



CDM Executive Board
UNFCCC Secretariat
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1st June 2009

Dear CDM Executive Board Members,

Re: “Addition of a power generation micro unit at the 5 de Noviembre Power Plant” (Ref. No. 2425)

SGS has been informed that the following proposed CDM project activity “Addition of a power generation micro unit at the 5 de Noviembre Power Plant ” (Ref. No. 2425) is under consideration for review because three requests for review have been received from members of the Board.

The requests for review are based on the reasons outlined below. Through this letter, we would like to provide formal comments and additional information in response to said requests.

Request for Review, Issue 1:

The DOE shall further clarify how it has validated the investment analysis in accordance with EB 41 Annex 45 guidance, in particular the investment costs, the rate capacity of the new capacity addition, and the sensitivity analysis.

SGS’ and PP response to Issue 1:

The total investment of the project represents an amount of 1,432,501 US\$, as established in the PDD (ref.01) and in the financial analysis (ref.02), which was confirmed through the contract signed on 10 November 2008 (ref.03), after the public bid took place on 23 October 2008. The investments associated with the project activity consist on equipment such as: Hydraulic turbine Francis type 558,872.00 US\$, asynchrony generator 375,487.00 US\$, Control Panel and other operating equipments. In the contract page 32 a full table with all the equipment and labor to be considered for the project activity is described. All of which was verified through the contract described above. Also in the contract the price has changed due to the fact that the price established in the PDD 1,432,501 US\$, was the reference value for the public bid. The winner of the bid who signed this contract has established a cost of 1,385,082.00 US\$ + IVA (13%), which yields a total of 1,565,142 US\$. The amount established in the PDD and the financial analysis was not changed since it was considered to be a conservative value. Investments are financed by CEL’s equity (Comisión Ejecutiva Hidroeléctrica del Río Lempa), as verified in the page 3 Art. 4 of the contract between CEL and ESGEM worldwide corporation S.A. C.I. (ref.03). In the financial analysis (ref.02) only the investment costs financed by equity from CEL is considered in the cash flow.

According to EB41 Annex 45 guidance, as the project activity generates economic benefits other than CDM related income, a simple cost analysis could not be applied. A benchmark analysis was applied and an IRR (Internal Rate of Return) was used for the project evaluation, which was taken from the Agreement Number 29-E-2007 (ref.04). The agreement from SIGET (Superintendencia General de Electricidad y Telecomunicaciones – Electricity and Telecommunications Agency) establishes a 12% IRR. The value of IRR with CER’s revenues ends up at 11.20% which is still under the reference value of 12%, however higher than a value of 9.42% without CER’s.

The project estimates a production of 2,160 MWh/year. The project participant has explained that since the additional unit will work 24 hours in the rainy season (6 months) and 12 hours in the dry season (6months), multiplying the hours of work by the potential power of the unit 0.5MW, it gives you an approximation of 2,160 MWh for the rainy season and 1,080 MWh for the dry season, a total of 3,240 MWh/year. However

since in the dry season the water can be processed by the other units and the additional unit will be left to work on peak and rest hours it is not considered to be additional. Then only 2,160 MWh/year is considered to be additional.

The energy price is assumed as 76US\$/MWh, which was verified to be conservative compared to historical values (average value of 2007 is 70 US\$/MWh), as per UT (Unidad de Transacciones S.A. – Transactions Unit) (ref.05). The project participant provided the referenced document and the web address www.ut.com.sv where the documentation could be duplicated by a search engine (selecting period of time “Jan 1st 2007 – Dec 31st 2007”). It was verified following the procedures and calculating once more the average price of energy in 2007 to be 70.07553 US\$/MWh. The value was found to be correct and conservative.

A fiscal retribution of 25% was used, as established by Decree Number 146 (ref.06) which establishes in Art.15 that any institution or autonomous official enterprise has to pay a retribution of 25% of its income. In the same Art. it refers specifically to CEL and ANTEL (National Telecommunication Administration) it only excludes autonomous official enterprise that are in charge of education and social security.

As established in the Guidance on the Assessment of Investment Analysis Version 02, “As a general point of departure variations in the sensitivity analysis should at least cover a range of +10% and -10%”, the PP has submitted the following variables to a sensitivity analysis:

- Capital Expenditures
- Additional Generation
- Energy Price
- Maintenance

Variable	Base Value	Variation	IRR
<i>Capital Expenditures</i>	1,432,501	10% -10%	8.45% 10.55%
<i>Additional Generation</i>	2,160	10% -10%	10.50% 8.29%
<i>Energy Price</i>	76.00	10% -10%	10.56% 8.22%
<i>Maintenance</i>	15,000	10% -10%	9.36% 9.47%

The variables such as (energy price and additional generation) constitute a 100% of the incomes of the project not considering CDM revenues. The only variable submitted to the sensitivity analysis without an impact over 20% is maintenance, however it was considered since it is a permanent expenditure for the project. Even though the variables were submitted to a sensitivity analysis the IRR did not surpass the 12% reference value.

