CLEAN DEVELOPMENT MECHANISM
SIMPLIFIED PROJECT DESIGN DOCUMENT
FOR SMALL-SCALE PROJECT ACTIVITIES (SSC-CDM-PDD)
Version 02

CONTENTS

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>.

SECTION A. General description of the small-scale project activity

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

Trojes Hydroelectric Project

Version 3

Date: April 19th,2006

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

The objective of the proposed project activity is to generate renewable electricity using hydroelectric resources and to sell the generated output to Mexican consumer partners (primarily industrial users and municipalities) on the basis of power purchase agreements (PPA's), using the Comisión Federal de Electricidad (CFE) transmission system to wheel the energy. The project activity generates GHG emission reductions by avoiding electricity generation, and CO_2 emissions, at fossil fuel-fired power plants that would be generating otherwise.

The Trojes project generates clean electricity in a rural area located into the Municipality of Pihuamo in the State of Jalisco and the nearest city to the proposed project is Coalcomán, in the state of Michoacán.

The Trojes project has an existing dam at the site. The power plant has a nominal capacity of 8 MW, using the existing pattern of irrigation flow releases to generate electricity. The existing dam is a rock filled dam with an impervious clay core center and has been built with the intent to construct future hydroelectric plant on-site.

Two diversion tunnels have been constructed at the dam to divert storm water flows during dam construction. One of the diversion tunnels is being utilized to provide irrigation flows downstream from the dam. The diversion tunnel not utilized for irrigation flows contains the penstock facility to feed the powerhouse at the site. The hydroelectric facility is constructed directly downstream from the outlet of the diversion tunnels within an area previously designated for the placement of a hydroelectric facility.

The project serves to impound water mainly utilized for downstream irrigation. It is possible for this project to regulate downstream water volume. The regulating dam can accommodate some degree of varying upstream dam flow releases, thus allowing for increased flexibility in the quantity and the time intervals at which flows are released for hydroelectric generation. Irrigation demand flows will take priority and will not be modified in any way as a result of the development of the project.

The dam provides storage for interannual regulation of river flows for irrigation districts located downstream. The Trojes project consists of a hydroelectric plant constructed downstream the point where the water intake tunnel for irrigation exits the dam. The hydro plant will use an existing penstock to feed the turbine. A bypass upstream of the powerhouse will allow irrigation.

The water intake for Trojes is formed by a concrete-lined tunnel with a 2 m diameter steel pipe line running inside the tunnel. The turbine is a horizontal axis Francis type rated to produce, under design conditions, 8 MW. A transmission line was constructed to connect with the national distribution grid.

The main design characteristics of the Trojes project are summarized in Table1.

Table 1: Main project characteristics

Trojes	
Power (MW)	8.0
Design head (m)	61.8
Design rate of flow (m^3/s)	15.0
Project efficiency (%)	88.0
Transmission line (Km)	2.5

The expected total annual average generation output of 38.7 GWh is distributed over the peak, intermediate, and base intervals as follows:

Table 2: Trojes' output profile

Peak	Intermediate	Base
6.4 GWh	28.6 GWh	3.7 GWh
16.5%	73.9%	9.5%

The expected annual distribution of hours of generation over the different intervals is as follows:

Table 3: Trojes: Hours of production per year

Peak (hrs/yr)	Intermediate (hrs/yr)	Base (hrs/yr)
805	3605	463

The turbines and generators for the project were made by Alstom Power who signed an Engineering/Procurement/Construction (EPC) contract with the project sponsors. This company has been manufacturing hydroelectric facilities for decades and has improved the engineering and technology that they use in the design and fabrication of hydroelectric turbines and generators.

