CDM: Proposed new methodology expert form

(To be used by methodology experts providing desk review for a proposed new methodology)

Name of expert responsible for completing and submitting this form	Pedro Maldonado
Related F-CDM-NM document ID number	NM 0001

Evaluation of the proposed new methodology:

Based on an assessment of the draft PDD, evaluate the proposed new baseline and /or monitoring methodologies with respect to the Annexes 3 and 4 of the CDM PDD

New baseline methodology(ies)

In respect of a new baseline methodology(ies), evaluate each section of ***Annex 3 of the CDM-PDD****. Please provide your comments below, also taking into consideration further questions in italics below:*

Section 2. Description of the methodology

Two approaches have been submitted to consideration by the VRBC project developer:

a) First Approach: "Marginal energy generation sources at the grid for bagasse cogeneration".
b) Second Approach: This approach considers an hypothetical power plant to be displaced by the project activity, at the margin of the grid.

Most of the analysis will focus on the first approach, except if is explicitly mentioned that a comment deals with the second approach. If the application condition exists, only the first approach should apply.

The methodology proposed is applied to the expansion of Vale do Rosario Bagasse Cogeneration (VRBC) installations and their energy efficiency improving. The project has been conceived in four phases, being the last two (under implementation from year 2001) pre-certified by TÜV Süddeutschland and on process to be submitted to GHG emission reduction under CDM. VRBC is already exporting electricity to the Brazilian South-Southeast grid (under a long-term contract with the state-owned utility Companhia Paulista de Força e Luz, CPFL). The present contract with CPFL amount to 15 MW and the capacity applying for CER is 50 MW (additional to the previous contract).

Section 2.1. General approach

The carbon intensity of the electricity sources, additional to hydroelectric power sources, dispatched at the margin of the grid is considered the business-as-usual scenario. The displacement of power plants dispatched at the margin by the project under evaluation reduce GHG emissions. By convention, energy renewable projects are considered as a zero emission option. Leakage should be deducted to the emission savings resulting from the power sources displaced by, in this case, the cogeneration project.

Is the approach selected the most appropriate (see paragraph 48 of the CDM M&P)?

Yes. The emissions are estimated adequately and the methodology considers the local situation, the national policy, the economic rationality and technological circumstances for the country

Section 2.2. Overall description

Adequacy of methodology description

The methodology proposed considers, in order to evaluate the avoided generation, the Operating Margin (OM); OM corresponds to the weighted average emissions of all plants in operation (excluding those plants that are must-run and have zero or low fuel-costs); and the Build Margin (BM), BM considers the emissions of future plants to be added to the system.

The methodology assumes that the new plant will affect both the operation of the current or future plants (i.e. the operating margin, in the short run) and the building of new plants (i.e. the build margin, in the long run), the methodology reflects the combined margin. In the case evaluated, the plant may not eliminate new additions but only delay them.

Combined_Margin= (OM + BM)/2

Obviously no single baseline can be considered "the methodology", but the adequate approach for the present specific case. The methodology is technically simple to apply and is not demanding for subjective assumptions.

Appropriateness of determining the baseline scenario proposed. Does the baseline scenario reasonably represent the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed project activity? Explain.

Yes. The baseline scenario would reasonably represent the anthropogenic emissions by sources of greenhouse gases in the "what would happen otherwise" case. The emissions assumed represents the reasonable estimation of current and future plants operation, also the characteristics of new facilities (energy sources, power, load factor and emission factors) and when they will be built.

Perhaps, been consistent with the methodology adopted, a correction to the operating margin could be introduced. Indeed, due to the fact that hydropower comprises a significant proportion of the resource mix (65%) of the regional grid, where the project is located, it will be more conservative to subtract part of the generation from hydropower sources.

Section 3. Key parameters/assumptions (including emission factors and activity levels) and data sources considered and used:

The key parameters considered by the methodology are:

- Power plants installed in the system analysed, considering: power, load factor, efficiency, and fuel
- Power plants under construction and planned, considering: power, load factor, efficiency, and fuel
- Carbon content of fuel for each case
- Energy content of fuel for each case
- National and international accepted factors for the carbon and energy content of fuels

Reliability, accuracy and adequacy of data required (e.g. your expert judgement on emission factors and activity data used)

In the case of installed plants:

- The data required is reliable because the National Agency of Electric Power, the public regulatory agency collects this kind of data. Fuel characteristics are sufficiently known and no deviations can be expected in this case.
- The operational data corresponding to installed plants is sufficiently accurate, because it corresponds to the actual exploitation of those plants.
- The data required is adequate to estimate the GHG emissions.

