

**CDM-EB66-A49-GUID**

## Guideline

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# Quality assurance and quality control of data used in the establishment of standardized baselines

Version 02.0



**United Nations**  
Framework Convention on  
Climate Change

<b>TABLE OF CONTENTS</b>	<b>Page</b>
<b>1. INTRODUCTION .....</b>	<b>3</b>
1.1. Background .....	3
1.2. Objectives.....	3
<b>2. SCOPE, APPLICABILITY, AND ENTRY INTO FORCE .....</b>	<b>4</b>
2.1. Scope .....	4
2.2. Applicability .....	4
2.3. Entry into force .....	5
<b>3. NORMATIVE REFERENCES .....</b>	<b>5</b>
<b>4. DEFINITIONS .....</b>	<b>5</b>
<b>5. DATA QUALITY OBJECTIVES.....</b>	<b>6</b>
<b>6. QUALITY CONTROL .....</b>	<b>8</b>
<b>7. QUALITY ASSURANCE .....</b>	<b>11</b>
<b>8. DOCUMENTATION PROVISIONS.....</b>	<b>13</b>
<b>APPENDIX 1. DATA DELIVERY PROTOCOL (SAMPLER).....</b>	<b>14</b>
<b>APPENDIX 2. DATA TEMPLATE FORMAT (SAMPLER).....</b>	<b>16</b>
<b>APPENDIX 3. QUALITY CONTROL (QC) REPORT (SAMPLER).....</b>	<b>17</b>
<b>APPENDIX 4. CHECKLISTS FOR DNAS .....</b>	<b>18</b>

## 1. Introduction

### 1.1. Background

1. The Executive Board of the clean development mechanism (CDM) (hereinafter referred to as the Board), at its sixty-second meeting, approved the “Guidelines for the Establishment of Sector Specific Standardized Baselines” (hereinafter referred to as the SB Guidelines) to meet the request from the sixth session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP).
2. The Board at its sixty-third meeting adopted the “Procedure for submission and consideration of standardized baselines”. The Board at its sixty-fifth meeting agreed to the work programme on the standardized baselines. For the effective implementation of the SB Guidelines, the Board at its sixty-sixth meeting adopted the “Guidelines for quality assurance and quality control of data used in the establishment of standardized baselines”. At its seventy meeting, the Board adopted the “Guideline for establishment of standardized baselines for afforestation and reforestation project activities under the CDM”.
3. The Board at its seventy-first meeting adopted the “CDM two-year business plan and management plan 2013–2014”, which included further revision of the regulatory framework based on the lessons learned from road-testing and based on inputs from stakeholders and relevant research. At its seventy-fifth and seventy-sixth meetings, the Board requested the secretariat to revise the “Guidelines for quality assurance and quality control of data used in the establishment of standardized baselines”, taking into account the inputs provided by the Board.
4. At its seventy-seventh meeting, the Board adopted the “Standard for determining coverage of data and validity of standardized baselines”, and agreed to the work programme on the further development and implementation of standardized baselines.

### 1.2. Objectives

5. The development of standardized baselines is a data-intensive process. The data required for quantifying baseline greenhouse gas (GHG) emissions in a particular sector include data on activities in a country or a group of countries such as energy usage, industrial production statistics, production technologies, demographic data, process-related characteristics and mitigation-related practices. Some data might already be available to designated national authorities (DNAs) but in many cases it could be challenging for DNAs to collect data and ensure the data quality. The purpose of this document is to specify data quality objectives and to provide guidance and best practices/examples on practical aspects of data collection, processing, compilation and reporting.
6. This document defines best practices to meet the data quality objectives given the current state of scientific knowledge and data availability, which could help DNAs improve their institutional capacities for data management.
7. The best practice to ensure data quality as outlined in this document is twofold:

- (a) Proactively<sup>1</sup> preventing potential risks that could cause quality deterioration, with a well-designed data management system, well-trained personnel and the culture of data quality; and
- (b) Identifying and formulating data problems and implementing corrective actions, through regular reviews and continuous improvement processes.

