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Annex 10

COVER NOTE

STANDARD

UNCERTAINTY OF MEASUREMENTS IN LARGE-SCALE BASELINE AND MONITORING METHODOLOGIES

I. Background

1. The Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP), in its decision 9/CMP.7, paragraph 7(a), requested the Executive Board of the clean development mechanism (the Board), as part of its decision on implementing the concept of materiality, to "address the issue of uncertainties of measurements in baseline and monitoring methodologies, so that these types of uncertainties do not need to be considered in addressing materiality".

2. In response to this request, the Board included in its 2012 management plan a project on accounting for uncertainties in measurements in methodologies. The objective of the project is to develop a new standard or amend the Project standard (PS) and the Verification and validation standard (VVS) in order to address the uncertainties in measurements of parameters in baseline and monitoring methodologies in a systematic and consistent manner.

II. Purpose

3. The document would instruct project participants and designated operational entities (DOEs) how to address the uncertainty of measurements. It aims to address the uncertainty of measurements of parameters relevant for the evaluation of emission reductions, while at the same time provides more flexibility to optimize measurement procedures and instrumentation based on cost-benefit considerations.

III. Key issues and proposed solutions

4. The guidance could have a significant impact on small-scale project activities. Therefore, an option to address this issue is to limit the applicability of the standard to CDM projects and POAs using large-scale methodologies.

5. It is proposed that the amended standard applies only to new projects.

IV. Proposed work and timelines

6. Draft amendment to be presented at EB69 for approval.

7. The proposed text should be valid from the moment the Board accepts it.

V. Recommendations to the Board

8. The secretariat recommends that the Board accept the proposed text to be included in the PS and VVS standards on their next revision to incorporate the uncertainty of measurements in baseline and monitoring methodologies

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STANDARD
UNCERTAINTY OF MEASUREMENTS IN LARGE-SCALE BASELINE AND MONITORING METHODOLOGIES

(Version 01.0)

I. Background

1. The Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP), in its decision 9/CMP.7, paragraph 7(a), requested the Executive Board of the clean development mechanism (the Board), as part of its decision on implementing the concept of materiality, to "address the issue of uncertainties of measurements in baseline and monitoring methodologies, so that these types of uncertainties do not need to be considered in addressing materiality".

2. In response to this request, the Board included in its 2012 management plan a project on accounting for uncertainties in measurements in methodologies.

3. The objective of the "Uncertainty of measurements in large-scale and baseline and monitoring methodologies standard" is to address the uncertainties in measurements of parameters in baseline and monitoring methodologies in a systematic and consistent manner.

4. This Standard will be incorporated into CDM Project standard and CDM Validation and verification standard standards on their next revision.

II. Scope and applicability

5. This standard is applicable to project participants and coordinating/managing entities (CMEs) in the design and implementation of large-scale CDM project activities and Programme of activities (PoAs).

6. This standard is also applicable to DOEs in order to validate and / or verify the uncertainty in measurements.

For project participants and CMEs, this Standard is to be applied in conjunction with the CDM Project Standard. For DOEs, this Standard is to be applied in conjunction with the CDM Validation and verification standard.

III. Qualitative specifications

7. In order to minimize measurement uncertainties of parameters measured as part of the clean development mechanism (CDM) project activity participants shall:

(a) Establish and follow measurement procedures minimizing measurement uncertainty in accordance with recognized industrial standards[1] and local requirements;

[1] Commonly accepted considerations for minimizing measurement uncertainty can be found, for example, in "Guide to the expression of uncertainty in measurement", JCGM, 2008.

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(b) Establish and implement quality assurance/quality control (QA/QC) procedures to reduce measurement uncertainties of monitored parameters. This should include, inter alia:

(i) Identifying key monitored parameters and proposing clear QA/QC procedures required for each of them;

(ii) Using back-up instrumentation with the required accuracy, if possible;

(iii) Calibrating instruments using traceable measurement standards and following manufacturer specifications;

(iv) In the case of sampling or intermediate measurements, pre-defining the measurement schedule in a manner that avoids possible sources of bias, such as daily, seasonal or process variations;

(c) Specify requirements regarding the documentation of measurement results;

(d) For non-integrating measurement instrumentation[2] of continuously measured parameters, define the measurement frequency so that it will capture the expected meaningful parameter variations.