For future plants, in comparison to the existing ones, less strong statements can be issued. Nevertheless, part of that data will be provided certainly by the equipment suppliers and in the case of the less defined projects, the corresponding data will be obtained from the international specialised literature. Then, in this case it could be expected a reasonable reliability and accuracy for the estimated energy conversion efficiency, the carbon intensity and the energy content of each fuel.

Key implicit and explicit assumptions (if any)

a. Identification

b. Acceptability

Transparency

Only few parameters are requested and the corresponding sources for that data are known by sufficient specialists; by the other hand the other stakeholders can understand the calculation steps needed to build the baseline. Those sources are normally public and widely open.

Section 4. Definition of the project boundary related to the baseline methodology:

Coverage of project boundary (adequate?):

Yes, the project boundaries cover the main sources of GHG emissions. The emissions related to the power plants operation connected to the South-Southeast grid and also those generated by the bagasse project are basically the only GHG emissions sources, the methodology considers both the plants and the project site. Leakage is considered below.

Specifically, the transmission and distribution losses are excluded. This approach could be discussed, but it is required more data to evaluate if losses will be reduced or increased due to the bagasse cogeneration project.

a. *Gases and sources*
b. *Physical delineation*

Section 5. Assessment of uncertainties:

In relation with the first approach, uncertainties are related with the reliability of the data source, in the case of power generation and fuel used, but data is provided basically by public entities on charge of sector regulation, then, in principle, uncertainties are no relevant. Fuel consumption could be a problem, but, in some cases, the authority, during the tariff periodic process, publishes plant efficiency and, normally, the corresponding data is adequate. Carbon intensity is usually provided by international agencies like IPCC, again reliable enough.

In relation with the second approach, the methodology assumes that the bagasse plant displaces theoretically a natural gas combined cycle power plant. This assumption supposes the existence of an electricity expansion plan and that natural gas is the cost-effective option. In the case of Brazil, it is a reasonable assumption. The methodology should consider the best available technology (BAT), what is reasonable if plants are dispatched by their merits.

Key implicit and explicit assumptions (if any)

a. Identification

b. Acceptability

Section 6. Description of how the baseline methodology addresses the calculation of baseline emissions and the determination of project additionality:

The methodology estimates adequately, for both approaches, the net emissions reduction (ERnet), through the following formulae:

$ERnet = E_bC_b - E_pC_p - L_p$;

where:

E is the energy produced; C is the fuel carbon intensity; b baseline parameters, p project parameters and L_p emission due to project implementation leakage.

Please evaluate the proposed new methodology:

In Brazil, most of electricity generation is hydroelectric as is the case in the South-Southeast electrical system, but this situation is changing in favour of natural gas, after system privatisation. Even more, apparently the government would be promoting this option in order to reduce the system stress during wintertime and the present lack of investment. Then it is assumed by the methodology that natural gas power plants will be the business as usual scenario and the bagasse cogeneration power plant as environmentally additional.

"Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity *(i.e. explanation of how and why this project is additional and therefore not the baseline scenario)"*

Because the natural gas power plants presumiblely will work on the margin, the project plant will displace one of those plants instead of hydroelectric power plants. Nevertheless two doubts remain:

a) The internal rate of return foreseen is relatively high, then perhaps VRBC's project could be considered as no additional and it should be proved than the company has better investment opportunities.
b) Should be subtracted part of the hydropower generation, due to the significant importance of this source in the electricity mix?

Section 7. Description of how the baseline methodology addresses any potential leakage of the project activity:

One eventual source of leakage corresponds to consumers that presently use bagasse as a fuel for their installations, and due to the project could face a shortage of bagasse and adopt as substitute a fossil fuel. In this case, the monitoring methodology suggests to perform surveys, oriented to evaluate the GHG emissions arriving from this situation and deduct the corresponding emissions if this is the situatio.

Other potential source of leakage corresponds to the possible decomposition of bagasse stored at the project site, but it is not clear that these emissions couldn't arrive similarly in the situation business as usual as, if this is a normal practice for the sugar mill installations. This should be considered in the monitoring plan.

