CDM: Proposed New Methodology
Meth Panel recommendation to the Executive Board
(version 04)

(To be used by the Meth Panel to make a recommendation to the Board regarding a proposed new methodology)

Date of Meth Panel meeting:	14 - 17 June 2005
Related F-CDM-NM document ID number *(electronically available to EB members)*	F-CDM-NM0101: “Grasim baseline methodology for the energy efficiency improvement in the heat conversion and heat transfer equipment system”
Related F-CDM-NMex document ID number(s) *(electronically available to EB members)*	F-CDM-NMex0101: Spalding-Fecher / Brodmann
Related F-CDM-NMpu document ID number(s) *(electronically available to EB members)*	F-CDM-Nmpu0101: Takao / Graichen

Note to those completing this form, as applicable: Please provide recommendations on the proposed new baseline and monitoring methodologies based on an assessment of CDM-NMB and CDM-NMM and of their application in sections A to E of the draft CDM-PDD, desk reviews and public input. Please ensure that the form is entirely filled and that arguments and expert judgements are substantiated.

A. Final recommendations by the Meth Panel

I. Recommendation on the proposed new baseline methodology: *(checkmark the choice made)*

Title of proposed new baseline methodology:>> Grasim baseline methodology for the energy efficiency improvement in the heat conversion and heat transfer equipment system.

a. To approve this proposed methodology with minor changes

☐

i. Conditions under which this proposed methodology is applicable to other potential CDM project activities (e.g. project type, region, data availability):

>>

ii. Minor changes:

>>

b. To reconsider this proposed methodology, subject to required changes

☐

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

>>

ii. Required changes:

>>

(Project participants shall make required changes to the proposed new methodology and send it back to the Meth Panel. The proposed new methodology will be reconsidered by the Meth Panel if changes required are made by the project participants. The Executive Board will only consider this proposed new methodology after the revised proposed methodology has been reconsidered by the Meth Panel.)

c. Not to approve the proposed methodology

☒

i. Reasons for non-approval:

>> The strengths of this methodology include use of existing, approved methods, thoroughness of coverage of potential heat inputs and outputs, and reliance to monitored variables. Nonetheless, there are several aspects that suggest that the present methodology is unworkable, and improvements would need to be so significant as to require a new desk review.

- Complexity and uncertainty of methodology: The methodology relies on numerous, detailed heat transfer and conversion measurements in order to detect (potentially small) changes in thermal efficiency, pre- vs. post-project implementation. It is based loosely on AM0018 "Steam optimization systems", however, there is a fundamental difference. In AM0018, estimates of GHG emissions are related to a single *measured* variable, steam consumption, which can be readily monitored. In contrast in this methodology, GHG emissions are related to differences in two composite *calculated* variables, "useful heat output" and "heat input", which are calculated based on the sum of numerous individual heat conversion and transfer process equations, which could in some cases could, together, require the measurement or estimation of dozens of mass and heat flow variables. This leads far greater potential complexity and uncertainty, and requires the clarification of a number questions, including:
  (a) Signal-to-noise ratio (gains relative to uncertainties): Given the potentially large number of monitored and estimated variables, how can it be determined that the project-related increase in efficiency is significant related to these uncertainties? (Note that in the draft CDM-PDD case calculated efficiency increases from 52.04% to 53.63% after the project). Uncertainties with respect to these variables are not currently addressed in the methodology (other than in a qualitative discussion of potential instrument malfunction).
  (b) Potential for simplification: Is this level of complexity necessary? Are there alternatives that could provide a simpler, more robust and/or readily verifiable methodology? (See e.g. various reviewer comments and suggestions as well as other methodologies)
  (c) Mass balance of clinker line: See detailed explanations in the form below.
- Accounting for other factors affecting system efficiency: A number of exogenous factors appear capable of affect heat inputs or outputs such the composition of raw feed and clinker (e.g., fly ash or other calcined materials in the raw feed could decrease heat consumption) or fuel choice (biomass fuels for example might increase heat consumption). The methodology needs to indicate how changes in these factors, either before or after project implementation, might affect the CER calculation and whether additional changes to the methodology are needed.
- Ambiguities: The methodology does not appear to provide sufficient guidance on which heat and mass flows need to be included in order to ensure replicable and verifiable results. See comments below on draft CDM-PDD application (Section 3a).
- Baseline scenarios: Provide a methodology for identifying candidate baseline scenarios and selecting the most likely baseline. The methodology simply presumes that the baseline is continued facility operation (with deteriorating performance)
- Historical data used for the baseline calculations: A minimum of one to three months of historical data (as specified in the CDM-NMB) may be insufficient to reliably characterize pre-project efficiencies, given many factors affecting energy use, including those related to seasonal changes. The reference period for establishing historical efficiency should be extended significantly.
- Simplification and redrafting: Step 2 of the methodology contains numerous the redundancies and formatting problems (repeated numberings, etc.). Section D.7 repeats the same equations as D.6. Equations need to be numbered and consistent equation and variable formatting and units need to be used. Some key definitions and equations are found only in footnotes (e.g. fn 10); a box on how to consider retrofitting sits separate from the stepwise methodology. Note that the monitoring methodology already addresses several of these points; the CDM-NMM equations could have been used in the CDM-NMB.
- Electricity methodology:

Since this methodology has a broad range of applicability conditions, the use of the small-scale approach is not advisable. It is likely to be non-conservative since it allows for the use of the current generation mix (weighted average) and many projects could increase electricity use.

(A new proposal should be submitted in accordance with the procedures for submission and consideration of proposed new methodologies of the Executive Board.)

II. Recommendation on the proposed new monitoring methodology: *(checkmark the choice made)*

Title of proposed new monitoring methodology: >> Grasim monitoring methodology for the energy efficiency improvement in the heat conversion and heat transfer equipment system.

a. To approve this proposed methodology with minor changes

☐

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

>>

ii. Minor changes:

>>

b. To reconsider this proposed methodology, subjected to required changes

☐

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

>>

ii. Required changes:

>>

(Project participants shall make required changes in the proposed new methodology and send it back to the Meth Panel. The proposed new methodology will be reconsidered by the Meth Panel if changes required are correctly made by the project participants. The Executive Board will only consider this proposed new methodology after required changes proposed have been made and the revised proposed methodology has been reconsidered by the Meth Panel.)

c. Not to approve the proposed methodology

☒

i. Reasons for non-approval:

>> This monitoring methodology faces the same problems as the baseline methodology noted above, though the presentation of the basic algorithms and variables in the CDM-NMM is much clearer than in the CDM-NMB. In addition, the QA/QC procedures are insufficiently elaborated, and the determination that uncertainty is low for all data items needs to be justified.

(A new proposal should be submitted in accordance with the procedures for submission and consideration of proposed new methodologies of the Executive Board.)

B. Details of the evaluation of the proposed new methodology by the Meth Panel:

I. Proposed new baseline methodology *(specify title here):* >> Grasim baseline methodology for the energy efficiency improvement in the heat conversion and heat transfer equipment system

(1) Short description of the methodology, including an assessment of which approach from paragraph 48 of the CDM modalities and procedures was used:

a) Describe the methodology:

>> This methodology evaluates the energy, and thus emissions, savings from improving the energy efficiency of heat transfer and heat conversion equipment/systems. The methodology establishes baseline efficiency for the system based on historical data. This is compared to monitored data on the efficiency of the project system, as well as any additional electricity used (or saved, to calculate the net emissions savings.

The with-project efficiency is monitored regularly (shift- or batch-wise). Emission reductions are calculated from the monitored increase in system efficiency over the baseline level, and the monitored fuel consumption.

Efficiencies are to be determined for "normal" output ranges in order to eliminate the impact of differences in load on the energy consumption.

Separate equations are provided for electricity-related emissions: a simple captive power approach and for grid-connected power based on the small-scale methodology.

In the event that the system efficiency increases further due to factors not related to the project activity (e.g., future retrofitting), the methodology requires to estimate and deduct the associated emission reductions, but does not provide any detailed instructions. The corresponding wording (CDM-NMB Section D.9) is taken from AM0018. No specific guidance on how to do so is provided.

b) State the approach selected:

>> The selected approach is as per paragraph 48 (a) of the CDM modalities and procedures: "Existing actual or historical emissions", as applicable.

c) Indicate (in summary form) why the approach selected is the most appropriate. Please provide your expert judgement on the appropriateness of the selected approach to the project category:

>> Approach as per paragraph 48 (a) of the CDM modalities and procedures is appropriate for this methodology given the use of pre-project performance data.