## 2. Scope, applicability, and entry into force

### 2.1. Scope

- 8. The “Guidelines for the Quality Assurance and Quality Control of Data used in the Establishment of Standardized Baselines” (hereafter referred to as the QA/QC Guidelines) include the quality control (QC) procedures for ensuring the quality of datasets and the quality assurance (QA) procedures for assessing that the QC system is designed and implemented to meet the data quality objectives. The QA/QC Guidelines also elaborate provisions for the documentation to be submitted in accordance with the “Procedure for development, revision, clarification and update of standardized baselines”.
- 9. The QA/QC procedures/activities and the best practices presented in this document are not exhaustive and it may not always be feasible for DNAs to operationalize them fully. DNAs could adapt the procedures to their own circumstances and apply other good practices as long as it can be demonstrated that the data quality objectives are met.

### 2.2. Applicability

- 10. The QA/QC Guidelines are applicable to those entities involved in the collection, processing, compilation and reporting of data needed for the establishment of standardized baselines.<sup>2</sup> Such entities include:
  - (a) DNAs<sup>3</sup> that develop, validate, and/or own the datasets used for the establishment of standardized baselines;
  - (b) Designated operational entities (DOEs) , and where applicable UNFCCC secretariat<sup>4</sup>, conducting review to assess the quality of the QC system used to establish the standardized baseline;
  - (c) Project participants or other entities<sup>5</sup> that develop standardized baselines.

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<sup>1</sup> It is the best practice to check the quality of data as early as possible. DNAs should avoid low-quality data being compiled in the datasets through pre- and post-submission quality checking.

<sup>2</sup> Standardized baselines can be developed using baseline and monitoring methodologies, methodological tools and/or approved guidelines and standards adopted by the CDM Executive Board.

<sup>3</sup> DNAs should ensure that the QA/QC Guidelines are applied by all involved entities when the collection and management of data is outsourced.

<sup>4</sup> According to the “Procedure for development, revision, clarification and update of standardized baselines”, DOEs will prepare an assessment report. In the case where an eligible Party (with 10 or fewer registered CDM project activities as of 31 December 2010) does not provide an assessment report in the submission, the secretariat should prepare the assessment report in accordance with the procedure.

## 2.3. Entry into force

11. This document shall enter into force on 01 June 2014.

## 3. Normative references

12. The guidelines are related to, and hence should be implemented in conjunction with the latest version of:
  - (a) The “Guidelines for development of standardized baselines”;
  - (b) The “Guideline for the establishment of standardized baselines for afforestation and reforestation project activities under the CDM”;
  - (c) The “Procedure for development, revision, clarification and update of standardized baselines”;
  - (d) The “Standard for determining coverage of data and validity of standardized baselines”.

## 4. Definitions

13. The definitions contained in the Glossary of CDM terms apply.
14. For the purpose of this document, the following key concepts apply:
  - (a) Data quality: data quality is a multi-dimensional concept and is commonly described as the degree to which data are “fit for use”.<sup>6</sup> Data quality is ensured when it can be demonstrated that the datasets are relevant, complete, consistent, credible, current, accurate and objective. In addition, processing data to derive standardized baselines should be conservative, secure, transparent and traceable;
  - (b) Quality control (QC): QC is a system of routine technical activities to be conducted by a DNA to assess and maintain the quality of the datasets. It begins with pre-submission QC activities, followed by post-submission QC activities, internal review and a summary of the QC implementation (QC report);
  - (c) Quality assurance (QA): QA is a system developed by a DNA to ensure that the QC system is designed to meet the data quality objectives below and that it is implemented effectively. The conformity and the effectiveness of the QC system are reviewed and the review activities/results are reported (assessment report) by DOEs.

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<sup>5</sup> The CMP at its sixth session decided that Parties, project participants, as well as international industry organizations or admitted observer organizations through the host country’s DNA may submit proposals for standardized baselines. According to the “Procedure for development, revision, clarification and update of standardized baselines”, the Board may also decide to develop standardized baselines in agreement with the DNA(s) of a Party(ies) through top-down approach.

<sup>6</sup> Knight, S. & Burn, J. (2005) Developing a framework for assessing information quality on the world wide web. *Information Science Journal* vol. 8. pp.159–172.