The project will assist Mexico in stimulating and accelerating the commercialization of renewable energy technologies and markets at the grid level and under private ownership and operation in order to reduce greenhouse gas (GHG) emissions while responding to increasing energy demand and energy diversification imperatives necessary for sustainable economic growth. Broadened private experience in the development, operation and maintenance of hydropower electricity generation is a significant option for expanding and diversifying Mexico's energy resources, and at the level of the Comisión Federal de Electricidad (CFE), increased experience in accommodating smaller distributed resources that offer potential energy, capacity, and diversification benefit

A.3. Project participants:

Name of Party involved (*) ((host) indicates host Party)	Private or Public entity (ies) project Participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be projects participant (Yes/No)
Mexico	Impulsora Nacional de Electricidad S. de R.L. de C.V. (Private) Hidroelectricidad del Pacífico S de R.L de C.V. (Private)	No

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

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

A.4.1.1. Host Party(ies):

Mexico

Letter of approval from Mexico's Designated National Authority (DNA) is available as Annex 3

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

Municipality of Pihuamo in the State of Jalisco in México

A.4.1.3. City/Town/Community etc:

Within the state of Jalisco, 50 kilometers south-east of the city of Colima. Located on the Barreras river in West-Central Mexico.

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

The project is located at the Trojes Dam, which was built by the National Water Commission (CNA) for irrigation purposes. This dam was built to store water from 3 rivers: Coahuayana, Barreras and Trojes. The water released from the dam is used to irrigate the Coahuayana Irrigation District, located about 20 kilometers downstream. Figure 1 shows the location of the project.

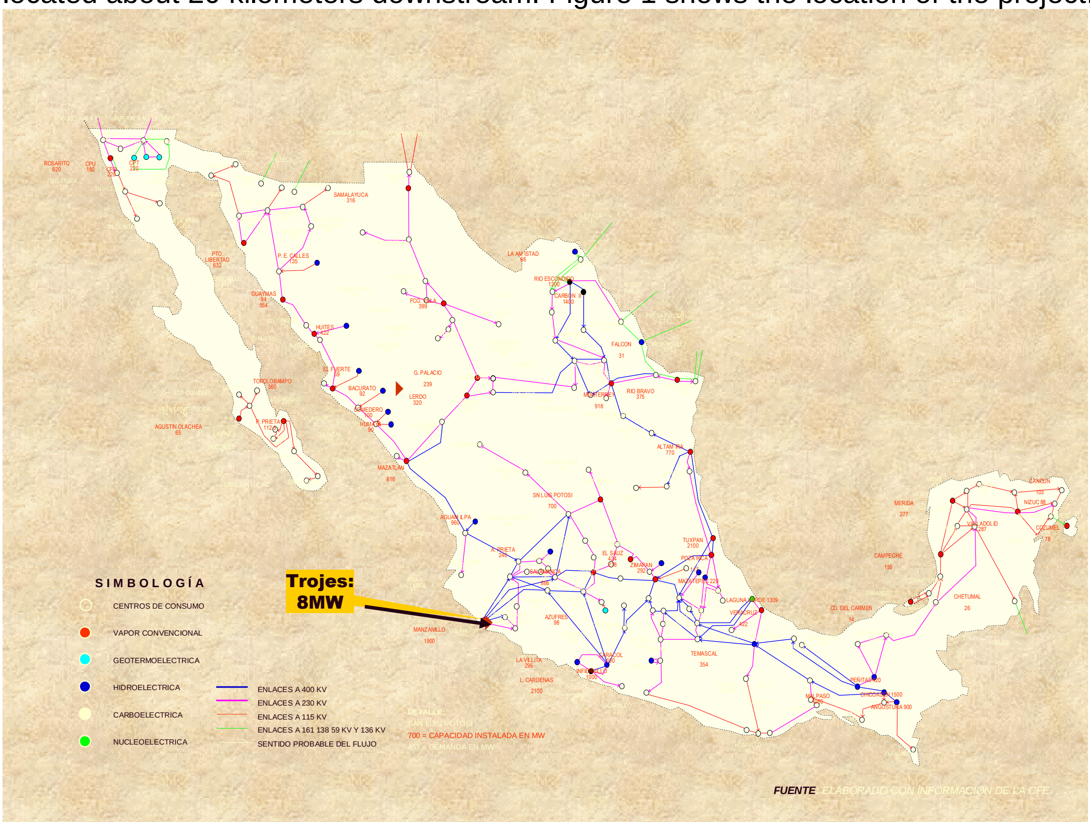

Figure 1: Location of the Trojes hydroelectric project.