(2) Basis for determining the baseline scenario:

a) State whether the documentation explains how the baseline scenario is to be chosen and identified:

>> Not sufficiently. The methodology (D.1) basically states that the baseline scenario is the continuation of pre-project conditions, and as conservative representation on a presumed deterioration of equipment efficiency. No process is clearly indicated for identifying and selecting this as the most likely baseline scenario. This may be accomplished in part through the evaluation of alternatives during the application of the additionality tool, however, there should be an explicit linkage with text in D.1., along with a process for identifying reasonable candidate baseline scenarios for this project type. If for example the additionality tool is used to determine that project is additional, and the most likely baseline scenario is one other than continuation of current practice (with deterioration), then the methodology should indicate how to proceed.

b) State the basic underlying rationale for algorithms/formulae used (e.g. marginal vs. average basis) (see also section 4 below):

>> Average emissions per unit of output, based on the average efficiency of the equipment and relevant fuel emissions factors. The basic rationale is to determine the overall efficiency of an energy conversion & transfer system pre- and post-project through heat balance, taking into account all heat forms (specific heat; latent heat incl. phase transformations; heat of combustion and chemical reactions; thermal equivalent of electricity used). The system efficiency is defined as "Useful Energy Output, divided by Energy Input" (CDM-NMB p.12).

c) State whether the documentation explains how, through the use of the methodology, it can be demonstrated that a project activity is additional and therefore not the baseline scenario. If so, what are the tools provided by the project participants?

>> The "Tool for the demonstration and assessment of additionality" is used, which is appropriate. It

would be useful, however, if the methodology noted whether any special issues in this sector must be taken into consideration when applying the generic tool to these project types.

d) State whether the basis for determining the baseline scenario and for assessing additionality is appropriate and adequate:

>> The basis for determining additionality is adequate. As noted above, the basis for determining the baseline scenario is inadequate.

(3) Assessment of the description of the proposed methodology and its applicability

a) State whether the methodology has been described in an adequate manner:

>> The description is overly redundant, awkwardly structured (due to repetitions, and hard-to-follow numbering), and somewhat ambiguous in terms of how it can be applied in a consistent manner. Given the multiplicity of mass and heat flows and the large number of variables that may need to be considered, more guidance is needed to determine which variables should be considered in a given circumstance.

According to one desk reviewer, the methodology fails to provide guidance on the crucial question which heat inputs and outputs are actually relevant for the calculation of the system efficiency in a given project context. As a result, the parameters "Useful Energy Output" and "Energy Input", used to calculate the system efficiency (CDM-NMB p.12 and 15), are not properly defined. The reviewer suggests that this is reflected in Annex 3 and Enclosures 1 and 2 of the draft CDM-PDD, where the approach taken to calculate the overall efficiencies of the two affected clinker lines is neither transparent nor appropriate for several reasons:

- The specific heat contents of various mass streams entering the kiln (air, coal, raw material) are counted as "heat input" and added to the calorific value of the coal consumed. This seems inappropriate since the specific heat content of these mass streams will not contribute to the chemical process of clinker formation.
- The calculation is inconsistent in itself because both the heat content and calorific value of petcoke (2^{nd} fuel, contributing 40% - 95% of total heat consumption) is neglected.
- It seems surprising that air streams entering the kiln and a stream of cooling air are treated in the same way, despite their different function.
- Mass streams are not consistently accounted for in the baseline scenario and the with-project scenario. For example, the heat contained in cooler water appears in the projection of the with-project system efficiency, but not in the analysis of the baseline efficiency (see draft CDM-PDD Enclosures 1 and 2 vs. Annex 3). Note that the unit of solid mass streams is incorrectly given as Nm3/hr, but should probably be kg/hr.
- The heat of reaction (= "Useful Energy Output") is not derived in a transparent way in Annex 3. According to p.8 of the draft CDM-PDD, the "Useful Heat Output" is the heat of clinkerisation. However, no value or data source for the specific heat of clinkerisation (e.g., in MJ/t clinker) is indicated. Presumably, "clinkerisation" is used to denote the full process of clinker production in the draft CDM-PDD. However, it should be noted that pyroprocessing of raw materials in a cement kiln involves two chemically distinct phases: 1. calcination of raw materials (an endothermic process), and 2. clinkerisation of the calcined materials (exothermic).