## 5. Data quality objectives

15. The following data quality objectives are intended to guide the implementation of the QA/QC procedures:
- (a) **Relevance:** collect data and information required for the establishment of standardized baselines, which includes mainly activity data and information applicable for the determination of the baseline emissions in a sector;
  - (b) **Completeness:** include all relevant activity data and information to produce representative standardized baselines covering the relevant target population (installations/facilities/companies) that contribute to the production of the output of the sector in a region, country or group of countries, based on the scope of the standardized baselines, the time period considered, and the level of aggregation chosen. Efforts should be undertaken to avoid, identify and handle missing data;
  - (c) **Consistency:** present the same data with the same definition/scope in the same format and make the datasets compatible with each other. Ensure consistency in time series of data;
  - (d) **Credibility:** identify and utilize authoritative data and information sources.

### **Best practices to identify and select credible data and information sources**

DNAs may identify which data and information sources are available and which data and information need to be collected for the purpose of establishing a standardized baseline. DNAs may determine which data and information sources are more credible through consultation with experts or representatives of the particular sector as well as relevant authorities and institutions collecting data. DNAs may conduct a comparison of available data for a best fit for standardized baselines. The primary data that are collected from data providers to establish standardized baselines can be the best option because DNAs have the ownership for maintaining the data management system, which can provide flexibility in its operation and facilitate in meeting the data quality objectives in an efficient and effective way. When secondary data sources are used, DNAs will need to predetermine procedures to: (i) ensure the consistency of data derived from multiple data sources (e.g. definitions and formats); (ii) evaluate the credibility of each data source (e.g. checking how QA/QC activities have been conducted by data providers); and (iii) maintain the data system (e.g. addressing how to update the database or how to incorporate changes in secondary data sources).

The following secondary data sources can, inter alia, be used:

- Data already collected/maintained by DNAs for purposes other than SBs;
- Data collected by other government authorities;
- Data collected by peer-reviewed international statistics documents;
- Data collected by research institutes, private-sector organizations (e.g. market research), academic research, or international institutions;
- Data available with relevant manufacturers or suppliers.

- (e) **Currentness:** utilize recent data available in order to reflect the current economic and technological practices. The currentness of data should be as per the provisions of the “Standard for data coverage and validity of standardized baselines”;
- (f) **Accuracy:** avoid/reduce errors and identify/address uncertainties as far as it is practical and cost-effective. When a sampling approach is employed to derive the required data, DNAs should apply statistically sound sampling approaches, comply with the sampling requirement for reliability (95/10 confidence/precision

for industrial sectors<sup>7</sup> and 90/10 confidence/precision for other sectors) and select sample sizes in accordance with the latest approved “Standard for sampling and surveys for CDM project activities and programme of activities”;

- (g) Objectivity: avoid biased, prejudiced and partial data or information. There should be little room for assumptions or differing interpretations in managing the data<sup>8</sup>;
- (h) Conservativeness: while processing and using data, ensure that any deviation that may lead to an overestimation of the baseline emissions should be addressed by taking a conservative approach. Where other data quality objectives specified above could not be met, a conservative approach should be applied;

**Best practices to apply conservative approaches**

DNA should make effort to meet all data quality objectives. In absence of achieving all the objectives various approaches may be used by DNAs to ensure conservativeness as long as they are justified. DNAs may consider the following practices to ensure conservativeness in case where the data quality objectives are not met:

- 1) Default values pre-established by government agencies or international organizations (such as IPCC), selected in a conservative manner;
- 2) Average values of the top 20% best performing facilities;
- 3) Average values of facilities installed in the last five years, where this leads to a conservative estimate;
- 4) Applicable design values provided by manufacturers, where this leads to a conservative estimate;
- 5) Best performers' data;
- 6) Discounting factors (e.g. FCCC/SBSTA/2003/10/Add.2, p. 25
- 7) Instead of applying conservative values, DNAs may provide evidence-based justifications confirming that any deviations from the data quality objectives do not lead to an overestimation of the baseline emissions.

- (i) Security: develop procedures for restricted access to the datasets and maintain the security of the datasets. The procedures should include how to identify, process, present and manage confidential data. The data should be open to the public in an anonymous aggregate form;
- (j) Transparency: disclose sufficient and appropriate data and processes to allow monitoring of the quality of the compiled datasets and the generated outcomes. DNAs should conduct a public consultation on the matters related to proposed standardized baselines and prepare a report that includes: (i) the objectives of public consultation; (ii) processes followed for public consultation; (iii) participants who attended the public consultation; (iv) a summary of the comments provided by stakeholders/experts; and (v) how comments were taken into account;

<sup>7</sup> Based on the category of sectoral scopes in the CDM, industrial sectors include energy industries, manufacturing industries, chemical industries, mining/mineral production and metal production.