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

Type I: Renewable Energy Projects
Category I.D.: Renewable Electricity Generation for a Grid

The Trojes hydroelectric project conforms with the project type and category selected, as it is a project activity which involves renewable energy generation from the installation of a new small-scale hydroelectric plant in an existing dam used for irrigation purposes and whose output will be fed into the national electricity grid, thus displacing generation from fossil fuel-fired plants.

The Project has the DNA Letter of Approval as a CDM Project.

A.4.3. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed small-scale project activity, including why the emission reductions would not occur in the absence of the proposed small-scale project activity, taking into account national and/or sectoral policies and circumstances:

The proposed Small Scale Project Activity reduces GHGs emissions through its use of a natural renewable source of energy: the surface water runoff which is stored in a dam, released and passed through a hydraulic turbine to take advantage of the energy derived from its position. The Project Activity will displace the construction of thermoelectric power plants.

Applying the methodology approved for small-scale on-grid renewables projects (described in section B.2) shows that the implementation of the Trojes hydroelectric plant in the Mexican electricity system will generate a total reduction of 431,550 tons of CO_2 over 21 years

This reduction is the result of the displacement of generation from fossil fuel-fired plants that would have otherwise delivered electricity to the CFE interconnected grid.

A.4.3.1 Estimated amount of emission reductions over the chosen crediting period:

Table A 4.3.1

Years	Annual Estimation of emission reductions in tones of CO_2
2003	15,412
2004	20,550
2005	20,550
2006	20,550
2007	20,550
2008	20,550
2009	5,137
Total Estimated Reductions (first seven years)	143,871
Total Number of crediting years.	7 x 3 = 21
Anual Average over the crediting period of estimated reductions (tonnes of CO2e)	20,550

In each crediting period, the amount of ERs generated by the project will vary directly with the metered net generation output from Trojes. The estimations in Table 4 are based on a grid emission rate of 0.531 tCO_2equiv/MWh and an expected 38,700 MWh of electric-energy output per year from Trojes. The emission rate is computed from the most recent three years with official information on the Mexican electric power sector.

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

There is no public funding involved in the proposed project activity.

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

According to the simplified M&P for small-scale CDM project activities, a small-scale project is a debundled component of a larger project if there is a registered small-scale activity or an application to register another small-scale activity:

- With the same participants
- In the same project category and technology/measure; and
- 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.

The Trojes project is the first hydroelectric plant to be sited on the three rivers mentioned in section A.4.1.4. Since Trojes is not overlapping any small-scale project within 1 km of its project boundary which is already registered or in the process of applying for registration as a small-scale CDM project, it is not a debundled component of a larger hydroelectric project activity.

SECTION B. Application of a baseline methodology:

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

Type 1: Renewable energy project.

Category AMS-1.D: Renewable Electricity Generation for a Grid.

B.2 Project category applicable to the small-scale project activity:

This baseline methodology is applicable because:

1.- The project Generates hydroelectric Power which is connected to a Grid, displacing electricity that would have been generated by the use of fossil fuels and this causes a reduction of emission in the project boundaries.

2.- Also because the project has less than 15MW installed capacity.

Variable	Unit	Data Source
Electricity Generated and placed into the interconnected Grid	KWh	Prospectiva del Sector eléctrico and CFE
Electricity Generated by the project	KWh	CFE meters and Project meters, the offical meter is CFE's

.

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

The Trojes project will displace a portfolio of thermal generation units in the Mexican electrical system. The expansion plan which the CFE produced in 2002 indicates that hydro-power's share of the total generation will drop from about 13% in 2003 to about 10% by 2013. Although hydroelectric resources constitute a sizeable portion of the total installed capacity, hydroelectric plants have low generating costs and will be dispatched regardless of the generation from the Trojes project. The chosen baseline methodology thus represents the more realistic of the two options available

PROJECT BARRIERS AND THE IMPORTANCE OF CARBON FINANCE

In general, the barriers to this type of investment in Mexico typically involve (a) transaction costs of identifying and negotiating with multiple power off-takers and maintaining supply-demand balance, (b) payment risks associated with the off-takers, (c) legal deficiencies inherent in the self-supply scheme, and hence lack of legal remedies in the event of unilateral termination, and, in consequence, (d) difficulties in securing financing, especially long-term debt financing, for such developments. The requirements with respect to permits, authorizations and contract are identical for small and large hydro projects, resulting in significantly higher transaction or development costs for smaller projects.

