,398.0	(gal)	523,892	(L)	18.4	(TJ)	1,334.4
TG Piura R6	R6		1,139,366.0	(gal)	4,312,956	(L)	162	(TJ)	12,238.0
TG Trujillo	D2	0.00	0.00	(gal)	0	(L)	0.0	(TJ)	0.0
TG FLORES TG1	GAS	13.08	62,481.0	(mpc)	1,769,265	(m3)	63	(TJ)	3,398.8
EEPSA		**683.67**							**438,568.64**
MalacasTGI	GAS	48.43	817,287.2	(mpc)	23,142,991	(m3)	819	(TJ)	44,458.9
Malacas TG2	GAS	17.92	307,742.1	(mpc)	8,714,284	(m3)	308	(TJ)	16,740.6
Malacas TGN4	GAS	617.32	6,937,179.4	(mpc)	196,438,999	(m3)	6,950	(TJ)	377,369.2
EGASA		**115.74**							**79,865.18**
Chilina - Vapor R5	R5	41.53	962,629.0	(gal)	3,643,936	(L)	137	(TJ)	10,339.6
Chilina - Sulver D2	D2		185,117.0	(gal)	700,742	(L)	24.6	(TJ)	1,784.9
Chilina - Sulver R5	R5		1,770,671.0	(gal)	6,702,698	(L)	252	(TJ)	19,018.8
Chilina - Combinado D2	D2		236,831.0	(gal)	896,500	(L)	31.5	(TJ)	2,283.5
Mollendo Mirrlees R5	R5	60.41	3,159,094.0	(gal)	11,958,434	(L)	449	(TJ)	33,931.9
Mollendo Mirrlees D2	D2		379,441.0	(gal)	1,436,336	(L)	50.4	(TJ)	3,658.6
Pisco TG1	GAS	3.60	42,488.23	(mpc)	1,203,132	(m3)	43	(TJ)	2,311.3
Pisco TG2	GAS	10.20	120,161.45	(mpc)	3,402,593	(m3)	120	(TJ)	6,536.6
SDF ENERGÍA		**203.60**							**113,073.81**
TG1 Oquendo	GAS	203.60	2,078,636.13	(mpc)	58,860,407	(m3)	2,082	(TJ)	113,073.8

ELECTROPERÚ		**171.13**							**115,662.40**
Tumbes D2	D2	47.57	2,495,512.0	(gal)	9,446,511	(L)	331.4	(TJ)	24,061.7
Tumbes R6	R6		287,361.0	(gal)	1,087,776	(L)	41	(TJ)	3,086.6
Emergencia Trujillo Norte	D2	120.97	8,989,748.7	(gal)	34,029,795	(L)	1,193.9	(TJ)	86,679.1
Yarinacocha	D2	2.59	758.6	(gal)	2,872	(L)	0.1	(TJ)	7.3
Yarinacocha	R6		170,164.9	(gal)	644,142	(L)	24	(TJ)	1,827.7

ENERSUR		**3,995.80**							**2,482,199.98**
Chilca TG 1 1	GAS	1,092.95	10,536,129.09	(mpc)	298,349,882	(m3)	10,555	(TJ)	573,145.2
Chilca TG 1 2	GAS	406.19	4,023,062.55	(mpc)	113,920,419	(m3)	4,030	(TJ)	218,846.9
Chilca TG 2 1	GAS	930.35	9,153,560.75	(mpc)	259,199,915	(m3)	9,170	(TJ)	497,936.1
Ilo Catkato	D2	3.37	217,857.16	(gal)	824,676	(L)	28.9	(TJ)	2,100.6
IloTG	D2	36.80	3,025,182.35	(gal)	11,451,525	(L)	401.8	(TJ)	29,168.8
Ilo2 TV1	Coking Coal	1,066.81	393,153.44	(ton)	393,153,440	(KG)	9,436	(TJ)	823,735.1
Ilo2 TV2	D2		144,581.60	(gal)	547,299	(L)	19.2	(TJ)	1,394.1
Ilo1TVs	R5	459.33	31,237,877.80	(gal)	118,247,863	(L)	4,444	(TJ)	335,526.9
Ilo1TVs	D2		35,931.70	(gal)	136,016	(L)	4.8	(TJ)	346.5
Ilo1TVs	Vapor		393,153.44	(klb)	4384052.4	(klb)	-	(TJ)	0

KALLPA GENERACIÓN S.A.		**3,211.07**							**1,694,050.22**
Kallpa TGI	GAS	880.43	8,486,211.6	(mpc)	240,302,696	(m3)	8,502	(TJ)	461,633.6
Kallpa TG2	GAS	1,252.34	12,198,212.0	(mpc)	345,414,817	(m3)	12,220	(TJ)	663,559.3
Kallpa TG3	GAS	1,078.30	10,457,306.8	(mpc)	296,117,883	(m3)	10,476	(TJ)	568,857.4
SAN GABÁN		**1.42**							**1,108.42**
Bellavista	D2	0.16	12,764.86	(gal)	48,320	(L)	1.7	(TJ)	123.1
Taparachi	D2	1.26	102,193.23	(gal)	386,842	(L)	13.6	(TJ)	985.3

SHOUGESA		**38.53**							**39,767.22**
Cummins	D2	0.08	6,016.00	(gal)	22,773	(L)	0.8	(TJ)	58.0
San Nicolás TVs	R5	38.45	3,696,966.00	(gal)	13,994,495	(L)	526	(TJ)	39,709.2

TERMOSELVA		**764.93**							**540,087.02**
TG1 Aguaytía	GAS	318.24	4,133,683.63	(mpc)	117,052,858	(m3)	4,141	(TJ)	224,864.4
TG2 Aguaytía	GAS	446.69	5,794,737.74	(mpc)	164,088,661	(m3)	5,805	(TJ)	315,222.6

EGEMSA		**0.33**							**299.28**
Dolorespata	D2	0.33	31,039.36	(gal)	117,496	(L)	4.1	(TJ)	299.3

EGESUR		**5.27**							**2,383.06**
Independencia	GAS	5.27	43,807.73	(mpc)	1,240,496	(m3)	44	(TJ)	2,383.1

AIPSA		**77.48**							**0.00**
Paramonga	BAGASSE	77.48	191,048.70	(Ton)	191,048.70	(TON)	0	(TJ)	0.0

Total Thermal (SEIN):	**13,462.28**	**(GWh)**	**Emissions by Fuel Type:**

Fuel (D2 + R5 +R6) (co2 ton) :	**652,267.9**
Natural Gas (co2 ton) :	**5,777,851.71**
Coking Coal (co2 ton) :	**823,735.09**
Bagasse (co2 ton) :	**0.00**

Total Thermal (SEIN):	**13,461.95**	**(GWh)**	**(co2 ton)**	**7,253,854.71**
Total Hydro (SEIN):	**18,964.56**	**(GWh)**	**(co2 ton)**	**0.00**
Total Generation (SEIN):	**32,426.51**	**(GWh)**	**(co2 ton)**	**7,253,854.71**