As the reviewer also notes, according to the draft CDM-PDD (p.36), the methodology follows AM-0018. However, AM0018 determines emission reductions from steam efficiency improvements based on the monitored decrease in specific steam consumption below a fixed baseline level (pre-project level, expressed in kg steam per unit product), to be multiplied with the monitored product output. The approach of NM0101 is effectively analogous but inverted, i.e. the amount of clinker produced (implicitly defined by the reaction heat or "Useful Energy Output") is placed in the numerator and the energy consumption in the denominator. However, the fuzzy definition of "Useful Energy Output" is a deviation from the spirit of AM0018.

b) State whether the proposed methodology is appropriate for the referred proposed project activity and the referred project context (described in Sections A - E of the draft CDM-PDD and submitted along with CDM-NMB):

>> In principle, the approach of calculating emission reductions based on the monitored increase in overall system efficiency over a pre-determined baseline efficiency level is correct. However, there would appear to be insufficient guidance to ensure that it is properly applied.

c) State whether the application of the methodology could result in a baseline scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed project activity.

>> It could, however, this methodology does not appear sufficient for several reasons.

Please explain:

>> As one reviewer notes, with respect to:

- Uncertainty: A comprehensive heat balance of a cement plant has a relatively high inherent uncertainty due to the large mass streams involved and the complexity of the process. For example, internal recycling of dust back to the kiln often leads to double-counting at scales measuring the raw material input into the kiln, resulting in a need for manual data correction. Furthermore, clinker production is usually not measured directly, but calculated from clinker consumption in the cement mill, product deliveries, and changes in clinker stocks. As a result, the mass balance of a clinker line (which is a precondition for the heat balance) is usually an iterative process, and detailed approaches are often highly plant-specific. The remaining uncertainty is likely to be substantial vis-à-vis the small efficiency gain resulting from the proposed project activity. The latter is less than 3%, according to the predicted change in fuel consumption given in the draft CDM-PDD (p.3).
- Complexity and impracticality: The heat consumption (and efficiency) of an existing kiln line can vary due to several factor, including e.g. the kiln load factor, frequency of stops, but also the composition of the raw materials and fuel mix. For example, addition of fly ash as a raw material to the kiln can reduce the specific heat consumption per tonne of clinker, because fly ash is already calcined. On the other hand, the specific heat consumption can increase if biomass or other non-conventional fuels with relatively high water content are used. The proposed methodology – implicitly- requires to account for these factors in each heat balance, i.e. on a daily (shift-wise) basis, since emission reductions will otherwise be either over- or underestimated. This seems overly complex given the relatively small emission impact of the project.
- Potential for bias: Due to its complexity, the methodology is prone to biasing of results. This applies in particular for the baseline system efficiency, which is to be determined based on observed performance during only a limited period (at least three months, see CDM-NMB p. 5).
- Verifiability: The complexity of the methodology will make verification highly difficult.

(4) Assessment of algorithms/formulae and type of data needed:

a) State whether the description of the methodology includes algorithms and generic formulae that can be applied to other potential project activities (if not, the proposed new methodology will be considered as a project-specific methodology):

>> Yes, the methodology is rather generic, and thus could be applied to other activities, assuming other concerns are addressed.

b) Explain the spatial scope of data used to determine the baseline and whether the scope is appropriate:

>> Emissions factors are local or national if possible, and IPCC otherwise. Technical data such as heat enthalpy of steam are from standard international publications. All other data is local. This is appropriate. It would, however, help to have a table of all the parameters and the source and spatial level indicated for each one.

c) Explain the vintage of data used (in relation to the duration of the project crediting period) and whether the vintage of data is appropriate, indicating the period covered by the data:

>> The vintage of data used to calculate the baseline efficiency – at least one month before the project activity (p.20) and/or "a minimum of three months data for the pre-project activity" (p.5) – appears to potentially inadequate. This could be problematic if there are seasonal variations in production or external factors (e.g. climate) that influence efficiency, as well as variations in process inputs or other factors. Indeed Step 2 of Section D.6 states that ambient temperature and humidity may play a significant role in the energy efficiency of equipment. (p.9). AM0018 specifically states that the data sampling for the baseline must cover the relevant seasonal variations. Applying this argument to the determination of the baseline signifies that historic data for several years is needed to provide a representative basis, especially in regions with pronounced seasons.

