

 <p style="text-align: center;">CDM: Proposed new methodology expert form (version 04) (To be used by methodology experts providing desk review for a proposed new methodology)</p>	
Name of expert responsible for completing and submitting this form	Steven Schiller
Related F-CDM-NM document ID number	NM0100: Mexico Energy Efficiency Motor Project
<p><i>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.</i></p>	
A. Evaluation of the proposed new methodologies by desk reviewers:	
I. Evaluation of the proposed new baseline methodology:	
<p>Title of new baseline methodology:>> Activities for the promotion of electricity efficiency, through the replacement of unitary equipment, by parties that are not the energy consumers</p>	
<p>i. Conditions under which this methodology is applicable to other potential projects (e.g. project type, region, data availability):</p> <p>>> If this methodology incorporates certain improvements and is approved it would be applicable for projects that:</p> <ol style="list-style-type: none"> 1. Involve third parties promoting, for example through the payment of incentives, the early replacement of fixed input, electricity consuming unitary equipment (for example constant speed motors) with more efficient versions of the same type of equipment on a regional or national basis when the replaced and new equipment is connected to a regional or national grid whose distribution/transmission losses can be calculated with reasonable certainty 2. Are justified as additional using EB 16 Annex 1 “Tool For the Demonstration And Assessment of Additionality” 3. Displace grid electricity whose emission factors can be determined on a regional or national basis. 	
<p>ii. Strengths and weaknesses of the methodology:</p> <p>>> Strengths: Addresses an important energy efficiency program concept. The program approach seems well thought out, particularly the requirement of destroying the replaced, less-efficient, motors. Well organized and prepared in a manner that should allow generalization to other projects. Builds on approved methodologies.</p> <p>Weaknesses:</p> <ul style="list-style-type: none"> • Assumes that is not economical, from the customer perspective or the utility perspective, that early replacement of equipment will be cost-effective in absence of the program. This is probably true, but the documentation should be part of the methodology. • Relies on undocumented and optimistic assumptions for motor operating hours and motor lives. Relies on baseline motor efficiency assumptions that are not documented. Indicates a crediting period of 21 years, which may be excessive. • Relies on a grid emission calculation method that is designed for calculation of emission factors for a specific project site, versus an entire country. The emissions factors would be expected to vary across 	

the country's grid; and motors replaced in one region of the country may have significantly different CO₂ reductions than motors replaced in another part of the country in which power plant fuel mixes and the applicability of build margin versus operating margin calculation methods would vary.

iii. Any changes needed to improve the methodology:

a. Minor changes:>>

- Section A3: The methodology should indicate that it is applicable to the replacement of old equipment with only NEW equipment – as referenced in Leakage discussion
- Section D3: The additionality tool should be required, versus recommended
- Section D7: EP_k should refer to electricity purchased for the new “project” equipment, not all energy used by participants in the program

b. Major changes:>>

There are three major areas of concern, the calculation of (a) baseline and project motor energy consumption, (b) generalized grid transmission/distribution (T&D) loss factors and emission factors, and (c) the persistence of savings and the potential for free riders.

(a) Baseline and project energy use: While the analysis equations are straightforward they rely on three major assumptions: motor efficiency, remaining motor life, and motor operating hours. These all appear to be based on assumptions, which are not documented in the PDD or via a method, explained in the Baseline or Monitoring Methodologies. The possible difficulties with these assumptions are compounded by the fact that often old motors do not have their nameplates or the nameplates are no longer readable. To resolve these difficulties I would suggest:

- Sponsor providing documentation on the basis for baseline motor efficiencies
- Classification of the motors into different subgroups with different assumptions for operating hours, remaining motor life and baseline efficiencies. The information for these data would come from surveys that may require some metering of operating hours. Operating hours in the calculation of project and baseline energy should probably be the post-project installation operating hours.