STEP 1. 2 Operating Margin 2009

A	B	C	D	E	F	G	H	I	J
PLANT	**FUEL TYPE**	**GEN 2009**	**FUEL CONSUMPTION**		**FUEL CONSUMPTION**		**Calorifc Value**		**Emission co2**
		(GWh)		**(unit)**		**(unit)**		**(unit)**	**(co2 ton)**
EDEGEL		**3,682.47**							**1,445,636.47**
TG Santa Rosa UTI - Gas	GAS	149.77	1,890,473	(mpc)	53,532,221	(m3)	1,894	(TJ)	102,838.1
TG Santa Rosa UTI - D2	D2	8.37	853,900	(gal)	3,232,353	(L)	113.4	(TJ)	8,233.3
TG Santa Rosa WTG - Gas	GAS	217.59	2,416,786	(mpc)	68,435,742	(m3)	2,421	(TJ)	131,468.5
TG Santa Rosa WTG - D2	D2	7.57	641,270	(gal)	2,427,463	(L)	85.2	(TJ)	6,183.1
TG Santa RosaTG8 - Gas	GAS	42.96	439,120	(mpc)	12,434,491	(m3)	440	(TJ)	23,887.3
TG Ventanilla D2	D2	0.91	75,180	(gal)	284,586	(L)	10.0	(TJ)	724.9
TG Ventanilla C.C.	GAS	3,255.29	21,550,418	(mpc)	610,239,738	(m3)	21,589	(TJ)	1,172,301.3
EGENOR		**77.05**							**67,556.53**
TG Chimbote	D2	10.89	1,254,834	(gal)	4,750,049	(L)	166.7	(TJ)	12,099.1
GD ChidayoOeste	D2	31.62	379,523	(gal)	1,436,645	(L)	50.4	(TJ)	3,659.4
GD ChidayoOeste	R6		1,893,569	(gal)	7,167,916	(L)	269.39	(TJ)	20,338.88
GD Paita	D2	2.01	199,780	(gal)	756,247	(L)	26.5	(TJ)	1,926.3
GD Piura	D2	11.64	394352	(gal)	1,492,780	(L)	52.4	(TJ)	3,802.3
GD Piura	R6		892,025	(gal)	3,376,671	(L)	126.90	(TJ)	9,581.27
GD Sullana	D2	5.98	512,507	(gal)	1,940,044	(L)	68.1	(TJ)	4,941.6
TG Piura D2	D2	14.06	115,570	(gal)	437,479	(L)	15.3	(TJ)	1,114.3
TG Piura R6	R6		836,725	(gal)	3,167,339	(L)	119.04	(TJ)	8,987.29
TG Trujillo	D2	0.85	114,719	(gal)	434,257	(L)	15.2	(TJ)	1,106.1
EEPSA		**579.81**							**386,715.33**
MalacasTGI	GAS	44.09	758,146	(mpc)	21,468,299	(m3)	759.5	(TJ)	41,241.7
Malacas TG2	GAS	54.39	902,463	(mpc)	25,554,900	(m3)	904.1	(TJ)	49,092.3
Malacas TGN4	GAS	481.33	5,448,380	(mpc)	154,280,905	(m3)	5,458.2	(TJ)	296,381.4
EGASA		**68.81**							**46,362.24**
Chilina - Vapor R5	R5	26.06	187,346	(gal)	709,180	(L)	26.7	(TJ)	2,012.3
Chilina - Sulver D2	D2		258,476	(gal)	978,435	(L)	34.3	(TJ)	2,492.2
Chilina - Sulver R5	R5		1,048,653	(gal)	3,969,571	(L)	149.2	(TJ)	11,263.6
Chilina - Combinado D2	D2		397,109	(gal)	1,503,216	(L)	52.7	(TJ)	3,828.9
MollendoMirrlees R5	R5	42.75	2,392,082	(gal)	9,054,987	(L)	340.3	(TJ)	25,693.4
MollendoMirrlees D2	D2		111,157	(gal)	420,774	(L)	14.8	(TJ)	1,071.8
SDF ENERGÍA		**187.44**							**100,317.23**

Oquendo TG	GAS	187.44	1,844,132	(mpc)	52,219,991	(m3)	1,847.5	(TJ)	100,317.2

ELECTROPERU		**119.01**							**74,654.76**
Tumbes D2	D2	24.49	118705	(gal)	449,346	(L)	15.8	(TJ)	1,144.6
Tumbes R6	R6		1,335,089	(gal)	5,053,846	(L)	189.9	(TJ)	14,340.2
Emergenda Trujillo	D2	83.34	5,318,203	(gal)	20,131,526	(L)	706.3	(TJ)	51,278.1
Yarinacocha	D2	11.19	4,974	(gal)	18,829	(L)	0.7	(TJ)	48.0
Yarinacocha	R6		730,280	(gal)	2,764,402	(L)	103.9	(TJ)	7,844.0
ENERSUR		**3,927.93**							**2,461,712.64**
Chilca TG 1 1	GAS	996.14	9,536,575	(mpc)	270,045,668	(m3)	9,554	(TJ)	518,771.3
Chilca TG 1 2	GAS	1,144.14	10,998,270	(mpc)	311,436,252	(m3)	11,018	(TJ)	598,284.7
Chilca TG 2 1	GAS	412.18	5,321,191	(mpc)	150,679,314	(m3)	5,331	(TJ)	289,462.6
IloCatkato	D2	6.04	384,824	(gal)	1,456,713	(L)	51.1	(TJ)	3,710.5
IloTG	D2	41.80	3,404,190	(gal)	12,886,221	(L)	452.1	(TJ)	32,823.2
Ilo2 TV1	Coking Coal	929.15	345,278				8,287	(TJ)	723,426.5
Ilo TVs	R5	398.49	27,486,562	(gal)	104,047,630	(L)	3,910	(TJ)	295,233.9
Ilo TVs	D2		27,183	(gal)	102,897	(L)	3.6	(TJ)	262.1
KALLPA GENERACIÓN S.A.		**1,237.92**							**665,800.25**
Kallpa TGI	GAS	734.24	7,376,446	(mpc)	208,877,641	(m3)	7,390	(TJ)	401,264
Kallpa TG2	GAS	503.69	4,862,962	(mpc)	137,703,717	(m3)	4,872	(TJ)	264,536
SAN GABAN		**2.32**							**1,758.94**
Bellavista	D2	0.28	22,017	(gal)	83,343	(L)	3	(TJ)	212
Taparachi	D2	2.04	160,408	(gal)	607,208	(L)	21	(TJ)	1,547
SHOUGESA		**132.88**							**128,622.26**
Cummins	D2	1.20	85,275	(gal)	322,800	(L)	11	(TJ)	822
San Nicolás TVs	R5	131.68	11,898,306	(gal)	45,039,848	(L)	1,693	(TJ)	127,800
TERMOSELVA		**1,038.13**							**689,165.58**
TG1 Aguaytía	GAS	601.86	7,294,965	(mpc)	206,570,357	(m3)	7,308	(TJ)	396,832
TG2 Aguaytía	GAS	436.27	5,373,968	(mpc)	152,173,792	(m3)	5,384	(TJ)	292,334

Total Thermal(SEIN):		**11,053.77**	**(GWh)**	**(co2 ton)**	**6,068,302.23**
Sub Total (a):	**Fuel (D2 + R5 +R6)**	**863.24**	**(GWh)**	**(co2 ton)**	**666,125.69**
Sub Total (b):	**Natural Gas**	**9,261.38**	**(GWh)**	**(co2 ton)**	**4,679,012.17**
Sub Total (c):	**Coking Coal**	**929.15**	**(GWh)**	**(co2 ton)**	**723,426.47**
Total Hydro (SEIN):		**18,751.67**	**(GWh)**		
Total Generation (SEIN):		**29,805.44**	**(GWh)**	**(co2 ton)**	**6,068,302.23**