Similar to Chilatán hydroelectric project, which is also included in the INELEC Projects Umbrella and Benito Juarez that due to difficulties obtaining a credit for the 4 Projects had to be taken out of the Umbrella Project[1] being proposed as small-scale projects under the CDM, Trojes is one of the first small-scale hydro project to be allowed as an auto-generator in Mexico. Being one of the first of its kind, securing sufficient financing of the project was difficult and delayed the development of the project. Some of the concerns of investors have stemmed from the legal and institutional framework in Mexico. Importantly, the financial sector in Mexico has been reluctant to provide the

[1] Inelec tried to finance Trojes, Chilatán, El Gallo and Benito Juárez all together by obtaining aq loan fot 70% of the Project Cost, but the finance, obtained in a syndicated loan from Scotiabank – Inverlat, FMO and BANOBRAS, was obtained only for 50% of the Project Cost and as the developers did not have any more capital to invest, decided to finance only 3 of the projects and leave Benito Juarez Project outside the loan and to find in a later stage finance for that Project.

loans for the project and obtaining the concessionary rights have proven to be very time-consuming. It had not been possible to obtain the necessary loans without having the concessions needed to operate the Trojes hydro plant and all the necessary PPAs with the consumer partners. This has resulted in a delay of 2 years of the project.

In this situation, it has been essential to demonstrate the project sponsor's willingness and capability to develop the project. Therefore, the construction of the Trojes project started in January 2002, even though financial closure had not been reached at that point (financial closure was reached in August 2004). The decision to begin the construction work was important, first, in order to gain the support of government authorities, including acquiring the necessary government support to receive the permits and concessions required to achieve financial closure and, second, in order to prove the capability to develop the project to potential consumers. In the absence of construction work that has demonstrated the willingness and capability to develop the project, it would not have been possible to convince consumer partners to sign long-term PPAs with the project sponsor and the banks to finance the Umbrella Project.

The project sponsor took carbon finance into account before construction work commenced in January 2002. In discussions on financing with the equity partner, Scudder Latin America Power Fund, the sponsor was advised of carbon finance opportunities in mid-2001. Based on this advice, the sponsor commissioned a study on carbon finance options and on how these could benefit the project financing. The study also examined how baselines would be determined and how ERs would be calculated. A report prepared by an external consultant was completed in November 2001. The first inquiry about carbon finance by the PCF was made on November 27, 2001.[2]

The generated output from the project is sold to industrial users and municipalities in Mexico at a lower price than the CFE's price. Municipalities who become partners reduce their costs of street light electricity, and industry partners reduce their electricity consumption costs relative to Peak Energy from the CFE tariff. This could expose the project to market and regulatory risks. The CFE could reduce their electricity price(s) in order to stimulate consumers to switch from Trojes/INELEC back to CFE. Moreover, the CFE could increase the wheeling tariffs, or other costs, incurred by the Trojes project.

Importantly, carbon finance will make it possible for the project to sell electricity at a lower price than it could otherwise. Carbon finance makes it possible to reduce the electricity price so that it is sufficiently attractive and competitive compared to CFE's tariffs. Without carbon finance, the return on the investment would not be attractive enough to justify the investment in the project.

The reluctance and concerns of investors and consumer partners regarding the Trojes project should be understood in the light of the state-controlled Mexican electric power sector, the CFE tariff structure that is currently in place, the dominance of the state-owned utility CFE within the power sector, and the lack of private entities with experience with the operation of hydroelectric plants.

[2] The documentary evidence is available for inspection by a designated operational entity.

The income from the sell of Emission Reduction Certificates was critical to obtain financing to build the project.

The project is operated by an external company called Myocen S.A. who operates the plants according to international standards, they are responsible of executing any corrective action recommended by the project Administrative agents ASERGEN S.C. who perform Internal Aurits everu month, determin the amount of electricity to be generated according to the annual program and Comision Nacional del Agua (CNA) guidelines and allowed Volumes andare also responsible of recommending corrective actions that would be implemented by Myocen S.A. (Operation Company) in the case of encountering Generation Deviations.