<sup>8</sup> Assumptions or different interpretations could be applied when a conservative approach is taken and transparently reported.

**Best practices to ensure transparency**

Despite the DNA's efforts to meet the data quality objectives, the uncertainty of data quality may remain significant. Through effective public engagement, data quality reviewers as well as DNAs can make decisions with reasonable confidence. By establishing collaborative processes with stakeholders, DNAs can improve the overall quality of data. DNAs may include stakeholders and sector experts from the planning stage for standardized baselines in order to better understand their perspectives and interests and/or encourage their participation in data collection. If applicable, DNAs may promote the involvement of stakeholders/experts during the overall QA/QC processes and regularly take into account their feedback on the data quality. DNAs should call for public consultation in a way that facilitates comments from relevant stakeholders (e.g. CDM/sector/quality experts, industry representatives, general public representatives, potential project participants, representatives of relevant ministries, etc.) and allows a reasonable time for comments on the established standardized baselines and relevant procedures.

- (k) Traceability: document all data sources as well as measurement, calculation and estimation methods, which will enable the reproduction or review of the data used for the development of the standardized baselines by a third party. All documentation provisions for the review addressed in section.
16. To meet the above data quality objectives, DNAs should develop a QA/QC system that outlines QA/QC activities, processes, schedules and responsibilities of the personnel involved as well as the institutional arrangement. DNAs may face a challenge in achieving the data quality objectives due to various circumstances. To address such a challenge DNAs may apply a more feasible and simplified approach to meet these objectives.

## 6. Quality control

17. As part of the QA/QC system, DNAs should develop QC procedures that address how to ensure the data quality from pre-submission QC activities to the finalization of a QC report.
18. Where data are to be collected, DNAs should develop a "data template"<sup>9</sup> along with a "data delivery protocol"<sup>10</sup> for data providers that describes specific rules and procedures

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<sup>9</sup> According to the "Procedure for development, revision, clarification and update of standardized baselines", DNAs (proponents of SBs) shall use a data template published by the secretariat or propose a new data template for its publication. The published data templates will help DNAs meet the data quality objectives (in particular, relevance, completeness, consistency, objectivity, accuracy, currentness and traceability) as well as prevent potential risks that could cause quality deterioration. That is, this provision for data templates may increase transaction costs at an early stage but help identify/address issues at an early stage with support from the secretariat/experts and avoid/reduce additional steps to solve problems at a later stage, which will decrease the overall transaction costs. As presented in appendix 2 (data template sampler), the data template should include the lists of data requested for establishing SBs with clear definitions and consistent formats. The data template can be developed for data collection, processing, compilation and/or verification. In cases where SBs are to be developed by using a methodological approach in the approved CDM methodologies/tools, DNAs may use their own or other available data templates in accordance with the monitoring provisions of the approved methodologies/tools (e.g. grid tool template).



for the collection and delivery of the requested data in order to ensure pre-submission data quality. DNAs may include the following components in the data delivery protocol:

- (a) Purpose of data collection: DNAs could set multiple purposes in addition to the establishment of standardized baselines for a certain sector;
- (b) Type and scope of data: DNAs should specify the lists, units and formats of data requested, based on pre-established data templates. The scope of each data should be clearly specified, including which exact emission sources are covered and at which aggregation the data should be collected (unit / facility level). Clear definitions or descriptions of the data related to accuracy and/or conservativeness should be provided in an objective manner;
- (c) Data acquisition procedures: DNAs should provide clear guidance on data compilation and aggregation, for example how specific unit-level (equipment/facility) data should be consistently aggregated into entity-level (company) data. The procedures should highlight which data sources may be used (e.g. invoices, on-site measurements, sales records, etc.) and how currentness is ensured in accordance with the applicable standard referred above;
- (d) Traceability: All the data acquisition procedures should be documented which essentially include data sources, references and, if possible, the persons responsible for different functions. If feasible, it is recommended that data providers explain how the data was collected and how the quality of the data was ensured. This explanation may be provided in a summary report which may include identified issues related to data quality. If a conservative approach has been used to address the data quality objectives that could not be achieved, this should be described in the summary report;
- (e) Delivery schedule: DNAs may specify a scheduled time frame;
- (f) Confidentiality issues: DNAs should describe how they will address issues related to confidentiality, if relevant;
- (g) Contact: DNAs should be responsive to queries from data providers and provide assistance whenever requested, so the protocol should contain contact information and define the deadline for responses to queries. DNAs should establish lines of effective communication and feedback with data providers to identify specific opportunities to improve the data quality.