STEP 1. 3 Operating Margin 2008

A	B	C	D	E	F	G	H	I	J
PLANT	FUEL TYPE	GEN 2008	FUEL CONSUMPTION		FUEL CONSUMPTION		Calorifc Value		Emission co2
		(GWh)		(unit)		(unit)		(unit)	(co2 ton)
EDEGEL		**4,002.26**							**1,602,468.65**
TG Santa Rosa UTI - Gas	GAS	256.50	3,133,356	(mpc)	88,726,741	(m3)	3,139	(TJ)	170,448.5
TG Santa Rosa WTG - Gas	GAS	171.19	1,826,562	(mpc)	51,722,464	(m3)	1,830	(TJ)	99,361.5
TG Santa Rosa WTG - D2	D2	86.75	7,098,178	(gal)	26,869,443	(L)	942.7	(TJ)	68,440.6
TG Ventanilla D2	D2	54.18	4,207,882	(gal)	15,928,517	(L)	558.8	(TJ)	40,572.4
TG Ventanilla Gas	GAS	3,433.64	22,494,283	(mpc)	636,967,013	(m3)	22,535	(TJ)	1,223,645.7
EGENOR		**179.52**							**171,025.69**
TG Chimbote	D2	46.70	5,155,128	(gal)	19,514,222	(L)	684.7	(TJ)	49,705.7
GD Chiclayo Oeste D2	D2	42.78	930,072	(gal)	3,520,694	(L)	123.5	(TJ)	8,967.7
GD Chiclayo Oeste R6	R6		2,070,482	(gal)	7,837,602	(L)	295	(TJ)	22,239.1
GD Paita	D2	9.73	837,083	(gal)	3,168,694	(L)	111.2	(TJ)	8,071.1
GDPiura2 D2	D2	17.94	421,754	(gal)	1,596,508	(L)	56.0	(TJ)	4,066.5
GDPiura R6	R6		898,950	(gal)	3,402,885	(L)	128	(TJ)	9,655.6
GDSullana	D2	16.26	1,327,513	(gal)	5,025,168	(L)	176.3	(TJ)	12,799.9
TG Piura D2	D2	43.15	328,783	(gal)	1,244,575	(L)	43.7	(TJ)	3,170.1
TG Piura R6	R6		4,559,500	(gal)	17,259,531	(L)	649	(TJ)	48,973.7
TGTrujillo	D2	2.96	350,145	(gal)	1,325,439	(L)	46.5	(TJ)	3,376.1
EEPSA		**685.12**							**435,347.42**
MalacasTGl	GAS	29.47	470,678	(mpc)	13,328,114	(m3)	472	(TJ)	25,604.0
MalacasTG2	GAS	49.66	765,754	(mpc)	21,683,733	(m3)	767	(TJ)	41,655.5
MalacasTGN4	GAS	605.98	6,766,561	(mpc)	191,607,625	(m3)	6,779	(TJ)	368,087.9
EGASA		**109.53**							**84,048.54**
Chilina - Vapor R5	R5	30.45	1,530,904	(gal)	5,795,084	(L)	218	(TJ)	16,443.5
Chilina - Combinado D2	D2		1,593,490	(gal)	6,031,997	(L)	211.6	(TJ)	15,364.4
MollendoMirrlees R5	R5	79.08	4,760,803	(gal)	18,021,544	(L)	677	(TJ)	51,135.9
MollendoMirrlees D2	D2		114,574	(gal)	433,708	(L)	15.2	(TJ)	1,104.7
EGEMSA		**3.13**							**2,473.94**
Dolorespata (4)	D2	3.13	256,580	(gal)	971,258	(L)	34.1	(TJ)	2,473.9
ELECTROPERÚ		**88.86**							**58,650.20**
Turnbes D2	D2	38.59	54,975	(gal)	208,102	(L)	7.3	(TJ)	530.1
Turnbes R6	R6		2,194,603	(gal)	8,307,450	(L)	312	(TJ)	23,572.3
Yarinacocha D2	D2	50.28	5,620	(gal)	21,274	(L)	0.7	(TJ)	54.2
Yarinacocha R6	R6		3,211,392	(gal)	12,156,403	(L)	457	(TJ)	34,493.6
ENERSUR		**4,040.93**							**2,474,441.55**
ChilcaTGl	GAS	1,288.91	12,022,305	(mpc)	340,433,687	(m3)	12,044	(TJ)	653,990.3
ChilcaTG2	GAS	1,272.02	12,094,508	(mpc)	342,478,248	(m3)	12,116	(TJ)	657,918.0
IloCatkato	D2	6.54	407,196	(gal)	1,541,400	(L)	54.1	(TJ)	3,926.2
IloTG	D2	70.95	5,679,932	(gal)	21,500,815	(L)	754.4	(TJ)	54,765.9
II02TV1	Coking Coal	909.28	347,461	(ton)			8,339	(TJ)	728,000.3
Ilo TVs	R5	493.23	34,983,416	(gal)	132,426,223	(L)	4,977	(TJ)	375,757.8

Ilo TVs	D2		8,624	(gal)	32,647	(L)	1.1	(TJ)	83.2
KALLPA GENERACIÓN S.A.		**987.60**							**530,193.35**
Kallpa	GAS	987.60	9,746,546	(mpc)	275,991,384	(m3)	9,764	(TJ)	530,193.4
SAN GABAN		**2.56**							**1,917.45**
Bellavista	D2	0.34	26,833	(gal)	101,574	(L)	3.6	(TJ)	258.7
Taparachi	D2	2.23	172,032	(gal)	651,210	(L)	22.8	(TJ)	1,658.7
SHOUGESA		**225.26**							**223,071.34**
Cummins	D2	0.82	57,591	(gal)	218,005	(L)	7.6	(TJ)	555.3
San Nicolás TVs	R5	224.44	20,716,458	(gal)	78,420,080	(L)	2,947	(TJ)	222,516.1
TERMOSELVA		**1,223.70**							**810,198.15**
TG1 Aguaytía	GAS	636.59	7,648,949	(mpc)	216,594,065	(m3)	7,663	(TJ)	416,088.1
TG2 Aguaytía	GAS	587.12	7,244,926	(mpc)	205,153,410	(m3)	7,258	(TJ)	394,110.0
Total Thermal(SEIN):		**11,548.48**	**(GWh)**					**(co2 ton)**	**6,393,836.29**
Sub Total (a):	**Fuel (D2 + R5 +R6)**	**1,320.53**	**(GWh)**					**(co2 ton)**	**1,084,733.14**
Sub Total (b):	**Natural Gas**	**9,318.67**	**(GWh)**					**(co2 ton)**	**4,581,102.87**
Sub Total (c):	**Coking Coal**	**909.28**	**(GWh)**					**(co2 ton)**	**728,000.29**
Total Hydro (SEIN):		**18,010.23**	**(GWh)**						
Total Generation (SEIN):		**29,558.71**	**(GWh)**					**(co2 ton)**	**6,393,836.29**

Operating Margin		**A**	**B**	**C**	**D**
		Total Emissions	**Total Generation**	**OM by year:**	**OM Average**
		(tCO_2)	**(MWh)**	**(tCO_2 / MWh)**	**(tCO_2 / MWh)**
STEP 1.1	**2010**	**7,253,855**	**32,426,510**	**0.2237**	
STEP 1.2	**2009**	**6,068,564**	**29,805,435**	**0.2036**	**0.2145**
STEP 1.3	**2008**	**6,393,836**	**29,558,709**	**0.2163**	

Calculation of the Build Margin

SEIN Annual Generation 2010 (Excluding CDM) GWh :	**29,820.69 (GWh)**
Build Margin Emission factor for 20% of grid (Excluding CDM) :	**5,964.14 (GWh)**

5 Most recent units generation :	1,118.10 (GWh)

Table 4A. Build Margin Emission factor for 20% of System Generation

A	B	C	D	E	F	G	H
POWER PLANT	TYPE	START	Effective Power (MW)	Generation 2010 (GWh)	5 Most recent Units (GWh)	20% Gen. 2010 (Excluding CDM) (GWh)	20% Gen. 2010 (Excluding CDM) (%)
Independencia	Gas turbine Natural Gas	Sep-10	5.7	5.27	5.27	5.27	0.02%
Pisco	Gas turbine Natural Gas	Aug-10	36.7	13.8	19.07	19.07	0.06%
Poechos II (*)	Hydro	May-10	10	28.29			
Roncador	Hydro	May-10	3.5	7.65	26.72	26.72	0.09%
Las Flores	Gas turbine Natural Gas	May-10	198.4	13.08	39.8	39.8	0.13%
Kallpa TG3	Gas turbine Natural Gas	Mar-10	192.6	1078.3	1118.1	1118.1	3.75%
AIPSA (Paramonga)	Bagasse	Mar-10	20	77.48		1195.58	4.01%
El Platanal(*)	Hydro	Feb-10	217.40	720.56			
Santa Cruz II(*)	Hydro	Jan-10	6.91	52.97			
La Joya(*)	Hydro	Oct-09	5.00	18.02			
Santa Rosa II (TG8)	Gas turbine Natural Gas	Sep-09	193.18	763.86		1,959.44	6.57%
Chilca I (TG3)	Thermal	Aug-09	199.80	930.46		2,889.90	9.69%
Emergencia de Trujillo NORTE	Thermal	Jul-09	64.00	120.97		3,010.87	10.10%
Kallpa (TG 2)	Gas turbine Natural Gas	Jun-09	216.00	1,252.34		4,263.21	14.30%
Santa Cruz I (Unidad 2)(*)	Hydro	May-09	6.91	22.49			
Oquendo (TG1)	Cogeneracion	Mar-09	31.00	203.60		4,466.81	14.98%
Caña Brava (*)	Hydro	Feb-09	5.31	29.08			
Chilca TG2	Gas turbine Natural Gas	Jul-07	175.97	406.19		4,873.00	16.34%
Kallpa TG1	Gas turbine Natural Gas	Jul-07	180.00	880.43		5,753.43	19.29%
Ventanilla C.C.(*)	Gas turbine Natural Gas	Mar-07	457.00	3,255.29			
Chilca 1 (TG1)	Gas turbine Natural Gas	Dec-06	171.68	1,092.95		6,846.38	22.96%
Santa Rosa UTI 5 y 6	Gas turbine Natural Gas	Aug-06	119.20	149.77			
YUNCAN	Hydro	Aug-05	133.50	692.59			
Santa Rosa(Westinghouse)	Gas turbine Natural Gas	Jun-05	127.50	217.59			
Yarinacocha	Diesel 2 / Residual	Feb-03	25.36	2.59			