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

The physical, geographical site of the Trojes project defines the project boundary.

Appendix B of the simplified M & P for small-scale CDM project activities gives two options that can be applied to the proposed project category:

"The baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO_2equ/kWh) calculated in a transparent and conservative manner as:

(a) The average of the "approximate operating margin" and the "build margin", where:

- (i) The "approximate operating margin" is the weighted average emissions (in kg CO_2equ/kWh) of all generating sources serving the system, excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation;
- (ii) The "build margin" is the weighted average emissions (in kg CO_2equ/kWh) of recent capacity additions to the system, defined as the lower of most recent 20% of plants built or the 5 most recent plants;

OR,

(b) The weighted average emissions (in kg CO_2equ/kWh) of the current generation mix".

Option a) is employed to estimate the emission coefficient in units of kg CO_2equ/kWh for the definition of Base Line.

B.5. Details of the baseline and its development:

The 7th meeting of the CDM EB, held in January 2003, agreed on two methodology options for on-grid renewables project as described above in section B.2. The methodology used for the proposed project activity corresponds fully with option (a) (confer section B.2).

The key steps in establishing the baseline

1. Information on annual electricity generation and annual fuel consumption by all plants (excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation) delivering to the CFE interconnected grid as well as all recent capacity additions is obtained from Secretaría de Energía (SENER): *Emisiones del Sector Eléctrico (CFE Y LFC)*, http://www.sener.gob.mx/wb2/SenerNva/ibEse

2. CO_2 emissions due to electricity generation are calculated from data on generation, fuel consumption, energy content of fuels, and fuel CO_2 content. Standardized fuel CO_2 content information is obtained from the IPCC, and CO_2 emission factor for CCGTs is obtained from the IEA.
3. The baseline CO_2 emission rate is computed by dividing the sum of CO_2 emissions (in tonnes) from all relevant power plants by the total generation (in GWh) from such plants.
4. The CO_2 emission rate for the electricity grid will be re-calculated over the project's crediting life as described in section E.1.2.

See section E for the details on the methodological steps to be followed when computing the baseline.

Date of completing the final draft of this baseline section *(DD/MM/YYYY)*: *19/04/2006.*

Name of person/entity determining the baseline:

Jacobo Mekler Waisburd for INELEC, with input from Antonio Huerta Goldman from SENER (Secretaría de Energía).

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C.P. 11700
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SECTION C. Duration of the project activity / Crediting period:

C.1. Duration of the small-scale project activity:

C.1.1. Starting date of the small-scale project activity:

The construction work on the Trojes project started in January 2002

The Trojes project started electricity generation on April 1, 2003.

C.1.2. Expected operational lifetime of the small-scale project activity:

50y

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

C.2.1 Renewable crediting period *(at most seven (7) years per crediting period)*

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

01/04/2003

C.2.1.2 Length of the first crediting period :

7y.

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. Application of a monitoring methodology and plan:

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

Category AMS-1.D: Renewable Electricity Generation for a Grid.

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

The monitoring methodology to be used by the proposed project activity is identical with that which is prescribed for category I.D. projects, i.e., "monitoring shall consist of metering of the electricity generated by the renewable technology.

D.3 Data to be monitored:

As determined in the simplified M&P for small-scale CDM projects, monitoring shall consist of metering the electricity generated by the renewable technology.

ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
1	Electricity Generated by the Project Delivered to Grid (net of parasitic consumption)	CFE and Project Operator	MWh	*m*	yearly	all	Electronic and paper	Data will be archived for Two (2) years following the end of the Crediting Period

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:

Net generation QC and QA are undertaken through double measurement: at Trojes power plant instruments, and CFE's measurement devices and procedures. CFE has ISO 9000.

D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

Since the monitoring of emission reduction will be achieved through the measurement of net electricity generation, no special operational and management structure is needed apart from normal electricity generation O&M structure.