Section 8. Criteria used in developing the proposed baseline methodology, including an explanation of how the baseline methodology was developed in a transparent and conservative manner:

The transparency of the baseline methodology was already mentioned.

The monitoring methodology suggests evaluating periodically the carbon intensity of the marginal sources, in order to be conservative. In the case of the second approach, a BAT option it is considered, which is the correct decision. Perhaps the plant efficiency should be considered 55%

Section 9. Assessment of strengths and weaknesses of the baseline methodology:

Two of the most important factors to be taken in consideration before choosing a baseline methodology are: the environmental risk of overestimating the emissions reduced by the project and the transaction costs associated to the development of the baseline.

In principle, and by convention, energy renewable projects have reduced environmental risks in comparison to other mitigation options. Additionally, the first approach is based on reliable sources, then the environmental risks arising from overestimated emissions avoided by the project aren't significant; by the other hand, the baseline evaluation is simple, insuring that this exercise would not be excessively resources consuming. The second approach is even simpler, but has eventually an environmental risk, because it is assumed that a natural gas combined cycle will be displaced by the bagasse cogeneration project. If it is not the case (eventually hdropower could be displaced), the risk is small, as it is the project.

Section 10. Other considerations, such as a description of how national and/or sectorial policies and circumstances have been taken into account:

National policies have been taken into account, especially in relation with the treatment of independent power producers (IPP) and the promotion of natural gas power plants. National and regional circumstances are reflected in the consideration of the power generation structure, electricity shortage in 2001 and programs to increase energy supply

In addition, please address the following aspects

Applicability of methodology across project types and regions

Developing emissions baseline methodologies correspond, in a certain sense, to estimate the unknown, then no single baseline methodology can be considered as "the methodology". It can be said that the methodology proposed is a proper one for in grid small renewable energy generation projects, operation data corresponding to the marginal sources of the grid is available and reliable and electric system expansion plans are also available and reasonably reliable, perhaps not for all developing countries. Nevertheless, in some of them the methodology is perfectly applicable.

Even if the methodology was developed for a small bagasse cogeneration project (65MW to be exported to the grid and 50MW applying for CER), it could be applied to other type of electricity generation, taking care of specific situations and data reliability.

Any other comments

Recommendations on baseline methodology(ies):

a. Approve methodology

i. Conditions under which methodology is applicable to other potential projects (e.g. project type, region, data availability, etc.)

As it was said, the methodology (first approach) could be applicable to different type of electricity generation project, if basic data is available and sufficiently reliable. The second approach is less recommended, but it can be used if expansion plans are not available, generation is based on energy renewables and the scale of the project is not so high (perhaps the limit established for the fast-track small CDM projects is the adequate project size).

ii. Minor changes suggested

Better development of project additionality.

Eventual correction in order to consider the significant importance of the hydropower in the regional electricity mix

It would be profitable for future methodology users, if it is approved, that the proponents develop in detail the estimation of the operating margin, build margin and combined margin.

b. Not approved

i. Reasons for rejection

ii. Specify changes needed

New monitoring methodology(ies)

In respect of new monitoring methodology(ies), evaluate each section of Annex 4. Please provide your comments section by section:

The methodology proposed was named "two parties verification plus monitoring and verification indicators for bagasse cogeneration project activities". As the project proponents defined it, the electric utility buying electricity from the project is interested that the electricity invoiced is not overcharged, then the electricity exported will be properly defined. Calibration tests of meters are recommended.

Net GHG emissions should be verified and the input data specified, based on the identification of the relevant indicators: (a) electric generation displacement (CO_2 equivalent emissions from the project and baseline cases), (b) on-site GHG emissions from stand by generation or from other on site sources; (c) eventual leakage.

For the first approach, the baseline carbon intensity should be monitored from a reliable source like the regulatory agency; in this case, the National Agency of Electric Power (ANEEL). For the second approach, it should be verified the efficiency of the type of plant assumed to be displaced and the carbon intensity considered.

To evaluate eventual leakage, it was recommended to query the former bagasse consumers about eventual changes to fossil fuel if the project affects bagasse supply.

Data to be collected and how this data will be archived are shown in the following tables. It looks fine for the monitoring purposes.