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<sup>10</sup> The data delivery protocol is the guidance for data providers, explaining what data are to be collected, why and how, and when data are to be delivered to DNAs. As presented in appendix 1 (data delivery protocol sampler), it can be in a comprehensive format. In cases where data templates are to be filled directly by data providers, the data delivery protocol can be a simple instruction on how to fill the data template.

**Best practices to facilitate data delivery from data providers (primary data source)**

It is difficult to collect data when data providers do not have incentives or legislative obligations for data delivery. The DNAs may establish a partnership with data providers directly or indirectly through relevant associations.

The selection of target sectors for the establishment of standardized baselines requires taking into account the interests of stakeholders and the mitigation potential of the sector, which can be efficiently identified through such partnerships.

If applicable, data templates may be developed in cooperation with stakeholders and sector experts, which will help in establishing a more practical data delivery protocol. Before initiating data collection from data providers, DNAs should identify whether some of the required data are already collected for different purposes by other organizations. The coordinated data collection based on institutional arrangements can achieve multiple purposes in an efficient manner including promoting the consistency of the data.

19. DNAs should conduct a post-submission quality check by assessing the data and documents submitted by data providers. DNAs should also review the summary reports of data providers and assess whether the data were generated in accordance with the data delivery protocol. To ensure that the data quality objectives are met, DNAs may arrange for a third party to conduct a further check at the facilities/companies. Compliance with all the data quality objectives should be ensured.
20. When the data quality objectives are not met, DNAs should implement the following corrective actions before approval:
  - (a) Request data corrections. In order to obtain correct data, DNAs could provide assistance to improve data systems and management practices for data providers;
  - (b) Apply a conservative approach as specified in the QA/QC system (see best practices on conservative approaches above);
  - (c) Replace the data with data from other sources that better meet the data quality objectives.
21. The data that meet the quality objectives are the input data for the data template. When compiling the data in the data template, DNAs should identify whether the following risks exist and take appropriate actions to prevent or solve them through internal review:
  - (a) Double counting or duplication of records: the data approved per each data provider should be included only once in the data template (e.g. by using one spreadsheet per company);
  - (b) No response and incomplete data: for any non-responses or incomplete data, a conservative approach should be applied to replace the missing data or a justification should be provided confirming that the missing data do not cause an overestimation of the baseline emissions;
  - (c) Incorrect data entry: typographical errors, erroneous entries (in the wrong column or wrong category) and duplication of entries (within one spreadsheet) should be avoided by regular or automatic data entry checks;
  - (d) Data processing: if further consolidation, calculation or conversion of data is required, DNAs should establish an additional step to double-check the outcomes

(e.g. recalculation or reconciliation). The formulae and steps used should be clearly described;

- (e) Inconsistency: DNAs should ensure that the datasets in the data template are consistently compiled. Consistent categories, methods, processes and approaches should be applied.

**Best practices to reduce risks related to data compiling**

An automatic system may be implemented where applicable and cost-effective. When designing data templates, based on predefined algorithms and procedures, an automatic function may be built in as much as possible to avoid typographical errors, omissions or duplications and to enhance consistency and efficiency. The potential for human error leads to a high level of risk, and thus well designed automatic systems reducing manual processing and utilizing predetermined default values may help minimize risks in an effective manner.

22. DNAs may cross-check the outcomes (e.g. baseline emission factors or positive lists) of the established standardized baselines against similar international data or against other relevant data or historical data, if available.
23. The level of uncertainties depends on the data availability and knowledge of underlying process and inference methods. A traceable and transparent data system is vital to understand uncertainties. Therefore DNAs should ensure the traceability of the QA/QC system including data sources' conditions (e.g. monitoring equipment or archives). DNAs may identify key causes of uncertainties, quantify such uncertainties<sup>11</sup> and take corrective actions to address them.
24. DNAs should document in a QC report how the QC procedures were implemented and how the data quality objectives were met. The QC report may specify how all evidence/references to data sources were checked. It may include justifications on the selected approach for obtaining reliable input data (e.g. measurement, calculation, national statistics, sampling, surveys and/or measurement campaign). Information on the uncertainties associated with activity data and major issues regarding the quality of input data, methods, processing or estimates may be addressed in this report. If updating, the report may highlight changes in data inputs or methods, substantial divergences in the datasets and a trend analysis if necessary. The QC report should summarize key findings and present a plan for how to address any identified major issues in the future (e.g. training for data maintenance personnel or automatic data management systems).