(b) Generalized emission and T&D factors: Emission factors come from ACM002 and are applied to the entire Mexican power grid. This may be too broad an application if the replaced motors are not uniformly distributed over all of Mexico. The same is true for the T&D factors. What I would suggest for this type of national project is that:

- Emission and T&D factors be calculated on a more regional grid basis and that the replaced motors are recorded as to which regional grid they are from
- The methodology should note that is only valid for motors which are connected to and receive power from national grid and not at a facility from which the displaced power would come from on-site generation

(c) Crediting period and persistence of savings: The motor life assumption, at forty years seems optimistic as well as the assumption that all new motors would stay in operation for 21 years. There is also an implied assumption that there will not be any changes (increases) in the national motor efficiency requirements that will impact the net energy savings from the program over 21 years. Lastly, there is also an implied assumption that all of the replaced motors were operational (that is the motor was replaced “early” not when it failed) and that there are no “free-riders” (that is none of the motors would have been replaced without the incentive provided by the program). To resolve these issues I would suggest:

- A “net-effects” study that looks at free-rider, spill over and other program indirect impacts to determine a net to gross ratio for multiplying times the calculated emission reductions. This is standard practice in motor replacement programs in the United States.

- A persistence study to determine baseline motor life and how long savings should be claimed for the program given whether the program sponsor will continue inspections for the term of the crediting and other factors such as discontinuation of motor use for a percentage of end users, and whether the early replaced motors would have been replaced without the program's influence prior to the end of the crediting period.

The result of these suggestion would in effect be a more programmatic approach to the analysis with replaced motor data collected and multiplied by various factors (essentially what is known as a net to gross factor) depending on (a) the type of application from which they come and the location of the application as well as assumptions on savings persistence and freeridership; with some sampling of baseline and project installations.

II. Evaluation of the proposed new monitoring methodology:

Title of new monitoring methodology: >> Activities for the promotion of electricity efficiency, through the replacement of unitary equipment, by parties that are not the energy consumers

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

>> If this methodology incorporates certain improvements and is approved it would be applicable for projects:

1. That involve third parties promoting, for example through the payment of incentives, the early replacement of fixed input, electricity consuming unitary equipment (for example constant speed motors) with more efficient versions of the same type of equipment on a regional or national basis when the replaced and new equipment is connected to a regional or national grid whose emissions factors and distribution/transmission losses can be calculated with reasonable certainty
2. For which reasonable quality information can be obtained on replaced equipment (for example name place data) and for which operating hours and persistence surveys can be completed for a reasonable sample of installations.

- ii. Strengths and weaknesses of the methodology:

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Strengths: relatively simple data collection

Weaknesses: Does not address the difficulties in obtaining data from old, replaced motors which often do not have readable, or any, nameplates. Reliance on generalized undocumented assumptions on operating hours, motor efficiencies and persistence of savings.

- iii. Any changes needed to improve the methodology:

- a. Minor changes:>>

- Tables listing variables to be measured, estimated or calculated should include the name of the factors, not just the symbols
- Some variables listed in the tables that are indicated to be measured are actually estimated
- Energy use of motors is shown to vary by climate in one of the tables, but this independent variable is not discussed in text and it would seem to be only one of several possible independent variables (such as motor application) to be considered

- b. Major changes:>>

- Frequency of measurements and surveys are not defined for key parameters such as operating hours and persistence of savings. The generalization of assumptions across all motors in Mexico, for example the relatively high estimate of operating hours, is not segmented by types of applications or other factors that

determine operating hours.

- QA/QC procedures are not well defined and will be of particular importance with the potential of unreadable nameplates and the potential of overly optimistic reports of motor operating hours and measure persistence.
- As indicated above in the baseline methodology section, I would suggest more segmentation of assumptions for emissions, motor operating hours, etc. and surveys and analysis to determine net to gross ratios.