D.6. Name of person/entity determining the monitoring methodology:

Lasse Ringius with input from Donald Hertzmark

Contact information:
Through Jacobo Mekler Waisburd
Hidroelectricidad del Pacífico S. de R.L. de C.V.
Bosque de Ciruelos 190-303 A
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SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

E.1.1 Selected formulae as provided in appendix B:

No formula is provided in Appendix B of the simplified M&P for small-scale CDM project activities for renewable electricity generation projects for a system where some but not all generating units use fuel oil or diesel oil.

E.1.2 Description of formulae when not provided in appendix B:

E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary:

Emissions by sources are zero since the project activity utilises a hydroelectric power plant, i.e. a non-emitting renewable energy technology.

E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities

Estimation of leakage is only required if the renewable energy technology is transferred from another activity. The Trojes project does not involve such a transfer.

E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the small-scale project activity emissions:

It follows that the sum of E.1.2.1 and E.1.2.2. is zero GHG emissions.

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHGs in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities:

The proposed project uses the combined margin methodology to compute the baseline emission rate, which reflects the proposed project's effects on both the operating margin (affecting the operation of current and/or future power plants) and the build margin (delaying or avoiding the construction of future power plants). The baseline emission rate is thus:

$$BaselineEmissionRate(gCO_2/kWh) = \frac{OM + BM}{2} \qquad \text{(E.1.2.4.1)}$$

where OM = the calculated operating margin value factor (in grams CO_2/kWh), and
BM = the calculated build margin value factor (in grams CO_2/kWh).

The operating margin and build margin emission coefficients have been determined using data on electricity generation and CO_2 emissions published by Mexican Energy Secretariat (SENER) *Emisiones del Sector Eléctrico (CFE Y LFC)*, http://www.sener.gob.mx/wb2/SenerNva/ibEse
For some power plants operated by independent power producers no CO_2 emissions and fuel consumption data are publicly available and a proxy for these plants' emission factor has been determined, using conservative assumptions for the efficiency of these plants.
Total emissions, E, are given as the sum product of the fuels used in generation multiplied by the specific CO_2 emission rate for that fuel.

$$E(tonCO_2/year) = \sum_j E_j \qquad \text{(E1.2.4.2)}$$

Where Ej = CO_2 emissions per year in tons for fuel j.

For each E_j, the emissions are calculated as:

$$E_j = Q_j * F_j \qquad \text{(E.1.2.4.3)}$$

Where Q_j = quantity of fuel j in year, and
F_j = CO_2 emissions per unit for each fuel j.

Thus E can be calculated directly as the following sumproduct:

$$E = \sum_j Q_j * F_j, \text{ for all j} \qquad \text{(E1.2.4.4)}$$

The Operating Margin Emissions are defined as the generation-weighted average emissions per electricity unit (g/kWh), excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation and are derived from the following equation:

$$OM = \sum_{j} E_j \div K_j \qquad \text{(E.1.2.4.5)}$$

Where K_j = electricity generation from fuel j, and generation by source is listed in the *Prospectiva* (p. 70). For the year 2003, this value for OM was 695 g/kWh. For 2002, 2003 and 2004 the average value for OM is 659 g/KWh.

The Build Margin Emissions are defined as the lower (in MWh) of the emissions from the 5 most recent plants built or the most recent 20% of the generating units built.

Using E.1.2.4.1 gives a CM as follows:

$$BM(tCO_2/MWh) = \frac{\sum_{j=1}^{m} e_j \times G_j}{\sum_{j=1}^{m} G_j} = \frac{e_1 \times G_1 + e_2 \times G_2 + \ldots + e_m \times G_m}{G_1 + G_2 + \ldots + G_m} \qquad \text{(E.1.2.4.6)}$$

The Build Margin for 2004 is 403 g/KWh

where G_j = the generation (MWh) from unit j,
e_j = the emission rate (in tons CO_2/MWh) for unit j, and
j = individual plants included among the lesser (in MW) of most recent 20% or the 5 most recent (over 15 MW) units built.

E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:

Following the baseline methodology, and because step E.1.2.3 equals zero GHG emissions, the emission reductions due to the Trojes project will be calculated by using formulae (E.1.2.4.1) through (E.1.2.4.5) only, as explained in section E.1.2.4 above.