Arcata	Hydro	Apr-03	3.15	30.14			
Huanchor	Hydro	Nov-02	18.36	146.83			
Machupichu	Hydro	Oct-01	90.45	722.01			
San Nicolas Cummins	Diesel 2 / Residual	Jul-01	1.25	1.19			
Tumbes	Diesel 2 / Residual	Feb-01	18.68	47.57			
Chimay	Hydro	Oct-00	142.80	800.14			
Ilo2	Steam Turbine / Coal	Aug-00	135.20	1,066.92			
San Gaban II	Hydro	Feb-00	107.96	590.98			
(*) These projects are registered as CDM projects and thus excluded as per the "Tool to calculate the emission factor for an electricity system" (Version 2.2.1)							

A	B	C	D	E	F	G	H	I
POWER PLANT	TYPE	START	Effective Power	Generation 2010	20% Gen. 2010 (Excluding CDM)	20% Cumulative Generation. 2010 (Excluding CDM)	20% Cum. Gen. 2010 (Excluding CDM)	Emission (tCO_2)
			(MW)	(GWh)	(GWh)	(GWh)	(%)	(CO_2 ton)
Independencia	Gas turbine Natural Gas	Sep-10	5.7	5.27	5.27	5.27	0.02%	2,383.06
Pisco	Gas turbine Natural Gas	Aug-10	36.7	13.8	13.8	19.07	0.06%	8,847.83
Poechos II	Hydro	May-10	10	28.29				
Roncador	Hydro	May-10	3.5	7.65	7.65	26.72	0.09%	
Las Flores	Gas turbine Natural Gas	May-10	198.4	13.08	13.08	39.8	0.13%	3,398.85
Kallpa TG3	Gas turbine Natural Gas	Mar-10	192.6	1078.3	1078.3	1118.1	3.75%	568,857.37
AIPSA (Paramonga)	Bagasse	Mar-10	20	77.48	77.48	1195.58	4.01%	0.00
El Platanal	Hydro	Feb-10	217.40	720.56				
Santa Cruz II	Hydro	Jan-10	6.91	52.97				
La Joya	Hydro	Oct-09	5.00	18.02				
Santa Rosa II (TG8)	Gas turbine Natural Gas	Sep-09	193.18	763.86	763.86	1,959.44	6.57%	410,098.63
Chilca I (TG3)	Thermal	Aug-09	199.80	930.46	930.46	2,889.90	9.69%	497,936.10
Emergencia de Trujillo NORTE	Thermal	Jul-09	64.00	120.97	120.97	3,010.87	10.10%	86,679.08
Kallpa (TG 2)	Gas turbine Natural Gas	Jun-09	216.00	1,252.34	1252.34	4,263.21	14.30%	663,559.27
Santa Cruz I (Unidad 2)	Hydro	May-09	6.91	22.49				
Oquendo (TG1)	Cogeneracion	Mar-09	31.00	203.60	203.6	4,466.81	14.98%	113,073.81
Caña Brava	Hydro	Feb-09	5.31	29.08				
Chilca TG2	Gas turbine Natural Gas	Jul-07	175.97	406.19	406.19	4,873.00	16.34%	218,846.86
Kallpa TG1	Gas turbine Natural Gas	Jul-07	180.00	880.43	880.43	5,753.43	19.29%	461,633.59
Ventanilla C.C.	Gas turbine Natural Gas	Mar-07	457.00	3,255.29				
Chilca 1 (TG1)	Gas turbine Natural Gas	Dec-06	171.68	1,092.95	1092.95	6,846.38	22.96%	573,145.15

Total				**6,846.38**			**3,608,459.58**
The World Bank, with *COES –Comité de OperaciónEconómicadelSistemaInterconectadoNacional*(Dispatch Center) data.							

Build Margin Emission factor		
Emissions:	**3,608,459.58**	**(tCO_2)**
Generation:	**6,846,380**	**(MWh)**
BM:	**0.5271**	**(tCO_2 / MWh)**

CDM – Executive Board

Annex 4

MONITORING INFORMATION

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CDM – Executive Board

I. Background Information

The baseline methodology and monitoring methodology for the project are in accordance with the approved small-scale methodology AMS-I.D, which is applicable to renewable electricity generation for a grid.

The project installed capacity and estimated yearly average generation is as follows:

Project name	Installed capacity (MW)	Expected Annual Generation (MWh/year)
Santa Rosa	**4.218**	**30,100**[39]

Source: The project's technical report

The project is a bundle of 3 small run-of-river hydropower plants, located in Lima-Peru, in the Santa Rosa Irrigation[40] in the Sayán District. The Purpose of the project is renewable electricity generation to be supplied to the National Interconnected Electric Grid ("SEIN"). The project will displace 11,769 tCO_2 approx. per year[41]. GHG Emissions Reductions ("ERs") for the first crediting period (7 years) account for 82,383 tCO_2 or ERs. Because the existing Project equipment is neither transferred to another activity nor it comes from another activity, there is no need to monitor leakages. Leakage for the project is zero.

The project boundary is the area in the Santa Rosa Irrigation where Santa Rosa I, II and III powerhouses and transmission lines are placed; and as the transmission lines reach the SEIN by interconnecting to EDELNOR transmission line, the SEIN will also be included in the project boundary.

II. Purpose of the Monitoring Plan

This report presents the Monitoring Plan ("the MP") for the project, which has been considered by the Community Development Carbon Fund (CDCF) for ERs purchases in Peru. The MP defines a standard against which the performance in terms of the project's ERs will be monitored and verified, in conformance with all relevant requirements of the CDM of The Kyoto Protocol. The MP is part of the Emissions Reductions Purchase Agreement (ERPA) document and, after its validation, will be an integral part of the contractual agreement between the CDCF, and the project' sponsor ("the sponsor"). For the MP, the sponsor will be treated as it were the project's operator ("the operator"), and solely responsible for the ERs delivery. Both the project's baseline and the MP are subject to verification procedures.

III. Use of the Monitoring Plan by the Operator

This report, the MP, identifies key performance indicators of the project and sets out the procedures for metering, monitoring, calculating and verifying the ERs generated by the project, annually. Adherence to the instructions in the MP is necessary for the operator to successfully measure and track the impact of the project on the environment and prepare all data required for the periodic audit and verification process that must be undertaken to confirm the achievement of the corresponding ERs. The MP is thus the basis for the production of ERs and delivery of ERs to the CDCF. The MP assists the operator in establishing a credible, transparent, and adequate data measurement, collection, recording and management system to successfully develop and maintain the proper information; required for an audit and for the verification and certification of the achieved ERs and other Project outcomes. Specifically, the MP provides the requirements and instructions for: (i) establishing and maintaining the appropriate monitoring system including spreadsheets for the calculation of ERs, (ii) checking whether the project meets key sustainable development indicators, (iii)

[39] When all the project components are operational

[40] The Santa Rosa irrigation has more than 40 years in operation

[41] When all the project components are operational

implementing the necessary measurement and management operations, and (iv) preparing for the requirements of independent third party verifications and audits.