## 7. Quality assurance

25. QA procedures should be based on an approach for assessing the quality of the data management system rather than checking the accuracy of a specific set of data, focusing on the system and procedures rather than on the outcomes.
26. As part of the QA/QC system, DNAs should develop QA procedures for the systematic identification, formulation and analysis of risks of not meeting the data quality objectives and for defining and implementing activities that mitigate the identified risks. The QA procedures should include update plans to continuously improve the data quality and the

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<sup>11</sup> Refer to the 2006 IPCC report for further guidance on uncertainty <[http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/1\\_Volume1/V1\\_3\\_Ch3\\_Uncertainties.pdf](http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/1_Volume1/V1_3_Ch3_Uncertainties.pdf)>.

- efficiency of the overall data system, if feasible. DNAs could develop procedures to secure official organizational approval and support for the data system, if necessary.
27. As part of the QA system, the DOE contracted by the DNA should check whether the QA/QC system is put in place and assess the QA/QC system against the data quality objectives established in this document. It also includes assessing whether the QA/QC system has been implemented as designed.
  28. During the review of the QA/QC system by the DOE or the UNFCCC secretariat, it is recommended to include experts in relevant technical fields to check whether the QA/QC system, procedures and approaches as well as the final standardized baselines are reasonable.
  29. The elements of the QA/QC system that are to be assessed by the DOE include:
    - (a) System availability – identify whether a “standardized” data system (collection, consolidation and maintenance) is currently in place and a procedure for reporting activities conducted as part of the QC system has been developed and implemented;
    - (b) Conformity – assess whether the QA/QC system, the procedures and all the approaches to develop the datasets met the data quality objectives. In particular, DOEs should assess whether a conservative approach has been applied in a consistent manner; whether the data delivery protocol was consistent with the data template if applicable; and whether the transparency was ensured, based on the public consultation report and the QC report. DOEs should check whether the QA/QC procedures were: (i) developed in accordance with the QA/QC Guidelines; and (ii) effectively implemented (e.g. met the data quality objectives);
    - (c) Traceability – check whether all data and information relating to the datasets and procedures for standardized baselines were clearly documented;
    - (d) Security – check whether a security system for data management is in place and has operated effectively. Identify whether any issues related to security occurred;
    - (e) Error tolerance – check whether DNAs planned to minimize errors and established and implemented procedures to identify and correct errors proactively.
  30. The results of the QA activities should be documented and included in an assessment report<sup>12</sup> by the DOE. The DOE should prepare a summary of findings including the key issues identified and provide the overall evaluation. If necessary, DOEs may provide recommendations to improve the quality of data or the overall data system. The assessment report should be made available to DNAs. DNAs may provide responses to the findings in the assessment report and/or implement appropriate corrective actions that address the findings. The responses as well as the corrective actions implemented should be well documented in the final assessment report.

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<sup>12</sup> An assessment report is not required for certain conditions: i) where no intensive data collection/processing is required to establish standardized baselines (e.g. a standardized baseline for landfill methane destruction may require regulation data only on the mandatory destruction level); or ii) where standardized baselines are developed through a top-down approach in accordance with the “Procedure for development, revision, clarification and update of standardized baselines”.

## 8. Documentation provisions

31. DNAs should document and maintain all data and information relating to the establishment of standardized baselines and submit<sup>13</sup> the datasets compiled in the data templates and the following documents in accordance with the “Procedure for development, revision, clarification and update of standardized baselines”:
- (a) Data delivery protocol – as specified in paragraph 18, if applicable;
  - (b) Summary reports – if submitted by the data providers as specified in paragraph 18 (d);
  - (c) Any supplementary documents, if necessary;
  - (d) Public consultation report – as specified in paragraph 15 (j);
  - (e) QC report – as specified in paragraph 24;
  - (f) Assessment report – as specified in paragraph 30.
32. DNAs should retain all the data/information for a period of five years after the submission of the standardized baselines. DNAs may ensure data confidentiality and have a secure data maintenance system including code set for access control, strategies for unexpected damage or loss of data and procedures to protect confidential data.