(5) Definition of the project boundary related to the baseline methodology:

a) State how the project boundary is defined in terms of:

i) Gases and sources

>> CO_2 from fuel consumption only

ii) Physical delineation

>> Heat conversion and transfer equipment, mass streams flowing to and from this equipment, and electricity sources.

b) Indicate whether this project boundary is appropriate:

>> It would appear so, however, the PP should address the following points raised by one reviewer:

The physical boundary should, in the context of the proposed project activity, include the raw mill in addition to the clinker line, because a part of the heat exchange between the kiln gas and the raw material can take place there (if off-gas is cycled through the raw mill after leaving the pre-heater). This may be relevant since the 6^{th} stage will reduce the gas temperature at the pre-heater outlet (see draft CDM-PDD p.5), i.e. the heat transfer in the raw meal will likely be impacted, but the net effect will not necessarily be material.

(6) Key assumptions/parameters (including emission factors and activity levels) and data sources:

a) List the implicit and explicit key assumptions. Identify those, if any, which are problematic and explain:

>> The key assumption is that the impact of project on overall system efficiency can be reliably and verifiably determined, given the uncertainties associated with the numerous variables that need to be monitored, given any adjustments needed to account for other influencing factors. The robustness of this

assumption needs to be further evaluated.

b) State whether the key assumptions are arrived at in a transparent manner:

>> Yes – many directly reflect AM0018.

c) Give your expert judgement on whether the assumptions/parameters are adequate:

>> The main challenge is that described in 6a above.

d) Indicate which data sources are used and how the data are obtained (e.g. official statistics, expert judgement):

>> Data sources specified in Section E.2. include:

- A handbook for chemical engineers;
- Bureau of Energy Efficiency, Government of India (for equipment efficiencies);
- IPCC 1996 Guidelines;

UNFCCC, Simplified Modalities and Procedures for SSC projects.

e) Give your expert judgement on whether the data used are adequate, consistent, accurate and reliable:

>> They are in general, however a number of clarifications are needed:

- It should be made clear that local factors are preferable to IPCC
- Data sources and calculation approaches for "Useful Heat Output" (reaction heat of clinker production in the draft CDM-PDD case), are not sufficiently transparent, hence accuracy cannot be judged.
- If ηc is going to be calculated in D.9, then the relevant parameters and equations from AM0018 should be included, rather than simply referring to them in a footnote.
- All of the parameters in sections D.6 and D.7should have variable names and definitions (i.e rather than being spelled out as in D.6 Step 2a)1 numbers 2 to 4).
- Definition of HI on page 16 in footnote should be included in main text, and an equation should be shown for how this is estimated.
- All parameters and variable should have clearly marked units.

f) State possible data gaps:

>> Sources should be given for heats of reaction, enthalpy of phase transformation. If the methodology is applied in countries other than India, other sources for equipment efficiency should be identified

(7) Assessment of uncertainties:

a) State whether the methodology includes an assessment of uncertainties regarding:

i) The basis for determining the baseline scenario:

>> No – see comments above.

ii) Algorithms/formulae:

>> No

iii) Key assumptions:

>> No.

iv) Data:

>> Yes, with respect to instrument malfunction or errors in IPCC/WBSCD emission factors.

b) State whether the uncertainties presented are reasonable:

>> No they are not. This is a fundamental problem with this methodology as noted above under Section A.

(8) Leakage:

a) State how the baseline methodology addresses any potential leakage due to the project activity:

>> No relevant source of leakage is identified.

b) Indicate whether the treatment for leakage is appropriate and adequate:

>>Most likely, yes.