The MP ensures environmental integrity and accuracy of crediting ERs by only allowing actual ERs to be accounted for after they have been achieved. The MP must therefore be used throughout the period in which the project has committed to or desires to sell/track ERs. It must be adopted as a key input into the detailed planning of the project, and included as one of the operational manuals of the project.

The MP can be updated and adjusted to meet operational requirements. The verifier approves such modifications during the process of initial or periodic verification. In particular, any shifts in the baseline scenario may lead to such amendments, which may be mandated by the verifier. Amendments may also be necessary as a consequence of new circumstances that affect the ability to monitor ERs as described here or to accommodate new or modified CDM rules.

IV. Organizational, Operational and Monitoring Obligations

A. Obligations of The Operator

Monitoring the project's performance in terms of ERs achievement requires the fulfillment of operational data collection and processing obligations from the operator. The operator has the primary obligation to calculate the project ERs based on the most recent available information, following the ERs Calculation Procedure ("ERCP") presented in this MP and to abide to the ERCP Organizational Structure and the ERCP Quality Control Procedure presented in the annex section of this MP. Both the ERCP Organizational Structure and the ERCP Quality Control can be seen in the annex.

The ERCP Organizational Structure aims at showing that the ERCP Manager will be responsible for performing the ERCP (monthly), and the MP Steering Committee will be responsible for supervising the ERCP Manager monitoring work (monthly). The ERCP Manager will report to the MP Steering Committee (monthly); and both the ERCP Manager and MP Steering Committee coordinately will report to the verifier (when the verification takes place), allowing for a successful verification of the project's accounted ERs.

The ERCP Quality Control aims at providing guidance on how to handle monitoring data as to ensure that sufficient and accurate information is made available to the verifier, allowing for a successful verification of accounted ERs. The ERCP Quality Control presented in the annex section of this MP provides guidance on how to trace back the electricity produced by the project from both the COES and the final client(s). It is responsibility of the operator to enter into agreements with both sorts of data-sources (COES and final clients) to ensure that data is made available monthly to the ERCP Manager.

To avoid conflict of interests, all data required for the MP will come from a third party: final clients or COES information system, being the latter the preferred data provider. Original data will be kept by the sponsor for the verification. It is believed that the MP approach presented here will result in an accurate, yet conservative calculation of ERs. However some uncertainties may lead to a deviation between monitored and verified ERs, especially errors in the data monitoring and processing system. The operator is expected to prevent such errors and the verification audits are expected to uncover any possible errors. The Certified Emissions Reductions ("CERs") would be granted post-verification.

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Monthly Data Collection – parties involved and monitoring responsibilities

I. Electricity distributor final client(s) (Data Provider)	- Shall provide the operator with written proof of the project's monthly generation registered by ICE's meter (through e-mail) Frequency: Monthly
II. COES – (Data Provider)	- Shall provide the operator with written proof of the project's hourly generation registered by it. Frequency: Monthly Shall keep receipt of sales.
III. The operator (Data Processor)	- Shall keep receipt of sales. - Shall perform monthly calculation of ERs following the ERCP. - Shall perform the annual report of ERs achieved to the verifier. - Shall establish the necessary agreements with both COES and final clients to assure that they both provide (monthly) a written report of the project's hourly generation registered and bought, respectively.

Source: The World Bank

B. Emissions Reductions Calculation Procedure and Required Spreadsheets

The ERCP is the basic instrument for gathering, recording and processing information that will result in the measured ERs. The operator shall consider the project's ERCP as a manual. The ERCP should contain: i) data gathered from the project final clients or COES information system, being the latter the preferred data provider, and ii) data processed by the operator. All data processing should be done in Excel. The ERCP is designed for monthly and yearly calculation, based on final monthly COES reports and the final client monthly recording. Filling data monthly in the required spreadsheets will provide time to review formulas, minimize errors and have data readily available for the verifier in any period of the year. There will be in only 1 spreadsheet to be reviewed by the verifier named Santa Rosa ERs at "yearly period in question".xls. However, as the verifier could require preliminary calculations, The ERCP responsible ("ERCP manager") should keep the name of the file and follow by the date at which the latest adjustment is made, every time he works on the file. Doing so will allow to save old versions in disk and keep them as a record to show to the verifier, if required.

When the ERs calculation for the month is completed, the file should be named Santa Rosa ERs at "month in question".xls, to allow differentiating scratch versions from the final monthly calculation. Likewise, after the calculation of the ERs of the last month of the year, the file should change its name to Santa Rosa ERs at "yearly period in question".xls.

The year for the MP will run from August 1 to July 31st. This monthly-filled file will be composed by 3 worksheets:

1. Worksheet # 1: Original Data from COES
2. Worksheet # 2: Original Data from final clients- data that is not registered by COES.
3. Worksheet # 3: Organized Data, Processed Data and Result

1. Worksheet #1: Should contain data as it was handed in, by COES, through a CD or email, regardless of how it comes i.e. arranged in hours or every 15 minutes. The ERCP manager should not manipulate this data other than copy and paste it from the file it was handed in. The CD or e-mail through which data comes from provider should be kept as proof for the verifier.

2. Worksheet # 2: The same procedure as Worksheet#1, but from data coming from final clients and

that is not registered by COES.

3. Worksheet # 3: The ERCP manager should put in columns (3 columns per month) the hourly generation or quarter-of-hour generation of the month of the project's components and sum it up to obtain the monthly Project's components' generation (adding up must be done to each project component, which will occupy one column each). In this same Worksheet, the ERCP manager should calculate monthly ERs (measured in tCO_2) by multiplying the generation in KWh (or MWh) times 0.456 in $KgCO_2$/MWh (or tCO_2/MWh), which is the baseline emission factor for the project and will be used for the first crediting period (7 years). No rounding needs to be made per month when calculating monthly ERs -as this is only done to measure progress. However, resulting yearly ERs must be rounded down to the nearest integer per project component. At the end of the year[42], the ERCP manager should sum the resulting yearly ERs of each project component (already rounded down to the nearest integer per project component per year) to obtain the yearly project' ERs ready for verification. Once the yearly ERs calculation is completed in the Santa Rosa ERs at July.xls (July is the last month of the year, for the MP), this file should become Santa Rosa ERs at "yearly period in question".xls.

Worksheet # 3 also allows the ERCP manager to calculate the cumulative generation and cumulative ERs along the year and be aware of the project's environmental benefits progresses regarding ERs.

The ERCP Quality Control and Organizational Structure can be seen in the annex section of this MP.

V. Sustainable Development Monitoring Plan ("SDMP"):

Being a CDM activity, the project must meet the requirements of The Kyoto Protocol Article 12 for CDM Projects, which states that the CDM activity must assist the host country in achieving sustainable development. The Government of Peru has endorsed the project as a CDM-eligible activity. This part of the MP explains why it can be taken for granted that the project will contribute to environmental sustainability as well as development in Peru over its lifetime. The sustainable development objective applies also to projects, where not only positive but also negative environmental and social effects are conceivable. The MP for the project specifies sustainable development indicators and targets, which must be monitored and met by the operator and the area to which these indicators and targets will be applied.

The specific SDMP built for the project can be seen in the annex section of this MP.

A. Environmental Sustainability: Impact on Local Pollution

In addition to mitigate emission of CO_2, the project will reduce emissions of local pollutants (particularly SO_2, NO_x and particulates).

The sustainable development contribution of the project is considered fulfilled as long as the project is operating. In the project's EIA no major impacts were identified. Construction impacts will be well managed through proper environmental practices.

The project does not cross or negatively affects any populated or cultivated areas, nor areas with cultural heritage sites. The area is not a migratory bird habitat, and no impact is expected on the local bird population.

The project will operate using the current and future water requirements for irrigation, potable water and ecological flow. The total flow is determined by the local Agricultural Authority of the region, not by the project's sponsor. The water concession is based upon the use of the flow required for agricultural needs.

