DET NORSKE VERITAS

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Att: CDM Executive Board

Your ref.:	Our ref.:	Date:
CDM Ref 1901	BRINKS/FEANT	11 December 2008

Response to request for review "Electricity Grid Interconnection San Gabán – Mazuko – Puerto Maldonado" (1901)

Dear Members of the CDM Executive Board,

We refer to the request for review raised by three Board members concerning DNV's request for registration of project activity 1901 "Electricity Grid Interconnection San Gabán – Mazuko – Puerto Maldonado", and we would like to provide the following response to the questions raised by these requests for review.

Comment 1: ***The DOE is requested to provide reliable evidence that CDM was considered prior to the project start date and that continuing and real actions were taken to secure CDM status for the project activity in parallel with its implementation, following the guidelines from paragraph 5, EB 41, Annex 46. The response should provide a detailed timeline of project implementation.***

DNV Response:

DNV acknowledges that CDM was seriously considered in the decision to undertake the project activity and that continuing and real action were taken to secure CDM status for the project activity in parallel with its implementation.

A formal study with an independent and qualified professional (Mr. Luis Geng) was developed in order to evaluate the emission reduction potential and the eligibility of the project activity before the project start date. Besides that, CDM incomes were considered in the economic evaluation of the project during the development of the feasibility study report.

The evidences provided for each event listed below have been reviewed by DNV. The detailed timeline of the project implementation is presented as follows:

- 19 December 2005: Publication of the public contest for the CDM study No AMC-0111-2005-ELSE named "CDM Study for the Transmission Line San Gabán – Puerto Maldonado";
- January 2006: Issuance of the final version of the "CDM Study for the transmission line San Gabán – Puerto Maldonado", carried out by Mr. Luis Geng;

- 08 February 2006: Communication to the DNA (CONAM at that time) that 1) the study named “CDM Study for the Transmission Line San Gabán – Puerto Maldonado” (“Estudio sobre bonos de carbono par ala linea de transmision San Gaban Puerto Maldonado”) has been developed, 2) the project will request the LoA soon and that 3) the project proponent is requesting to include the project in the Peruvian CDM portfolio;
- 14 March 2006: ELSE’s Board of Directors Meeting approving the start stages of the CDM project cycle in order to reduce financial risks and assure a good income flow for the project;
- 31 March 2006: Start date of the project activity (approval of feasibility study report);
- 16 June 2006: Public contest opening "CONCURSO PUBLICO N° CP-0014-2006-ELSE" named “Study contract for the certification and trading of the greenhouse gases reduction achieved in the context of the Clean Development Mechanism, Transmission Line San Gabán - Puerto Maldonado”;
- 19 July 2006: Winner approval for the public contest CP-0014-2006 named “Study contract for the certification and trading of the greenhouse gases reduction achieved in the context of the Clean Development Mechanism, Transmission Line San Gabán - Puerto Maldonado”;
- 14 August 2006: Contract signed with Deuman S.A.C for CDM assessment and development;
- 30 October 2006: Approval resolution of the project activity with initial budget of USD 17 million. Leads to first public contest for project construction. For this public contest no company presented a proposal. A later analysis determined that the initial budget had to be adjusted in order to achieve market costs and attract the construction companies;
- 22 December 2006: Approval of the new methodology AM0045;
- 28 December 2006: Approval resolution of the project activity’s final initial budget of USD 20 million. Leads to second public contest for project construction;
- 29 January 2007: Approval of the Environmental Impact Study by the Mines and Energy Ministry;
- 06 February 2007: Validation proposal from SGS;
- 07 February 2007: Official recognition of the winner company in charge of construction;
- 15 March 2007: Start of the actions to obtain the LoA;
- 16 March 2007: Validation proposal from DNV;
- 08 June 2007: Issuance of the Letter of Approval from Peruvian DNA;
- 01 August 2007: Contract signed between DNV and Deuman S.A.C for the project validation (DOEs are not domiciled in Peru and thus, none of them have been accredited by the government of Peru to participate in public contests requested by companies with governmental capital like ELSE. The possibility of accrediting different DOEs was evaluated, but the process was going to be very time demanding and internal information from DOEs would have been necessary. Due to the impossibility of ELSE to directly contract the DOE and the difficulty of accrediting them in order to participate in the public contest, Deuman S.A.C had to sign the contract with the finally selected DOE (DNV). Since this situation was not covered in the original contract between Deuman S.A.C and ELSE, a negotiation was carried out and an addendum had to be signed);
- 11 October 2007: Publication of the PDD version 01 on the CDM website;
- 20 December 2007: Site visit carried out by DNV;
- 01 July 2008: Request for Registration;

The project is expected to start its experimental operation on December 2008 and its commercial operation in January 2009.