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<sup>13</sup> DNAs may submit the required documents in a combined format as long as traceability can be met. For example, the data delivery protocol, summary reports, supplementary documents or public consultation report can be included or combined in a QC report.

## Appendix 1. Data delivery protocol (sampler)

Note: this sampler is designed for industrial sectors (e.g. cement sector) when data are to be collected. Samplers in the appendix can be used for reference.

1. This protocol is to promote an effective data delivery from the cement industry (data providers) to a DNA by providing general information and specific requirements for data collection and delivery. All principal data providers should ensure the delivery of the required data and documents in accordance with the guidance provided in this protocol.

### 1. General information

2. Purpose of data collection: To establish standardized baselines for CDM projects in a cement sector. [If other purposes are incorporated in this data collection, they should be mentioned]. All companies of the cement sector located in country “A” are required to provide relevant data and supporting documents. [If there are any incentives/benefits or legislative obligations involved, they should be addressed].
3. Confidentiality: All data and documents collected will be treated as confidential and the data will be open to the public only in an anonymous aggregate form unless consent to disclose certain information is given. Our security system and procedures are developed for a secure data management and will ensure restricted access to the data. [The data will not be used for other purposes without prior permission from data providers].
4. Help Desk: Please contact the help desk when further clarification or help is needed. Any queries and requests will be responded to within [x] days. [Help desk or contact person information should be stated].

### 2. Requirements for data collection and delivery

5. Data types: The following data are to be provided. The accompanying questionnaires [in the data template] will provide more detailed information.
6. Data acquisition/aggregation: Data should represent the total production of *cement* in relevant facility operated by your company which are relevant to standardized baseline. Actual measured data should be collected for the last three calendar years before the submission of standardized baselines. All data should be collected from credible data sources and great care should be taken to avoid typographical errors, duplication of entries and wrong calculations/conversions.
7. Traceability: The data acquisition procedures should all be documented including data sources, references and contact persons.
8. A summary report should be produced explaining how the data was collected and how the quality of the data was ensured. This summary report should include all identified issues related to data quality.
9. Delivery requirements: Ensure that all mandatory parts of the questionnaires [in the data template] are completed. Incomplete questionnaires in any of the main parts are likely to be unusable and your efforts may not yield results. The complete dataset, the summary

report and a declaration of conformity with the signature of your authorized representative should be delivered by email by [dd/mm/yyyy] [within a scheduled time frame].

*Date to provide this Protocol*

*Signature of DNA*

## Appendix 2. Data template format (sampler)

Note: this sampler is designed for industrial sectors (e.g. cement sector) by providing the format and key contents of a data template.

1. **Definition of sector (output):** This data template is to be used by DNAs in establishing sector-specific standardized baselines for the *cement* sector. The template is applicable only to the sector defined in each data template.
2. **Scope of standardized baselines:** The template is developed based on *integrated* measures. In order to take into account sector-specific situations, data that are directly or indirectly related to emissions/mitigation will be collected from all the *cement* sector located in country “A”.
3. **Structure of data template:**
  - (a) Introduction: Key information for the data template is clearly described including detailed formulas, approaches and assumptions used to establish standardized baselines. Definitions of key terminologies and instructions on how to fill the data template may be included (e.g. data coverage and validity);
  - (b) Input data: Lists of relevant data categories with consistent format and clear description are provided;
  - (c) Reference: Lists of predetermined defaults and key information/data are already (or to be) used instead of input data or for calculation/processing of input data are provided.
4. Examples of data categories: The required data may be listed per data source (primary vs. secondary).
  - (a) Primary data collection: general information (name, capacity, installation/updated date or location of facility) and performance data (technologies, fuel, feedstock and/or production);
  - (b) Secondary data collection: design performance data of technology (from manufacturers/suppliers or research institutions); market trends (from sectoral experts or statistics documents); or policies/regulations (from public documents or government authorities).