[42] For MP purposes: July 31st

B. Socio-Economic Sustainability

No negative social impacts are predicted as a consequence of the project. The direct area of influence of the project, including its ancillary infrastructure, is not in or near an indigenous reserve or populated area. Water user rights will be respected, as energy generation receives a lower priority than agricultural use. During operation, the project will hire local labour for operation and maintenance. The sponsor will donate part of the CERs' income to La Merced, which is the town closest to the project site. A broader contribution by the project to Socio-Economic Sustainability is contemplated in the SDMP, shown in the annex section of this MP.

VI. Management and Operational Systems Monitoring Plan

A. Purpose

It is the responsibility of the operator to develop and implement a management and operational system that meets the requirements of the project and of the MP. Equally, it is the operator's responsibility to enter into appropriate agreements with local institutions (i.e. COES) and final clients, to secure an adequate data gathering, processing and recording. The operational and management system shall include, among others Data Handling.

B. Data Handling:

-The establishment of a transparent system for the collection, computation and storage of data, including adequate record keeping and data monitoring systems is required. The CDCF has developed for the operator a set of obligations, an ERCP, an ERCP Organizational Structure and an ERCP Quality Control Procedure. It is deemed that the two latter complement the two prior by providing in detail instructions to accomplish a successful data handling, minimizing all types of failures that shall be under the control of the operator.

C. Quality Assurance:

-Well-defined protocols and routine procedures, with good, professional data entry, extraction and reporting procedures will reduce costs and time while making it considerably easier for the auditor and verifier to do their work - the more organized and transparent the organization, the easier will be to track, monitor, audit and verify.

-The operator must keep proper management processes and systems records, as the auditors will request copies of such records to check compliance with the required management systems. Auditors will accept only one set of official information, and any discrepancies between the official, signed records and on-site records will be questioned.

A reliable degree of quality assurance is granted if all indications given in section I.V of this MP, the ERCP Organizational Structure and the ERCP Quality Control are abided by the operator. The two latter are provided as an annex of the MP.

D. Reporting:

The operator will present the ERCP[43] final (or the most updated) spreadsheet with a summary of the procedure undertaken and final ERs achieved per month and per year by the project, when it is required to do so by the CDCF, Peruvian authorities or the auditors/verifiers.

[43] Explained under IV.B

-The operator will report regularly to the CDCF as well as to Peruvian authorities as required by them, no schedule for this exists as of today. However, any schedule imposed by any of these parties will need to be abided by the operator.
-The operator will prepare reports, as needed for audit and verification purposes; no schedule for this exists as of today. However, any schedule imposed by the auditors/verifiers will need to be abided by the operator. Moreover, the MP steering committee should secure that the ERCP is updated every month in case the verifier requires a report without previous notice.

E. Training:

It is the operator's responsibility to ensure that the required capacity and internal training is made available to the ERCP manager to enable him undertaking the tasks required by this MP. The ERCP manager has already been explained the ERCP by the CDCF; it is the ultimate decision of the ERCP Manager to request more training on this regard anytime before the project's validation.

F. Preparation for Operation:

-The management and operational systems and the capacity to implement this MP must be put in place before the project can start generating ERs or by the end of the first year of the first crediting period. This will be verified before any project can start to generate ERs that are accepted by the CDCF.

VII. Auditing and Verification Procedures A. Audit and Verification Objectives

Periodic auditing and verification of the project's results is a mandatory component for all CDM projects and a CDCF requirement. The chief objective of the audit is to independently verify that the project has achieved the ERs reported by the operator. Audits are an integral part of the verification process and are undertaken in conjunction with verification and by the same firm. This section of the MP outlines the auditing and verification procedures and prerequisites. It provides instructions on how the monitoring work undertaken by the operator is in line with the MP; as well as project performance and compliance with CDM requirements that need to be verified. The CDCF will select and contract the verifier.

A. The CDCF Audit and Verification Regime

The CDCF submits the project to third party validation and verification, which is conducted by independent firms specializing in environmental auditing services (Auditors, Validator, Verifiers, and Certifiers). The CDCF expects that its Auditors will seek accreditation under The Kyoto Protocol regime for providing these services. The CDCF verification system for CDM consists of four activities:

Validation of Project Design: The validator undergoes validation of the project's design, the project's baseline calculation and the MP against CDM requirements and modalities and is complemented by validation of the project. Validation is a CDM requirement. The CDCF will not sign contract with the project unless a validator has confirmed that the project's design is in compliance with all relevant CDM requirements. The validated MP for a project must be followed by the operator and any other involved partner. This MP can be adjusted or amended, if necessary, in order to improve consistency with its objectives, general concepts and project circumstances, but such adjustments are subject to approval by the project's verifier. A renewal of validation is not necessary in this case.

Initial Audit and Verification of Project Readiness: The CDCF requires that the project successfully complete an initial audit and verification process before the CDCF commissions the project and accept emissions reductions delivered by it. While initial verification is not a CDM requirement, The CDCF regards it as essential and final step in The CDCF project preparation and implementation cycle. In the case of small scale activities, as the project is, it can be the same firm and individuals that provide both validation and verification. Initial verification provides an opportunity for verifiers to become familiar with the project, its context, the operator and its management.

The purpose of the initial audit and verification process is threefold:

1. Ensure that the project has been implemented as planned, that the monitoring system is in place and that the project is ready to generate and record ERs.
2. Ensure that the correct meters and registers are installed and tested.
3. Approve adjustments and amendments to the MP that may have become necessary during the detailed design and construction of the project.
4. Assist meeting The CDCF supervision obligations and clear the way for project commissioning and generation of high quality ERs.

During initial verification, Auditors are expected to do the following. They will:

1. Familiarize themselves with the project and the project's circumstances,
2. Introduce the ERCP manager to the audit and verification process,
3. Check whether the project has been implemented as planned,
4. Check whether the meters and registers have been installed and tested correctly and are in operation.
5. Check whether assumptions that have an impact on the monitoring and verification processes and its outcomes are still reasonable, in particular assumptions for the baseline calculation.
6. Confirm system readiness: that the MP has been implemented in the project's management and operational procedures and that all necessary monitoring elements are in place to ensure generation of verifiable ERs.

Periodic verification of ERs: All CDCF Projects must undergo periodic audits and verification of ERs. This is a CDM requirement and the basis for issuance of Certified Emissions Reductions (CER) and for their value in the market place. Verification is arranged by The CDCF and conducted at annual or longer intervals as appropriate for the project. The purpose of periodic audits and verification is to confirm that:

1. The project has achieved the ERs claim for the verification period in compliance with the methodology laid down in this MP.
2. The claimed ERs are real and additional to any that would have occurred in the baseline scenario as interpreted and developed in the projects' baseline calculation and this MP.
3. The operation of the project continues to be in compliance with all Kyoto Protocol, CDCF and host country requirements and modalities for CDM project.
4. The project maintains high quality monitoring systems consistent with the MP.

As part of the periodic audit and verification process Auditors are expected to:

1. Review and audit relevant monitoring records and reports.
2. Verify that the required measurements and observations made for all data inputs necessary for the calculation of ER, are available.
3. Check that meters and recorders are operating correctly.
4. Check whether the MP methodology has been applied correctly and consistently.
5. Check whether achieved ERs have been computed correctly using the provided spreadsheets, and, if necessary, recalculate achieved ERs.
6. Verify that all relevant MP and the project's baseline calculation assumptions are still valid.
7. Verify that the management and monitoring system, including data handling, recording and reporting, are in place and remain adequate.
8. Verify that the social and environmental targets in the MP have been met and that the project assists the host country in achieving sustainable development.
9. Consult with the operator and other project partners on the continued adequacy of the monitoring system and approve any modifications that need to be made to ensure a high quality monitoring operation.

10. Undertake any other activities required by this MP, by The Kyoto Protocol requirements and modalities for the CDM, by the appropriate host country authorities and/or by professional auditing and verification standards and practice.

Verification concludes with a formal verification report. The report may include a statement that may permit the renewal of the project's crediting period in line with applicable CDM rules and modalities.