<u>Comment 2:</u> A clear investment comparison analysis between the proposed project activity and the selected alternative should be presented. Spreadsheets of the investment analysis and sensitivity analysis that allow replication of the calculations should also be provided.

DNV Response:

The Net Present Value (NPV) was selected as the most suitable financial indicator for investment comparison of Alternative 1 (Grid connection with isolated electricity systems within the complementary transmission system not undertaken as a CDM project activity) and Alternative 2 (Expansion of the actual installed capacity using diesel as fuel).

A discount rate of 12% has been used for Net Present Value calculations. This rate has been established by the Ministry of Energy and Mining (MINEM) for any energy related project assessment, and was confirmed by DNV.

DNV assessed the financial analysis based on the feasibility study report, approved on 31 March 2006. The following evidences, confirming the input values, were presented:

- Message from Mr. Fernando Valenzuela (from the Ministry of Economy) confirming that the parameters considered for investment analysis were assessed for the project's feasibility approval;
- Transmission line costs: Transmission Projects Portfolio from the Ministry of Mining and Energy dated November 2006[1]; the Definitive Study of the 138 kV line San Gabán – Mazuko and the 66 kV line Mazuko – Puerto Maldonado and substations dated July 2006 as well as the proposal for the construction of the Transmission Line San Gabán – Mazuko – Puerto Maldonado from GyM dated 05 February 2007. As the real construction costs of the transmission line were higher than the budget considered for investment analysis, the budget values are presumed to be conservative;
- Tariff costs: Ministry of Mining and Energy / OSINERG dated 04 February 2006[2];
- Average costs of fuel D2 evidences: ELSE Purchase Orders to Petroperu from 01 July 2005 to 05 September 2005.

<u>Comment 3:</u> The DOE is requested to further explain how it has validated the common practice analysis, in particular: a) the fundamental differences between the proposed project activity and other complementary transmission systems and; b) the exclusion of similar projects under construction.

DNV Response:

a) The common practice analysis was originally limited to the major isolated systems that would be interconnected to the national grid (SEIN) as part of the projects for the complementary transmission system. Those projects are:

[1] http://www.minem.gob.pe/archivos/dge/publicaciones/Portafolio_%20LLTT.pdf
[2] http://www2.osinerg.gob.pe/Tarifas/Electricidad/PliegosTarifariosUsuarioFinal.aspx?Id=170000

The project activity: It comprises a 226 km transmission line (68 km in 138 kV and 158 km in 66 kV. The project activity furthermore includes the three sub stations (i) San Gaban power substation (substation cell enlargement - 138 kV), (ii) Mazuko substation (power transformer and substation cells of 138/66/33 kV) and (iii) Puerto Maldonado substation (power transformer of 66/33/10 kV and substation cells of 66/33 kV). The main purpose of the project activity is to connect a major isolated system to the national grid (SEIN). It is located in the Peruvian southern forest area. The initial investment costs were of USD 13 million and ended in USD 20 million;

Isolated system Tarapoto – Moyabamba – Bellavista: The system comprises three main load centers. The centers are connected by a transmission line of 138 kV and some other loads or individual generation plants connected to a 60 kV system. With reference to the Electricity Reference Plan 2005-2014 of the Energy and Mines Ministry, DNV was able to confirm that this interconnection project is not considered similar to the project activity since it is of a different magnitude, location, investment and purpose. The conservative demand scenario in this isolated system estimates an electricity demand of 114.1 GWh and a power demand of 27.17 MW for the year 2007 compared to the 21.6 GWh and 5.4 MW of the project location. These figures show that this system is more than 5 times bigger than the Puerto Maldonado system. Furthermore, this isolated system with an investment cost of USD 18.36 million considers only modifications in already existing substations but includes the installation of a telecommunication system. It is a 138 kV transmission line of only 149.2 km located in the northern forest area. Taking into account all of these conditions this interconnection system is more feasible than the project activity.

Isolated system Bagua – Jaén: This system includes two main load centers connected by transmission lines of 60 kV and some other loads or individual generation plants connected by lines of 22.9 kV. This interconnection project is not considered similar to the project activity since it is of a different magnitude, location, investment and purpose. With reference to the Transmission Portfolio of the Energy and Mines Ministry and the Electricity Reference Plan 2005-2014, DNV was able to confirm that this interconnection system will have a 138 kV transmission line of only 140-150 km, which results in a lower real investment of USD 14.7 MM and USD 11.6. The estimated investment of this project in the year 2005 was USD 15 million. This particular project has reduced the estimated investment cost from 2005 while the proposed project activity had to increase its investment from USD 13 million to USD 20 million. The project volume of this isolated system will include the construction of only one new substation and it will work with another existing one of 220/138 kV. The conservative demand scenario in this isolated system estimates an electricity demand of 35.24 GWh and a power demand of 8.66 MW for 2007 compared to the 21.6 GWh and 5.4 MW of the project location. These figures show that this system, located in the northern forest area, is almost as twice as big as the Puerto Maldonado system and has to construct a considerably shorter transmission line. Taking into account all of these conditions this interconnection system is more feasible than the project activity.