E.2 Table providing values obtained when applying formulae above:

The following table summarizes the numerical results from the equations listed above. The table presents data, data sources and the underlying computations that are available in the excel-spreadsheet attached to the PDD:

Table 4: Numerical results from the equations

Operating Margin of the Mexican Electricity Grid	2002	2003	2004
Electricity Generation (GWh)	139,159	143,131	157,433
CO2 Emissions (tonnes)	95,328,117	97,705,797	95,802,514
Operating Margin	0.685	0.683	0.609

Build Margin of the Mexican Electricity Grid			2004
Electricity Generation (GWh)			42,212
CO2 Emissions (tonnes)			17,030,008
Operating Margin			0.403

Carbon Emission Factor	tCO2/MWh
Average Operating Margin 2002-2004	0.659
Average Build Margin 2004	0.403
Carbon Emission Factor	0.531

Source: Prospectiva del Sector Eléctricos, SENER, 2003-2012, 2004-2013 and 2005-2014 and CFE Website

SECTION F.: Environmental impacts:

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

The project will not have major environmental impacts. The areas that might have relevant environmental effects include:

1. Hydrology: The main impact will be generated by variations in discharge flow due to the peak hour operation of the plant. These variations may affect. (i) the stream bed and surrounding ecosystem, and (ii) the agricultural irrigation. These impacts will be mitigated by (i) maintaining a minimum flow (ecological flow) established according to Mexican Federal regulations CNA Regulations which will be CNA's responsibility to extract from their extraction valves to preserve the ecosystem, and (ii) the irrigation patterns will not be modified. The developer has established a legal agreement with CNA in this regards. To technically comply with this agreement, the developer increased the level of the regulating reservoir.

2. Flora and Fauna: The host environment is semi-arid, being the vegetation of the area secondary and homogenous in terms of species. There are mainly scrubs, bushes, mainly Huizache (acacia sp), and a limited amount of herbaceous vegetation. As a result of the dam construction fish native species are not abundant in the river downstream. There are fishing activities only in the reservoir of foreign species. There are neither critical natural habitats, nor threatened species in the area of the project. As a result of these facts, and due to the project characteristics, there will be no relevant impact in terms of flora and fauna.

3. Transmission Lines: The design of transmission lines was done in such a way that no resettlements will be necessary. The lines will essentially pass through agricultural lands. The Rights Of Way (ROW), where necessary, have already been granted. The minimum vegetation to be affected was manually removed.

SECTION G. Stakeholders' comments:

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

There have been consultations with the farmers downstream from the irrigation district who use the water stored in the dam. There have also been consultations with affected landowners along the route of the transmission line. The farmers were invited to know about the projects through the CNA who manages the irrigation district downstream. The land owners and the people that live in the surroundings were contacted directly and through the Presidents of the agrarian modules "Presidentes ejidales". The developer was requested to include NGOs in the communication campaign but no relevant NGOs were identified.

G.2. Summary of the comments received:

The comments received were:

- How people who own land that will be affected by the construction of the Transmission line were going to be compensated.
- What will happen to the fish that live in the dam after the Power house is built and electricity is being generated and
- If they will get less water for irrigation purposes because of the operation of the Power Plant.

The EIA has been officially approved by Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT) and the developer has designed and made available a web-site to inform the public about the EIAs and the INELEC Projects Umbrella. Web site: www.asergen.com.mx

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

A negotiation process has been followed with the landowners along the path of the transmission line, and agreements have been signed with each of them. The process was supervised by the agrarian authorities. Finally, the agreements were taken to the attention of a notary who certified the payment made to each landowner.

The Permit obtained from the CNA was presented to the stakeholders, in the permit it is clearly stated that the Generation plant will only use the amount of water determined by the CNA and that amount is based in the water used for irrigation or when there dam is spilling.

A schematic explanation was given to show how fish will still live in the dam and how they will not die because of electrocution in the dam. The developer explained that the speed of water entering the Intake is very slow and therefore the fish will not be dragged through the penstock.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

(Please repeat table as needed)

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding involved in the proposed project activity.

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