(9) Transparency and "conservativeness":

a) Indicate whether the baseline methodology was developed in a transparent way:

>> It is somewhat transparent, however there are major ambiguities in how it can be applied, and incompleteness and/or redundancies in the algorithms make it somewhat hard to follow.

b) State whether the baseline methodology is conservative:

>> This is hard to judge. However, the multiplicity of monitored/estimated variables, and ambiguity in how the methodology is applied (latitude on which heat sources to include), leaves room for gaming.

(10) Potential strengths and weaknesses of the proposed baseline methodology *(please explain)***:**

>> The weaknesses are summarized in Section A. The strengths include use of existing, approved methods, thoroughness of coverage of potential heat inputs and outputs, and reliance to monitored variables.

(11) Other considerations, such as a description of how national and/or sectoral policies and circumstances have been taken into account *(please explain)***:**

>> The methodology alludes to the tool for additionality, but does not provide any other means to assess whether national or sectoral policies and circumstances might affect future production characteristics of the facility, which might be important especially given the broad applicability conditions.

(12) Applicability of the proposed methodology across project types and regions *(please indicate)***:**

>> If the concerns can be addressed, this methodology could have very wide applicability as indicated.

(13) Any other comments:

a) State whether any other source of information (i.e. other than documentation on this proposed methodology available on the UNFCCC CDM web site) has been used by you in evaluating this methodology. If so, please provide specific references:

>> None.

b) Indicate any further comments:

>> No further comments.

II. Proposed new monitoring methodology *(specify title here):* >> Grasim monitoring methodology for the energy efficiency improvement in the heat conversion and heat transfer equipment system.

In respect of the proposed new monitoring methodology, evaluate each section of CDM-NMM to the draft CDM-PDD. Please provide your comments section by section:

(1) Brief description of new methodology:

Describe new methodology:

>> The methodology measures all of the key variables to directly determine the energy efficiency of the heat conversion/transfer process before and after the project, including flows rates and temperatures of incoming and outgoing streams, fuel consumption (including electricity), efficiency of heat conversion equipment, and other relevant parameters. It uses a heat balance approach to estimate energy efficiency on the basis of these measured parameters.

(2) Key assumptions/parameters:

a) List the implicit and explicit key assumptions. Identify those, if any, which are problematic and explain:

>> The methodology assumes: that it is possible to accurately measure flow and temperature; that all relevant input and output/production data can be collected at the end of the batch/shift; that electricity consumption data is available for relevant equipment or that nameplate data is a reliable proxy; that the efficiency of electricity generation is constant; that instruments are calibrated regularly; and that NCV, ultimate analysis and carbon emissions factors can be determined locally or that IPCC guidelines are a reliable proxy. The key assumption is that a comprehensive heat balance of complex systems such as a clinker production line can be determined for each batch or shift while ensuring:

- Sufficient accuracy;
- Verifiability by a DOE;
- Practicality and reasonable transaction costs in relation to the achieved emission reductions

b) State whether the key assumptions are arrived at in a transparent manner:

>> No, since the accuracy and verifiability are not discussed.

c) Give your expert judgement on whether the assumptions/parameters are adequate:

>> They may not be, due to ambiguities and uncertainties noted above for the baseline methodology.

(3) Data sources and data quality:

a) Indicate which data sources are used and how the data are obtained (e.g. official statistics, expert judgement):

>>Indicated data sources include (see e.g. CDM-NMM Section B.2.1):

- Measurement instruments installed at the project site (e.g. for input and output mass streams and their temperatures, and electricity consumption)
- Scientific publications and handbooks (e.g. for specific heats of materials and reactions)
- IPCC default carbon emission factors for fuels

b) Give your expert judgement on whether the data used are adequate, consistent, accurate and reliable:

>>The indicated sources are adequate in principle. However, due to the inherent complexity of the systems to which the methodology can be applied, such as clinker production lines, substantial reservations regarding accuracy and verifiability remain.

c) *State possible data gaps:*

>> Due to its generic nature, the methodology does not list any specific input or output streams and related parameters which need to be accounted for in the calculation of system efficiency. In the cement context, in particular, various parameters can have an influence on the overall system efficiency, e.g.:

- The composition of the fuel mix (fuels with relatively high water content such as biomass can increase heat consumption);
- The chemical composition of raw feed and clinker will influence heat consumption. E.g., calcined materials in the raw feed (e.g. from fly ash) can decrease heat consumption;
- Technical parameters influencing combustion efficiency.