In its response, the project proponent included an analysis of other transmission line projects that are part of the complementary system, although they do not consist of the grid interconnection of a major isolated system. Those projects are:

- Line Huayucachi - Huancayo eastern - Industrial Park 60 kV and SE Huancayo Eastern 60/22,9/10 kV, 25 MVA (2007);
- T.L Azángaro - Putina - Ananea - Huancané 60 kV Substations Azángaro 138/60/22,9 kV, Ananea 60/22,9/10 kV and Huancané 60/22,9/10 kV (2007);
- T.L. Antamina - Huari, 60 kV and Huari substation 60/22,9/10 kV (2007);
- T.L. Cajamarca-Cerro Corona, 33 km, 220 kV and Cerro Corona substation (2008).

Information available in the Transmission Portfolio of the Energy and Mines Ministry confirm that all those projects are not considered similar to the project activity since they are of a different magnitude, location, investment and purpose. All related evidences were provided and validated by DNV.

b) Evidences used for assessing common practice were the 'Efficient electricity generation development law No. 28832' and the 'Transitory Transmission Plan 2007-2008', both approved in the year 2006. Law No. 28832 is valid for both, guaranteed and complementary transmission line projects. Whereas guaranteed transmission line projects were excluded from the common practice analysis (with reference to the project proponent's response), similar projects under construction were taken into consideration by the project proponent as those projects are included in the Transitory Transmission Plan 2007-2008.

Considering the evidences presented, DNV acknowledges that the proposed CDM project activity should not be considered as common practice.

Comment 4: ***The DOE is required to explain how it has validated the value of leakage emissions due to deforestation and the conservativeness of the directly measured SF6 value.***

DNV Response:

According to AM0045, leakage emissions are calculated as the product between the area of the land deforested and the carbon stock per unit area. In order to determine the value of the carbon stock to be used in the calculation of the leakage, national values from independent studies in the Peruvian forest were selected. The study used was carried out by Wagner Guzman Castillo from the IIAP (Investigation Institute for the Peruvian Amazon) and Luis Arevalo Lopez from the ICRAF (International Center for Researching in Agroforestry). The document "Environmental services from carbon storage as an assets for development in the Peruvian Amazon: Progress and Challenges", dated 22 August 2003, uses information from ICRAF.

Specifically, the value used in the calculations is from the area Pucallpa, which has the higher of the values attributable to non touch primary forest between the two locations mentioned (Pucallpa and Yurimaguas) and is also the closest location to the project activity. The project activity is situated in Madre de Dios, Pucallpa is situated in Ucayali and Yurimaguas is situated in Loreto. The use of the mentioned value is presumed as conservative since not all the transmission lines of the project activity go through non touch primary forest. The applied value (450.36 tC/Ha) includes the tree, undergrowth, litter, root and soil component.

The final value of 0.4518 ha, which is used in the emission reduction calculation, is calculated as the length of the transmission lines times the width trail of 20 m for the transmission lines (taking into account the safety area that has to be observed for transmission lines of 115 to 145 kV according to the Electricity Supply National Code, table 219).

Regarding the value for SF6 leaks, AM0045 states that it must be determined directly by measuring or derived from publicly available data. The manufacturer's information does not consider any annual leaks of SF6 at all, and the only information provided was the gas content of 7.5 kg per equipment. The web page of another manufacturer of similar equipment states that the risk of leaks is less than 0.5% per year[3]. However, the already registered "Celtins and Cemat grid connection of isolated systems" project, using the same version of the AM0045 methodology,

[3] http://library.abb.com/global/scot/scot245.nsf/veritydisplay/46d7130dd98044fbc12574e4004e0477/$File/Guia%20para%20el%20comprador%20Interruptores%20de%20Tanque%20Vivo%20Ed4%20es.pdf

considers a leakage of 10%. Therefore, the project proponent conservatively decided to adopt a 10% leakage.

Leaks of SF6 will be directly measured during the project operation when the SF6 has to be injected in the equipment. The gas system will be constantly controlled by using a gas pressure gauge and a temperature compensated gas pressure switch that monitor the density and temperature variations of SF6. Leaks (changes in the density) will become evident when there is a change in the pressure levels below the established limits (low pressure alarm < 10% and low pressure cutout < 20% of normal gas pressure). These data will be monitored and can be confirmed during verification process. DNV considers this choice reasonable and conservative.

We sincerely hope that the Board accepts our above explanations.

Yours faithfully

for DET NORSKE VERITAS CERTIFICATION AS

H.W. Brinks

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