8. In case measurement quality is compromised, project participants shall:

(a) Follow the monitoring plan in the CDM project design document (PDD) and/or the procedure in the methodology for such an event, if such exist;

(b) In situations where a measurement instrument is used that is not properly calibrated, follow the latest version of the "Guidelines for assessing compliance with the calibration frequency requirements";

(c) If measurement is erroneous for any other reason, project participants shall either set the measured parameter to the most conservative value, if one is physically possible,[3] or submit a request for deviation.

VI. Quantitative

9. The overall measurement uncertainty of the measurement instruments relevant for the evaluation of the aggregated emission reductions shall be quantified as the root-mean-square of the calculation of the emission reductions. Only instrumentation uncertainty shall be considered when quantifying the measurement uncertainty.

10. The instrumentation uncertainly shall be taken from manufacturer specifications. If these are unavailable, the instrumentation uncertainty can be obtained as the standard deviation of an evaluation campaign.

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[2] Integrating instrumentation, such as a standard electricity meter, is considered continuous regardless of how often the data is registered.

[3] Examples:

- 0 MWh for an electricity meter related to baseline emissions;
- 100% methane for methane concentration measurement related to project emissions;
- No such value is available, for example, for an electricity meter related to project emissions.

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11. All uncertainty quantification shall be done in fractions (relative uncertainty). If the uncertainty of an instrument is available in absolute values, it shall be converted to a fraction by dividing by the measurement range of the instrument under the specific measurement settings and/or conditions.[4]

12. If the overall measurement uncertainty exceeds 5%,[5] the aggregated emission reductions shall be adjusted by the calculated overall uncertainty.

13. If various measurement instruments were used consequently for a single parameter, the project proponents shall either repeat the measurement uncertainty quantification and accounting procedure for each period or choose a conservative and plausible equipment combination for the whole verification period.

14. Existing provisions in approved methodologies regarding uncertainties of measurements supersede paragraphs 1-7 above.

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[4] For example, a pressure gauge measuring between 5 and 15 bar with accuracy of 0.5 bar has a relative uncertainty of 0.05 = 0.5 bar / (15 bar – 5 bar).

[5] "GHG Protocol Guidance on uncertainty assessment in GHG Inventories and Calculating Statistical Parameter Uncertainty". www.ghgprotocol.org

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Appendix 1

Example calculations of measurement uncertainty quantification and accounting

1. Definitions:

   (a) u uncertainty (fraction)

   (b) A B C … parameters

   (c) U overall uncertainty

2.

$ER = A * B * C$ $\quad U = \sqrt{u(A)^2 + u(B)^2 + u(C)^2}$

$ER = A * B / C$ $\quad U = \sqrt{u(A)^2 + u(B)^2 - u(C)^2}$

$ER = A * B^2$ $\quad U = \sqrt{u(A)^2 + 2u(B)^2}$

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Appendix 2

Expected impact of proposed guidelines/VVS revision

1. Implementing the suggestions above is expected to have the following effects on approved methodologies:

(a) Most methodologies will require no modification, as they provide explicit guidelines regarding uncertainty;

(b) Several methodologies, predominantly waste treatment and industrial gas methodologies, will have to be revised to clarify how the current provisions regarding uncertainties would be combined with the suggested instrumentation uncertainty quantification guidelines.

2. Implementing the suggestions above is expected to have the following effects on new projects:

(a) During verification, the measurement procedure quality will be assessed according to the suggested guidelines. As designated operational entities (DOEs) are already checking the measurement procedures' quality, this is not expected to require additional effort from projects participants;

(b) Furthermore, during verifications the instrumentation uncertainty will be quantified, and the project emissions discounted, if necessary, according to the proposed guidelines. This will demand only minimal additional effort during verifications, and the information required for the proposed procedure is already gathered during verifications, and the calculation itself is simple.

History of the document

Version	Date	Nature of revision
01.0	27 August 2012	Initial publication as an annex to the annotated agenda of EB69.
Decision Class: Regulatory **Document Type**: Standard **Business Function**: Methodology		