Data to be collected to monitor emissions from VRBC project activity, and how the data will be archived

ID number	Data type	Data variable	Data unit	Measured (M), Calculated(C), or estimated(E)	Recording frequency	% of data to be monitored	How data will be archived	For how long data will be kept	Comments
M1	Energy	Electric power exported	MWh	M**	Monthly	100%	Electronic and paper	5 years***	** Two party verification ***Brasilian regulation
M2	Carbon content	Carbon content of fuel per unit of energy	TCO_2/GJ	E	Not applicable	0%	Bibliographic reference	During the crediting period	By definition renewable energy souces are zero-emission
M3	Energy	Energy already	MWh	M	At the	0%	Electronic	During	Applicable to

		sold before the project implementation			validation		and paper	the crediting period	VRBC once the project activity is an expansion of the already existent activity

Relevant data necessary for determining the baseline of anthropogenic emissions of GHG

ID number	Data type	Data variable	Data unit	Will data be collected on his item	How is data archived	For how long is data to be kept?	Comments
B1	Carbon intensity	CO_2 equiv. per unit of energy of the marginal sources of the grid	tCO_2/MWh	No	Bibliographic references on electronic support	During the whole crediting period	This data shall be provided from a national reliable source
B2	Carbon content	C content of fuel per unt of energy	TCO_2/GJ	No.It is a value conventionally accepted	Bibliographic references on electronic support	During the whole crediting period	This is a parameter provided by the IPCC, to be used with the second approach
B3	Enegy conversion efficiency	Efficiency rate	%	No. It is a conventional alue based on average OECD perfmance	Bibliographic references on electronic support	During the whole crediting period	Parameter to be used with the baseline second approach

As it was already mentioned, the carbon content of the fuel per unit of energy is provided by the IPCC, GHG emissions from bagasse cogeneration are by convention considered equal to zero, (bagasse is an energy renewable source), and the carbon content per unit of energy of the marginal sources in the grid should be provided by the regulatory agency or other equivalent public institution.

Quality Control (QC) and Quality Assurance (QA) are undertaken by the monitoring methodology through the installation of adequate metering equipment (periodically calibrated) to check the electricity sold to the local utility

The main strength of the monitoring methodology can be summarised by the fact that only few data should be monitored, and is easy to measure and low-cost to implement. The collection and monitoring information is basically reduced to the limits of the project activities; this is perhaps the main methodology weakness, especially in detecting leakage.

Please also address the following

Applicability of methodology across project types and regions

Even if the proposed methodology was designed for a bagasse cogeneration project, it is applicable, in general, to renewable energy projects, provided that the data required is available. Their application is not

limited by regional circumstances.

Any other comments

Recommendations on monitoring methodology(ies):

a) Approve methodology

The monitoring methodology is appropriate. Nevertheless, if the project under evaluation is going to be connected to a grid, where the power plants are dispatched by their economic merits (i.e. lower marginal costs), the monitoring system should adopt an approach based on the economic load dispatching. This approach will be more simple and reliable, because it is possible, on real time, to know which power plan is being displaced by the lower GHG emissions option.

(i) Conditions under which methodology is applicable to other potential projects (e.g. project type, region, data availability, etc.)

As it was said, data availability could be a limitante. But if the data is available, the methodology fits properly to renewable generation technologies.

(ii) Minor changes suggested

b) Not approved

(i) Reasons for rejection

(ii) Specify changes needed

Cross-cutting issues

? *Can the presentation of the methodology/ies be further simplified?*

No, the methodology is sufficiently simple.

? *Should this methodology/ies be considered as new (see paragraph 37 (e) of the CDM M&P)?*

This methodology is based on recommendations suggested by well-known specialised international institutions

? *Comparison with other relevant methodologies*

The methodology proposed is based on Kartha, S., M. Lazarus and M. Bosi , 2002. *Practical Baseline Recommendations for Greenhouse Gas Mitigation Projects in the Electric Power Sector.* OECD and IEA Information Paper, International Energy Agency, Paris.

? *Are the methodology/ies rigorous?*

Yes, specially the first approach

Date and signature by expert	1/05/2003 
Section below to be filled by UNFCCC secretariat	
F-CDM-NMex doc id number *([related F-CDM-NM ID]+ex+[id number of expert])*	
Date when the form was received at UNFCCC secretariat	
Date of transmission to the EB, CDM-Meth Panel	