B. Details of the evaluation of the proposed new methodology by the desk reviewer:

I. Proposed new baseline methodology (*specify title here*): >> **Activities for the promotion of electricity efficiency, through the replacement of unitary equipment, by parties that are not the energy consumers**

(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 proposed methodology incorporates the following procedures and methodologies:

- Tools for the demonstration and assessment of additionality (Annex 1 to EB 16 Report).
- Approved consolidated baseline methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources.”
- Appendix B of the simplified modalities and procedures for small-scale CDM project activities

For equipment with a fixed power input, total on-site electricity consumption reduction is given by the product of equipment quantity, power input, the number of operating hours per year and a ratio comparing new and baseline equipment efficiencies. The on-site electricity reduction is increased by a transmission & distribution (T&D) loss factor to calculate grid electricity consumption reduction. The decrease in electricity use is converted into units of CO₂ equivalent using an emission factor.

b) State the approach selected:

>>48(a) of the CDM M&P – Existing 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:

>>48a is most applicable, because the project involves replacement of equipment currently in service, which reflects the nature of demand-side management programs and best practice for evaluating energy savings and greenhouse gas emission reductions. However, for generalized use the methodology should indicate that the energy efficient alternative is not cost-effective on the merits of energy cost savings (48b) and that no similar equipment replacement program has been conducted in the past, or sponsored with government financing, and could not be implemented without CDM revenues (48c).

(2) Basis for determining the baseline scenario:

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

a) >> The documentation explains how the baseline emissions factors are chosen and calculated with the exception of no documentation (a report is mentioned) on how baseline motor efficiency and operating hours were determined.

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

>> The basic underlying rationales consist of assuming that the baseline is the current electricity consumption of the end-use equipment taking into account T&D losses and that this energy consumption would continue to be the baseline for the entire crediting period.

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?

>> Documentation is provided. The documentation provided is based on EB 16 Annex 1 “tool for the demonstration and assessment of additionality”. The barriers analysis is used and the arguments provided are convincing that the baseline scenario is the existing operation of the equipment, in part due to the lack of existing programs in Mexico as well as the existence of other similar programs in other industrialized nations that address market barriers.

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

>> The basis for determining the baseline scenario and additionality is appropriate and adequate with the possible exception that analyses are not provided indicating that the early replacement of motors is not cost-effective for the owners of the motors or the servicing electric utility.

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

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

>> No, additional information is required on key assumptions. See item 3(c) below

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):

>> Additional documentation is required to determine whether this methodology is appropriate, see item 3(c).

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.

>> Yes, but note concerns below

Please explain:

- >> While the baseline energy analyses equations are straightforward they rely on three major assumptions: motor efficiency, remaining motor life, and motor operating hours. These all appear to be based on undocumented assumptions. The possible difficulties with these assumptions are compounded by the fact that often old motors do not have their nameplates or the nameplates are no longer readable.
- Emission factors come from ACM002 and are applied to the entire Mexican power grid. This may be too broad an application if the replaced motors are not uniformly distributed over all of Mexico. The

same is true for the T&D factors.

- There is also an implied assumption that increasing motor efficiency requirements will not impact the net energy savings from the program over 21 years. There is also an implied assumption that all of the replaced motors were operational (that is the motor was replaced “early” not when it failed) and that there are no “free-riders” (that is none of the motors would have been replaced without the incentive provided by the program).

See Section A 1 for suggestions.

(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

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

>>For this project the spatial scope is national, although for other projects it could be regional. The project would always involve multiple, actual “site” locations

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:

>>Baseline data on motor characteristics (age, rating and efficiency) would come from motors submitted for replacement. The data may not be available. Baseline motor efficiency comes from assumptions that are not documented. Baseline motor operating hours come from assumptions that are not provided. Baseline motor operating hours should probably equal project motor operating hours which will most likely vary over the term of the crediting period. The displaced grid electricity emission factors will vary over time and are proposed to be updated annually.

(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

>>CO₂(e) emissions associated with electricity produced for national electrical grid. The grid is assumed to supply the electricity used by baseline and project equipment.

ii) Physical delineation

>>National (as is case for this project) or regional

b) Indicate whether this project boundary is appropriate:

>>Yes, with the possible exception that regional emission (and T&D) factors should probably be used for a national program versus a single national value unless it can be shown that a single value provides acceptable results for the country of implementation.

(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:

>>Motor life, motor operating hours, and motor efficiency

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

>> no

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

>>Motor life and operating hours seem high, the efficiencies are probably fine and it is good that they are differentiated by motor age

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

>>A study is referenced on baseline motor efficiencies but not formally cited or provided. Operating hour and life information is not documented.