Certification of ERs: A successfully completed verification process and related verification report provide the basis for the issuance by the verifier of an emissions reductions certificate. The certificate is a legally binding statement, which confirms the (successful) verification report's conclusion that the project has achieved the stated quantity of ERs in compliance with all relevant criteria and requirements. The verifier's certificate constitutes sufficient confirmation for the CDCF as to the project's ERs performance. The verifier for the project is the only one that can issue the certificate but it does not constitute or creates CERs in the sense of Article 12 of The Kyoto Protocol. However, the verifier's certificate may be used by the CDCF and/or Peruvian authorities or authorized entities in the process of issuance and registration of CERs by the competent authority in line with applicable CDM and Kyoto Protocol modalities and procedures.

B. Auditing Criteria and Needs

Verification includes an audit of the project's output information, and data and management systems on the basis of the following established criteria:

1. Completeness.
2. Accuracy.
3. Coverage.
4. Risk Management Controls.

Auditors and verifiers will request information (in the form of records and documentation) from the operator to determine if key performance indicators meet the objectives of the project as set out in this document. The operator is required to record all such indicators, and provide satisfactory documentation and an audit trail for verification purposes (for instance, generation and sales records, etc.). The information that will be needed includes:

1. Records on reported ERs including the electronic worksheets and supporting documentation (assumptions, data estimations, measurement methods, etc).
2. Records on reported social and environmental performance as measured by indicators and targets laid down in the MP.
3. Records on project management, including monitoring, data collection and management systems.

The audit process followed, as with other management systems, is interactive, iterative and participatory. The auditors will determine the credibility and accuracy of the reported performance through spot checks of data measurement and collection systems and interviews with the key project participants. It is necessary for all involved in an audit to understand the audit process and verification requirements.

C. Audit and Verification Process

Audits procedures used to verify CDM projects are similar to audits of other environmental management systems (ISO 14000, EMS) and should complement these established processes. Principle audit tools are spot check of documents and interviews with participating organizations and individuals. Auditors/verifiers are generally free to apply any method that represents good auditing practice and

internationally accepted standards. Auditors typically conduct risk-based spot checks, which are checks of the key parameters and systems with the highest risks for data measurement and collection problems. The planning and scheduling of audits and the verification process is covered in this section.

Audit Preparation and Requests for Information: The auditor will familiarize himself with the project documentation, project reports, project requirements and expected project performance. The auditor will use this MP to prepare the audit process. He will make telephone contact with the operator, and if necessary, will request additional information. Two weeks should be allowed for the receipt of this information.

Development and Delivery of an Audit Checklist: The auditor will develop checklists to guide the audit process. The checklists will cover the key points of the audit. The appropriate checklist will be sent to the operator accompanied by explanatory materials prior to a site visit. Two weeks should be allowed for review, comments and preparation by the auditee.

The Audit: A visit will be made to the site to undertake the audit. The length of the audit visit is to be agreed between the auditor and CDCF and depends on the complexity of the monitoring system and on previous performance based on experience. Audits on each site do normally not require more than two days. The audit time will be spent checking records and undertaking interviews with staff and other individual, which will allow the auditor to complete the audit checklist. These activities are the basis for completing the verification process and for preparing the verification report.

Audit and Draft Verification Reports: The auditor will produce an audit report and a draft verification report for the project, which summarizes the audit findings. The draft verification report will state the number of ERs achieved by the project and will point to areas of possible non-compliance if warranted. The report will also include conclusions on data quality, the monitoring and management and operational system, and other areas where corrective action may be required to come into compliance, improve performance or mitigate risks. The draft report will be submitted to The CDCF, and a copy will be sent to the operator. The project will have the opportunity to come into compliance, if necessary, by submitting the appropriate evidence or by taking corrective action.

Final Verification Report: The auditor will revise the draft report taking into consideration reviewers' comments and further findings and issue the final verification report, if possible within two weeks of receiving all comments. If justified, the final verification report will conclude and explain that, within the verification period, the project has generated the stated quantity of ERs in compliance with all applicable CDM and other requirements. The final verification report is the basis for the issuance of a certificate by the verifier, which will state and confirm the conclusions of the report.

Non-Compliance and Dispute Settlement: In the event of non-compliance findings, the non-complying auditee will be given sufficient time to demonstrate compliance. An eight week period from the issuance of the draft report is recommended for the auditee to address identified deficiencies and come into compliance. It is the responsibility of the verifier to ensure that dispute over any non-compliance issue is communicated clearly and that any attempt is made to resolve it. The verifier will have final decision over the process. The verifier will also provide guidance as appropriate on how identified deficiencies can be met so that the operator can come into compliance in the following period.

Audit and Verification Schedule: Audits and verification of the project will be conducted annually at first, then at intervals over the life of the project. The CDCF in consultation with auditors and the operator will determine the audit schedule. Audit intervals will depend on audit outcomes and experience with the project performance and compliance with the MP, the quality of its monitoring

management and operational systems, and the type and number of corrective actions required by the verifier.

D. Roles and Responsibilities Audit responsibilities are allocated between the project's participants as follows:

The CDCF:
1. The CDCF will make arrangements for the audit and select a third party auditor/verifier in accordance with CDM modalities and CDCF requirements and selection criteria and in consultation with the relevant the host country CDM authority.
2. It is the CDCF's obligation to ensure that the audit process is fair, that the auditor/verifier is fully independent of the operator and that and all possible conflicts of interests are avoided. The CDCF requires details of the experts to be used on the audit/verification team.
3. The CDCF will facilitate the audit work and verification process and will work with the project's participants to ensure co-operation.

The Operator:
1. Will prepare for the audit and verification process to the best of its abilities.
2. Will facilitate the audit through providing Auditors with all the required information, before, during and, in the event of queries, after the audit.
3. Will fully cooperate with the auditors and instruct staff and management to be available for interviews and respond honestly to all audit questions.
4. It is the contractual obligation of the operator and in its best interest to fully cooperate with auditors and verifiers, since only successful verification will enable the delivery of ER to The CDCF in fulfilment of the operator' contracts with the CDCF.

The Auditor / Verifier:
1. The auditors/verifiers must be operational entities accredited in accordance with CDM modalities. They must be professional organizations with a proven track record in environmental auditing and verification, experience with CDM project and work in developing countries. The audit firm must guarantee professional work and assure the quality of the audit and verification team.
2. The auditors / verifiers must undertake the audit to the best of their professional abilities. The auditor's responsibilities include to (a) provide the checklists and request for information in good time, (b) allow adequate time for sufficient review and preparation, (c) provide publishable reports in the agreed format, (d) work with the operator, host country authorities and CDCF as appropriate, (e) report on lessons learnt during the course of the project.

VIII Annexes

Sustainable Development Monitoring Plan ("SDMP")

The SDMP will cover the project's direct and indirect area of influence[44] and their habitants. The following sustainable development indicators and targets framework will facilitate the measurement of progress towards sustainability. The indicators will be revised annually[45] by the verifier to check compliance with targets. The targets will be progresses registered by the indicators. The following indicators have been established:

SDMP Indicators and Targets Framework

Goal 1: Environmental Sustainability		
Initiative	**Indicator[46]**	**Target**
Water Quality	M^3 of solid residue removed from the water	Positive
New Initiative	In case the sponsor desires to incorporate a new initiative to this environmental-sustainability-initiative list, it will have to be approved by the verifier	N/A[47]

Goal 1: Socio-Economic Sustainability		
Initiative	**Indicator[48]**	**Target**
Economic standards	Number of employees hired from local population	Positive
	Purchases from local suppliers	Positive
	Donations to La Merced[49]	
New Initiative	In case the sponsor desires to incorporate a new initiative to this socio-economic-sustainability-initiative list, it will have to be approved by the verifier	N/A[50]

To provide evidence of listed indicators' progresses, the project should provide the verifier the following:

(a) Receipts of expenses incurred for the socially and environmentally responsible action.
(b) Documents related to socially and environmentally responsible action.
(c) The compliance form signed annually by all members of the compliance committee (described below).

The Compliance Committee: The compliance committee will be formed to enforce further the SDMP. The compliance committee will be composed by a representative from:

- The project's direct area of influence: President of the Junta de Regantes del Subsector Santa Rosa, Mr. Manuel Perez - León Jarrín.
- The project's indirect area of influence: Secretary of La Merced, Mr. Fernando Jimenez.