Due to its limited level of detail (which is a necessary consequence of the methodology's broad applicability across industry sectors), the methodology does not ensure that such factors are correctly accounted for.

(4) Assessment of the description of the proposed methodology and its applicability:

a) State whether the proposed methodology has been described in an adequate manner:

>> Largely yes – much better than in the CDM-NMB. The presentation of formulas should be used in the baseline methodology to help make it clearer. Issues to address include:

- The final formula for emissions reductions is in units of kg CO_2/hr, because the units for H_{actual} are kCal/hr. The methodology must show how total emissions reductions are to be calculated.
- The main formatting change required is that it would be easier to understand the nomenclature if the variable names were used in the actual monitoring tables (e.g. B.2.1 under the column "data variable") rather than presented in a separate table.
- Sections B.2.2 and B.2.4 do not actual show how emissions are calculated - they only show efficiency. Emissions are only covered in section B.5.
- The variables for electricity consumption say that only 2.5% of data is monitored - this is not really the case because, even though hourly electricity use may only be monitored periodically, total electricity use over the shift is known with high certainty. I suggest it says that 100% of data is covered (i.e. for B.2.8, B.1.12, B.3.8, B.3.12)
- In section B.5, the "average emission factor for all the fuels used" Eavg, heat should have units of kg CO_2/kCal
- Variable B.3.1 should have units kg/hr or m3/hr, not kCal/hr
- Critical parameters are not sufficiently defined (e.g., H_{input} on CDM-NMM p.25: How derived? Using lower or higher heating value?).
- Symbols for parameters used should be indicated in Sections B.2.1 and B.2.3.
- Parameters needed to account for changes in electricity consumption (see CDM-NMB p.17) are not covered in the CDM-NMM.

b) State whether the proposed methodology is appropriate for the referred proposed project activity and the referred project context (described in Sections A - E of the draft CDM-PDD and submitted along with CDM-NMM):

>> Issues with baseline methodology need to be addressed first.

c) State whether this proposed monitoring methodology is compatible with the proposed baseline methodology described in CDM-NMB of the draft CDM-PDD:

>> Yes.

(5) Leakage *(please elaborate, if appropriate)***:**

>> No methodology provided.

(6) Quality assurance and control procedures *(please explain)***:**

>> The QA/QC procedures are not adequate. In all cases where QA/QC is needed, the methodology only indicates that "QA/QC procedures need to be defined" for a number of parameters including e.g.:

- Useful heat output (= heat of reaction in the underlying project);
- Flow rate of input streams;
- Flow rate of output streams.

One reviewer suggests that contrary to the indication in the CDM-NMM, the uncertainty related to many of these parameters is likely to be "medium" to "high" rather than "low". Consequently, QA/QC procedures need to be defined in substantially more detail.

(7) Potential strengths and weaknesses of the proposed monitoring methodology *(please explain)***:**

>> Strengths include relies on measured data sources that are reliable and well understood in industry and thorough equations. Weaknesses include some of the concerns with the underlying baseline methodology, lack of equations for grid electricity emissions, absence of methods to track and deal with retrofits after

project implementation, absence of emissions reduction equations, lack of QA/QC procedures.

(8) Applicability of the proposed methodology across project types and regions *(please indicate)***:**

>> If the concerns can be addressed, this methodology could have very wide applicability as indicated.

(9) Any other comments:

a) State whether any other source of information (i.e. other than documentation on this proposed methodology available on the UNFCCC CDM web site) has been used by you in evaluating this methodology. If so, please provide specific references:

>> None.

b) Indicate any further comments:

>>No further comments.

Signature of Meth Panel Chair ……………………………………………..
Date: 22/06/2005 *Jean-Jacques Becker*

Signature of Meth Panel Vice-Chair ……………………………………………..
Date: 22/06/2005 *(name)*

Information to be completed by the secretariat	
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