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

>>The referenced study might be perfectly adequate and valid, but it needs to be provided. Similar work is probably required on motor life and operating hours.

f) State possible data gaps:

>>As noted before, nameplate data may not be available on existing motors, free riders have not been assessed and the baseline motor operating hours, life and efficiency needs to be documented. Note that as one of public reviewers indicates, if the replaced or new motors have variable input power then additional information would be required to calculate savings. (This is briefly touched upon in the Monitoring Methodology.)

(7) Assessment of uncertainties:

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

i) The basis for determining the baseline scenario:

>>not provided

ii) Algorithms/formulae:

>>No, but the algorithms provided are very straightforward.

iii) Key assumptions:

>>Not provided

iv) Data:

>>Not provided

b) State whether the uncertainties presented are reasonable:

>>As indicated above there are a wide range of uncertainties associated with data and key assumptions and at a minimum a net to gross ratio should be applied to account for these uncertainties as well as free rider, persistence and spill over effects. As stated in the public input from Brummer/Niederberger: "Certainly, the quality of the data on existing equipment in service is important for this methodology and the related uncertainty should be treated in each specific PDD. The methodology could perhaps provide more guidance on such data quality issues, recognizing that data availability and quality can vary greatly with country, sector, technology, etc. Perhaps some general principles to ensure that data availability and quality are treated explicitly in PDDs would be helpful."

(8) Leakage:

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

>> Leakage is addressed in this program through the program requirements that (a) only new equipment is provided to replace baseline motors and (b) replaced baseline motors will be destroyed.

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

>>Yes, as long as the program rules are enforced AND there are controls to not include or at least limit motors being submitted for equipment that were not in service (for example, someone going to the garbage dump and turning in an old motor) or originated from outside the project boundaries (for example Guatemala).

(9) Transparency and "conservativeness":

<p>a) <i>Indicate whether the baseline methodology was developed in a transparent way:</i> >>Yes</p> <p>b) <i>State whether the baseline methodology is conservative:</i> >>Not possible to tell at this time unless documentation can be provided on the factors of concern, as indicated earlier.</p>
<p>(10) Potential strengths and weaknesses of the proposed baseline methodology (please explain): >>See Section A.I ii and iii</p>
<p>(11) Other considerations, such as a description of how national and/or sectoral policies and circumstances have been taken into account (please explain): >>The project is based on the assumption that there will not be government or utility rate payer incentives available for inducing end users to replace existing motors with more efficient motors and that minimum motor efficiency standards will not increase over time.</p>
<p>(12) Applicability of the proposed methodology across project types and regions (please indicate): >>This proposed methodology represents an important contribution to the CDM process by addressing a very good program concept of replacing inefficient equipment with more efficient equipment through the use of CDM based financial incentives on a regional or national level. With some improvements it will be a very valuable methodology for motors, refrigerators, lighting, and other energy efficiency applications.</p>
<p>(13) Any other comments:</p> <p>a) <i>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:</i> >> Public input submitted by:</p> <ul style="list-style-type: none"> ▪ Conrad U. Brunner / A. Arquit Niederberger A + B International (Sustainable Energy Advisors) ▪ The Federation of Electric Power Companies KITAHARA Takao ▪ Jakob Graichen <p>b) <i>Indicate any further comments:</i> >>I refer readers to the public input program design comments of Conrad U. Brunner and A. Arquit Niederberger, Section B.I (13).</p>
<p>II. Proposed new monitoring methodology (specify title here): >> Activities for the promotion of electricity efficiency, through the replacement of unitary equipment, by parties that are not the energy consumers</p>
<p><i>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:</i></p>
<p>(1) Brief description of new methodology: Describe new methodology: >> This proposed methodology incorporates the following procedures and methodologies:</p> <ul style="list-style-type: none"> • Tools for the demonstration and assessment of additionality (Annex 1 to EB 16 Report). • Approved consolidated baseline methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources.” • Appendix B of the simplified modalities and procedures for small-scale CDM project activities <p>For equipment with a fixed power input, total on-site electricity consumption reduction is given by the product of equipment quantity, power input, the number of operating hours per year and a ratio comparing</p>