[44] Defined in the EIA
[45] The year for the MP runs from August 1st to July 31st.
[46] Yearly flow or yearly change.
[47] Target will be set when indicator is created and also needs to be approved by the verifier
[48] Yearly flow or yearly change.
[49] Until complying with social works committed with La Merced - according to the Act signed by La Merced and the sponsor, as of December 16ª, 2004
[50] Target will be set when indicator is created and also needs to be approved by the verifier.

The compliance committee will meet annually to:

- After reviewing evidence [(a) and (b) described above], reviewing a written summary of the environmentally and socially responsible actions taken in the semester - to be prepared by the sponsor (ELECTRICA SAC) - and being left convinced by this evidence about the indicators' progresses' accuracy claimed by the project, sign the attached form annexed below ("compliance form"); and

-Review progresses, identify stoppages and suggest solutions regarding listed indicators, to Electrica Santa Rosa SAC, legally represented by Mr. Guillermo Cox Harman, who will be present at the meeting.

Annual Compliance Committee Meeting - Compliance Form

Goal 1: Environmental Sustainability		
Initiative	**Indicator[51]**	**Target**
Land Quality	M^3 of solid residue removed from the water	As of July 31st
New Initiative	In case the sponsor desires to incorporate a new initiative to this environmental-sustainability-initiative list, it will have to be approved by the verifier	N/A[52]

Goal 1: Socio-Economic Sustainability		
Initiative	**Indicator[53]**	**Target**
Economic standards	Number of employees hired from local population	As of July 31st
	Purchases from local suppliers	As of July 31st
	Donations to La Merced[54]	As of July 31st
New Initiative	In case the sponsor desires to incorporate a new initiative to this socio-economic-sustainability-initiative list, it will have to be approved by the verifier	N/A[55]

Identified stoppages, suggested solutions and other observations brought up in the meeting: _____
_____
_____
_____
_____

(Annex extra-paper if necessary).

_____ _____

Direct area of influence representative Indirect area of influence representative

_____

The sponsor

Date of the Compliance Committee Meeting:

Period of the year monitored:

[51] Yearly flow or yearly change.

[52] Target will be set when indicator is created and also needs to be approved by the verifier

[53] Yearly flow or yearly change.

[54] Until complying with social works committed with La Merced - according to the Act signed by La Merced and the sponsor, as of December 16ª, 2004

[55] Target will be set when indicator is created and also needs to be approved by the verifier.

Sustainable Development Monitoring Plan (SDMP)

Biannual Period-Compliment Format

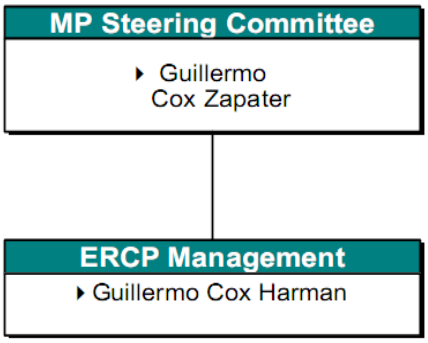
Objective 1: Environmental Sustainability		
Iniciative	Indicator[1]	Annual Accumulated Program
Soil Quality Improvement	M3 of solid residues removed from the canal	760 m3 removed during June 2007 - april 2009.

Objective 2: Socio – Economic Sustainability		
Iniciative	Indicator[2]	Annual Accumulated Program
Economic Standards Improvement	Number of workers in the HEPP belonging to the local community.	14 employees at HPP 1 security guard at Santa Rosa I HPP All workers are from the area as of April 2009
	Purchases to Local Companies	All purchases of construction materials were bought to local dealers. All labour hand for civil works reparations, improvements and maintenance was hired from the local community. S/. 53,150.00 Total purchases: US$ 17,716.67 Change rate 3.00 soles per dollar.
	Donations to La Merced	Christmas presents have been donated for the kindergarten children in La Merced local school in December 2007.

COMMUNITY BENEFIT PLAN		
Benefit	Indicator	Measurement of Compliance
Providing electricity to the local orphanage run by Asociacion Achaley, a non-governmental organization	Provision at no cost to the orphanage	Letter sent on march 2007 by the local orphanage evidencing that they receive electricity at no cost.
Using revenue received from the Trustee in the amount of at least $1.00 per CER to construct the listed community projects for the local school and broader La Merced Village. Increased Employment opportunities for the Local Community during the implementation of the listed community projects. Each of the community projects shall be carried out in descending chronological order upon receipt of funds.	Community Projects 1. Installation of the fence at the local school. The local community did this job before Electrica Santa Rosa received the first CER payment. 2. Construction of Two New Classrooms at the local school. Engineering works finished and a detailed budget available. (S/. 100,957 or US$ 36,538.91 at 2.763 change rate). Construction not started due to tight time schedule and cost exceeding by far US$ 35,251.02 corresponding to the amount received by CER's. 3. Construction of a Computer center at the local school. Project completed. 13 computers and furniture installed at local school. Maintenance services provided. 4. Construction of a community center for La Merced. Not started yet.	Total expenditure on the listed community projects: (a) Balance of investments up to 2007 (Monitoring Report Aug04 – May06): US$ 3,978.89 ...(a) (b) Maintenance of Computer Lab: S/. 1,040.00 Change rate 2.763 soles per dollar. Total Expenditure US$ 376.40 ... (b) Total investment: US$ 4,355.29 ... (a+b) Price per CER US$ 5.00 Amounted to spend in community projects US$ 1.00 = 20% of amount received. (c) Net Amount received: US$ 26,333.92 (Period Jun06-May07) Net amount to spend in community projects: 20% of US$ 26,333.92 = US$ 5,266.78..(c) (d) Net Amount received: US$ 26,423.92 (Period Jun07-May08) Net amount to spend in community projects: 20% of US$ 26,423.92 = US$ 5,284.78..(d) Net amount available to spend: US$ 6,196.27 (c+d-a-b)

Monitoring Plan (MP) – Emissions Reductions Calculation Procedure (ERCP)

ERCP Organizational Structure



Monitoring Plan (MP) – Emissions Reductions Calculation Procedure (ERCP)

ERCP Quality Control

- *Monthly recording*
- *Check calibration of electricity meters, periodically*
- *Make coordination with final clients and COES to be able to implement this document*
- *Only one person will be responsible for the ERCP: Mr. Guillermo Cox Harman (ERCP Manager)*

	COES	Final clients
Data	▸ The Project hourly generation that is registered by *COES*	▸ The Project hourly generation sold to final clients connected to the grid, and that is not registered by *COES*
Quality of Data Collection	▸ Which data comes? All of the above ▸ By what means does it come? By E-mail ▸ How does it come? In Excel ▸ How frequently does it come? Monthly ▸ From whom does it come? From *COES* ▸ To whom does it comes? Mr. Guillermo Cox Harman	▸ Which data comes? All of the above ▸ By what means does it come? By E-mail ▸ How does it come? In Excel ▸ How frequently does it come? Monthly ▸ From who does it come? From final clients ▸ To whom does it comes? Mr. Guillermo Cox Harman
Quality of Data Processing	▸ Original Data ▸ Organized Data ▸ Entered Data ▸ Processed Data ▸ Result • Monthly calculation involves 5 steps • All of it must be done in excel and documented with receipt of sales • Yearly consolidation of monthly calculation	▸ Original Data ▸ Organized Data ▸ Entered Data ▸ Processed Data ▸ Result • Monthly calculation involves 5 steps • All of it must be done in excel & documented with receipt of sales • Yearly consolidation of monthly calculation
Quality of Data Storage	▸ Prevent Excel versioning problem, by keeping "a new" Excel software package every year in PCs used for the ERs calculations ▸ Keep all data for 2 years after the first crediting period (9 years) – assign a password to excel spreadsheets used for the ERCP ▸ Save the document with the last date in which an alteration was made, so that old versions are kept in disk ▸ Keep all written documentation in a folder that will be provided to the verifier together with the data in excel collected	
Quality of Data Delivery	▸ Provide to the Verifier e-mails through which Data Providers delivered the original data ▸ Provide to the Verifier receipt of sales ▸ Provide to the Verifier all calculations made (all steps of Data Processing) by showing all preliminary versions of spreadsheets saved in disk	

Source: The World Bank