### Appendix 3. Quality control (QC) report (sampler)

Sector	
Name of DNA	
Primary Person Responsible for QC Procedures	
Contact of the Primary Person Responsible	
Implementation Dates of QC Procedures	
Please describe how your QC procedures were implemented	
<i>Pre-submission QC: data delivery protocol (as attached above)</i>	
<i>Post-submission QC: ...</i>	
<i>Corrective actions:...</i>	
Please specify how the credibility of the data sources was checked.	
Please specify how the accuracy of the data was checked.	
Please specify how the consistency was achieved in particular where multiple secondary data sources were used.	
Please specify how the “Standard for data coverage and validity of standardized baselines” was complied with.	
Please specify how the completeness was achieved.	
Please specify how the transparency was achieved.	
Please specify major issues and uncertainties identified during the QC procedures.	
Please specify major corrective actions taken during the QC procedures.	
Please justify the conservativeness of the approaches taken during the QC procedures.	
Please summarize key findings and present a plan to improve the data quality in the future.	

Date to finalize this report

Signature of DNA

## Appendix 4. Checklists for DNAs

### 1. Checklist for planning

QA/QC system is available (procedures, plan and responsibilities of personnel are specified)	<input type="checkbox"/>
Data management system is operated and maintained in a secure and effective manner	<input type="checkbox"/>
Definition and scope of the "sector" are clearly determined	<input type="checkbox"/>
Partnership with the sector is established	<input type="checkbox"/>
Potential data sources are identified	<input type="checkbox"/>
Institutional arrangement with other organizations is established for data collection/management or for developing standardized baselines	<input type="checkbox"/>
Sources of financial, technical or capacity-building support (e.g. through UNFCCC or international organizations) are identified and utilized	<input type="checkbox"/>
Data quality objectives in the QA/QC guidelines and requirements in all other regulatory documents for standardized baselines are understood	<input type="checkbox"/>
Data template is available (if not, develop a new one)	<input type="checkbox"/>

### 2. Checklist for pre-submission QC activities

Data delivery protocol is developed in consistency with the data template	<input type="checkbox"/>
Key sources of uncertainties related to data sources and data collection are identified and solutions/procedures to address them are established	<input type="checkbox"/>
Key issues related to secondary data are identified and solutions/procedures to address them are established	<input type="checkbox"/>
Partnerships with the sector are fully utilized (in particular, to communicate with the target population)	<input type="checkbox"/>
Incentives or legislative obligations are highlighted to promote data collection	<input type="checkbox"/>
Most feasible method is selected for data collection, taking into account effectiveness and efficiency	<input type="checkbox"/>

### 3. Checklist for post-submission QC activities

Level of population incompleteness is calculated, based on response rate and data availability	<input type="checkbox"/>
All required data and information are available to review the quality of data collected	<input type="checkbox"/>
By cross-checking, the quality of data collected is evaluated and validated	<input type="checkbox"/>
Solutions/procedures are applied to address the identified issues as predetermined	<input type="checkbox"/>

Through flexible and/or conservative approaches, newly identified issues are addressed in an effective and efficient manner	<input type="checkbox"/>
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**4. Checklist for compiling and outcomes**

Manual processing is minimized	<input type="checkbox"/>
Key sources of uncertainties related to data compiling are identified and solutions/procedures to address them are established	<input type="checkbox"/>
Solutions/procedures are applied to address the identified issues as predetermined	<input type="checkbox"/>
Through flexible and/or conservative approaches, newly identified issues are addressed in an effective and efficient manner	<input type="checkbox"/>
Established standardized baselines are reviewed through transparent consultation processes	<input type="checkbox"/>
If necessary, further modifications (e.g. disaggregation level of output) and additional steps (e.g. additionality demonstration) are applied to establish standardized baselines or positive lists	<input type="checkbox"/>

**5. Checklist for QC report**

All QC activities are documented	<input type="checkbox"/>
Key identified issues are summarized	<input type="checkbox"/>
The conservativeness of the applied solutions/procedures is justified	<input type="checkbox"/>
An improvement plan to reduce uncertainties and address other key issues is developed	<input type="checkbox"/>

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**Document information**

<i>Version</i>	<i>Date</i>	<i>Description</i>
02.0	1 June 2014	EB 79, Annex 7 Revision to improve clarity, provide best practices and include additional samplers to improve user friendliness.
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