Request for Review, Issue 2:

The DOE shall further clarify how it has validated the emission reduction calculations for the project activity are in accordance with the applicable baseline methodology, in particular the calculation of the emission factors for the project activity.

SGS' and PP response to Issue 2:

For El Salvador, the OM and the BM estimates are computed using the relevant time series from SIGET (Superintendencia General de Electricidad y Telecomunicaciones – Electricity and Telecommunications Agency) which data is publicly available at www.siget.gob.sv and has been verified and found to be correct in the following link: <http://www.siget.gob.sv/documentos/electricidad/estadisticas/boletin20072024.pdf>.

The information from SIGET is official and since it is the governmental agency in charge of supervising the energy generation, transmission and distribution. The generation and fuel consumption information of each plant was obtained from the Ministry of Environment and Natural Resources of El Salvador (MARN) and is publicly available in the following links: <http://www.marn.gob.sv/?fath=20&categoria=324> or directly to <http://www.marn.gob.sv/uploaded/content/category/755859456.xls>

The data available was until 2006 for values of 2007 the project participant has gathered the information thru MARN asking for the information directly to each power plant. The project participant has provided the emails sent by the power plant managers.

IPCC's Guidelines (2006) and the "Annual Energy Outlook"¹ (2007) were used since national estimates for critical parameters were currently unavailable. As for the NCV the project participant has used the Energy Information Administration (EIA) of the US government. The information used has been verified in the following link: <http://www.eia.doe.gov/oiaf/archive/aeo07/index.html>

The PDD version 1 (ref.01) submitted refers to an emission factor (EF=0.717) determined according to AMS ID version 13 by the project participant based on the data provided by SIGET. During the validation assessment SGS verified the information applied in the PDD and the spreadsheet to calculate the EF and found it to be correct.

Request for Review, Issue 3:

PP/ DOE are requested to clarify how the emission reductions can be calculated without monitoring of $WTE_{estimated}$ and auxiliary consumption.

SGS' and PP response to Issue 3:

The project participant has modified the PDD to add two parameters to be monitored ($WTE_{estimated y}$, inf_y - Water inflow to the power station) for the calculations of emission reduction and has added the following explanation on page 18 of the PDD:

$WTE_{estimated}$ is obtained from the relationship between the river's inflow and the electricity generated by the plant. This relationship is depicted in the graphic below.

"The scatter plot (ref.07) shows that there is a strong positive correlation between monthly average energy generation (y-axis) and the river's monthly average inflow (x-axis). However, once the inflow is as high as 200 m³/s, the plant is working at full capacity and the relation disappears (i.e. it is represented by a nearly flat line). A simple ordinary least squares analysis was performed in order to obtain the equations presented in the graph. As expected, they show a very high R² coefficient for the first part and a close to zero R² for the second part. Therefore, the equations for estimating² the $WTE_{estimated}$ parameter as a function of hydrological conditions are the following:"

(8) $WTE_{estimated} = 13,234 + 214.15 \cdot inf$, for inflows ("inf") of up to 200 m³/s.

(9) $WTE_{estimated} = 49,884 + 5,308 \cdot inf$, for inflows ("inf") greater than 200 m³/s

The scattered plot has been added to the PDD page 19. The information used for the plot has been submitted in a excel spreadsheet Ref.07 - generation and hydrology.

The auxiliary consumption of the new micro unit as stated by the project participant in the revised PDD footnote 2 page 3 "The new unit's auxiliary consumption will be negligible since the latter consists of an asynchronous generator (i.e. it has no exciter)."

The validation report (ref. 08) is revised in accordance with the responses above and submitted herewith.

¹ Energy Information Administration (EIA) – Official Energy Statistics from the US government.

² The sample from which the equations were obtained goes from July 2002 to December 2008. The starting date corresponds to the first month without the previous micro unit.



We apologize if the initial validation report has been unclear and hope that this letter and the attached information address the concerns of the members of the Board.

If further information is required, Emilio Doens (Emilio.Doens@sgs.com; +507 317 0828) will be the contact person for the review process and is available to address questions from the Board during the consideration of the review if necessary.

Yours sincerely,

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Enclosures –

1. Ref.01 - PDD Microunidad FINAL 25.05.09 (version 4)
2. Ref.02 - UPDATED Additionality Microunidad 1 MAY 09
3. Ref.03 - Contract CEL – EGSEM
4. Ref.04 - Agreement Number 29-E-2007
5. Ref.05 - average energy price 2007 UT
6. Ref.06 - Decree Number 146
7. Ref.07 - generation and hydrology
8. Ref.08 - Updated Validation report for project activity