new and baseline equipment efficiencies. The on-site electricity reduction is increase by a T&D loss factor to calculate grid electricity consumption reduction. The decrease in electricity use is converted into units of CO₂ equivalent using an emission factor. Information on each baseline motors' age, remaining life, operating hours, rating (in hp) and operating hours is collected when motors are turned in for replacement or from generalized assumptions. Project motors' similar characteristics are based on nameplate data or assumptions. T&D loss factor is set once for the entire crediting period based on assumptions for the entire country. Grid emission factors are based on the combined margin calculation method in ACM0002 and calculated annually for the entire country.

(2) Key assumptions/parameters:

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

>> Other than the major assumptions discussed with respect to the baseline methodology the primary monitoring assumptions concern:

- The availability of data on the replaced motors – which may very well be problematic
- Availability of operating hour information – which must be determined in some valid manner
- Motor life – which is only referenced to be done via an annual study in one note in table B.2.1
- Persistence of savings – which are not evaluated or monitored in the current methodology
- T&D losses – which are calculated once for the entire country

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

>> Documentation and further explanation are required for monitoring methodology, collection of all required data, and QA/QC procedures. The integrity of the data collected and the segmenting of data by application types, region, operating hours, etc. will be critical to the success of this methodology. Some monitoring aspects, such as monitoring of measure life (and thus persistence of savings), sample laboratory testing (with no indication of how or how many samples), and variable load equipment energy use are only mentioned in the briefest of ways (for example, a oblique reference to collecting data per climate for variable load equipment)

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

>> *At this time for the reasons stated above the assumptions/parameters are not adequate.*

(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):

>> historical motor sales data, prior studies on motor efficiencies, operating hours and motor life, laboratory testing of sample motors and large-scale annual surveys, purchase data for new motors, average national T&D loss data and average national electricity production and fuel use for electricity production,

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

>> Additional information is required for documenting electricity savings and regional versus national T&D losses and emission factors. Most of the project monitoring procedures are not defined and the historical information used in baseline assumptions is not documented. For generalized use of the methodology it would be helpful to have a set of guidelines for preparing the documentation of assumptions.

c) State possible data gaps:

>> Operating hour information, motor life information, T&D loss information, replaced motor efficiency data

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

<p>a) State whether the proposed methodology has been described in an adequate manner:</p> <p>>>No</p> <p>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):</p> <p>>>Not without further documentation of sources and use of more segmentation of the population of motors being replaced</p> <p>c) State whether this proposed monitoring methodology is compatible with the proposed baseline methodology described in CDM-NMB of the draft CDM-PDD:</p> <p>>>Yes</p>	
<p>(5) Leakage (please elaborate, if appropriate):</p> <p>>>Some monitoring of the sources of motors would be appropriate to ensure that a significant number of motors are not being turned in that are not functional or are from outside of the project boundaries</p>	
<p>(6) Quality assurance and control procedures (please explain):</p> <p>>>It is highly commendable that the old motors will be destroyed. Clarification on how any surveying and testing will be done is required.</p>	
<p>(7) Potential strengths and weaknesses of the proposed monitoring methodology (please explain):</p> <p>>>See Section A.II ii and iii</p>	
<p>(8) Applicability of the proposed methodology across project types and regions (please indicate):</p> <p>>>Energy efficiency equipment replacement in any region or country</p>	
<p>(9) Any other comments:</p> <p>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:</p> <p>>>Public input submitted by:</p> <ul style="list-style-type: none"> ▪ Conrad U. Brunner / A. Arquit Niederberger A + B International (Sustainable Energy Advisors) ▪ The Federation of Electric Power Companies KITAHARA Takao ▪ Jakob Graichen <p>b) Indicate any further comments:</p> <p>>></p>	
<p>Signature of desk reviewer</p> <p>Date: 28 / 04 /05</p>	
<p>Information to be completed by the secretariat</p>	
F-CDM-NMEX doc id number	
Date when the form was received at UNFCCC secretariat	
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Date of posting in the UNFCCC CDM web site	