# CDM: Form for Submissions on Small Scale Methodologies and Procedures (version 03)

***(To be used for presenting questions/proposals/amendments related to the simplified methodologies for small-scale CDM project activity categories)***

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| *Affiliation[1]:* | ☐DNA ☐DOE ☐PP ☒Stakeholder |
| *Title/Subject (max. 200 characters):* | Clarifications request on baseline emissions, installed capacities, back-up diesel groups inclusion, data availability and remaining lifetime for small hydropower rehabilitation |
| *Purpose of the submission:* | ☒ Query on an approved SSC methodology or small scale procedures[2] (Fill in field 1. below)<br>☐ Request for Revision of an approved SSC methodology (Fill in fields 2. and 3. below)<br>☐ Proposal for a new SSC methodology (Fill in fields 4. and 5. below) |
| *Approved SSC methodologies[2] to which your submission relates to, if applicable.* | AMS-I.F. "Renewable electricity generation for captive use and mini-grid --- Version 1" |
| *Contact Information (e-mail addresses to which the answers are to be delivered and phone contacts for possible dialogue on the submission).* | a.dunod@ecosurafrique.com<br>[Tel.] +33 607 828 011 |

**Information for completing the form**

Describe the questions related to the SSC Methodologies, Modalities and Procedures below. If the questions are related to a project under development or implementation, you may describe the context in which they arose.

## Query on an approved SSC methodology or SSC procedures

1. If you have questions relating to the application of an approved small-scale methodology (AMS) please specify and provide reference to the exact technology/measure below. If you have questions related to procedures for SSC project activities please clarify below:

Context: The project under consideration concerns small hydropower units' rehabilitation in Democratic Republic of the Congo, a Least Developed Country where only five percent of the Congolese population has access to electricity (SNEL statistics) in spite of a huge hydroelectric potential (estimated at 60% of the whole African continent).

The boundaries of the project include:

- three hydropower stations, served by the Lubilanji river in the Kasai province and operated by MIBA, a government mining agency:
  - Tshiala I (1.4 MW installed in 1933; out-of-order)
  - Lubilanji I (4 x 1.75 MW installed in 1953; 1 unit out-of-order; 3 x 1.68 MW currently available)
  - Lubilanji II (6 x 1.68 MW installed in 2002; 3 units out-of-order; 2.4 MW currently available)

[1] Designated National Authority (DNA); Designated Operational Entity (DOE); Project Participant (PP), and Stakeholder.

[2] The list of all approved small-scale methodologies (AMS) can be found at http://cdm.unfccc.int and go to CDM: small scale CDM methodologies.

- as well as the isolated mini-grid they supply, consisting of:
  - Mining facilities (backed-up with emergency diesel gen sets of 3 x 2,000 kVA)
  - Water plant (diesel back-up: 3 x 500 kVA)
  - Brewery (diesel back-up: 630 kVA)
  - Public Lighting and partial electrification of Mbuji-Mayi town (diesel back-up: 2 x 1,000 kVA)
  - Hospitals

Currently all three hydro schemes are dysfunctional and in a state of disrepair. Owing to the level of investment required, MIBA is currently considering rehabilitation of Lubilanji I hydro-electric scheme, which current under-production is compensated by the back-up diesel groups (all but the brewery one intermittently re-inject power on the mini-grid). Given the current technical distress of the hydro units and their owner's financial situation, a recent expertise ordered by a carbon credits buyer established that routine maintenance would only enable the power units to keep operating for a few more years while progressively loosing available capacity until complete breakdown. In the absence of the project activity, deficit electrical supply will in all likeliness be increasingly compensated by diesel groups, as the study also identified by analyzing off-takers and power transmission systems.

The studies further highlighted that the expected demand to be met on the mini-grid (about 17,370 kW) is consistent with the historically installed capacity of the hydropower stations, bringing the guarantee that the retrofit of some of them would not displace renewable electricity from the rest of the hydro units as all available capacities would still be fully needed and consumed by off-takers. It also reported that historical production data for some of the diesel back-up generators will be very difficult – if not impossible – to obtain.

This query, partly based on the response to a former clarification request SSC_402 for a different hydro retrofit project under AMS-I.A, seeks to clarify some applicability conditions of AMS-I.F as follows:

Questions:

**1. Baseline emissions**

From our understanding, the most suitable approach to determine baseline emissions in accordance with AMS-I.F is detailed in §13 (only applicable for a mini-grid system where all generators use exclusively fuel oil and/or diesel fuel) as the annual incremental electricity generated by the rehabilitation project activity times the default emission factor for a modern diesel generating unit of the relevant capacity operating at optimal load as given in Table I.F.1 (0.8 $tCO_2$/MWh). Indeed, the additional renewable electricity generated as a result of the retrofit project activity will only displace fossil fuel consumption in diesel generators.

The other possible approach consisting in the weighted average emissions for the current generation mix (following the procedure provided in AMS-I.D) seems to be less relevant due to the following reasons:
1) the operation of Lubilanji 2 hydropower plant (and Tshiala hydropower plant) will not be affected by the retrofitting of Lubilanji 1; and
2) the unavailability of some of the historical power generation data hampers the calculation.

➔ In so far as we can demonstrate that only fossil fuel consumption in diesel generators will be displaced, please kindly confirm that §13 can be applied to estimate baseline emissions (even if Lubilanji 2 hydropower plant will continue to supply the mini-grid without being affected by the proposed project activity) ?

**2. Determination of the mini-grid total installed capacities sum**

In §4. a) of the General Guidelines to SSC CDM methodologies (EB 55 Annex 35), it is defined as output capacity, or maximum output, the installed/rated capacity, as indicated by the manufacturer of the equipment or plant, disregarding the actual load factor of the plant.
Otherwise, following the request SSC402 (29/04/2010), the SSC WG agreed to clarify that the 15 MW limit of the total capacity of the generating units connected to the mini-grid is the sum of capacities of all units connected to the mini-grid before the implementation of the project.

**a) Determination of the capacity of the hydropower units**

In the current case, the technical study has reported that some of the hydro power plant units are out-of-order or their capacity are reduced (due to oil leakage and filters obstruction for example). Thus the experts note a total available generation capacity of 7.44 MW (for Lubilanji 1, Lubilanji 2 and Tshiala) regardless of the actual load factor of the station, further lowered by seasonality, etc. compared to the nominal capacity in operation of 10.29 MW and to the initially installed capacity of 18.48 MW

➔ Please kindly clarify if the available generation capacity of 7.44 MW rated by the expert study can be retained as maximum output since it is, to date, the most representative "maximum capacity" data. If not, which other value should be taken into account?

**b) Inclusion or exclusion of back-up diesel groups in the mini-grid total installed capacities sum**

In the current case, the sum of installed capacities of connected back-up diesel generators amounts to 7.6 MW (i.e. 9,500 kVA), hence a total installed capacity of the generating units connected to the mini-grid of 15.04 MW if considering all the installed capacities of diesel back-up generators and the hydro units' available capacity.

The project activity would therefore exceed the small-scale limit and face a methodological gap, as large-scale ACM0002 *Consolidated methodology for grid-connected electricity generation from renewable sources Version 12* is not applicable neither since it requires the application of the *Tool to calculate the emission factor for an electricity system* which does not accommodate for mini-grids without dispatching and consumption data.

➔ Please kindly clarify if back-up power generators can be left apart from this sum due to their intermittent and emergency only operation?

**3. Availability of historic data**

To establish the annual average historical net electricity generation by the existing hydro power plant, AMS-I.F §17 refers to AMS-I.D §15 which involves the "*Average of historical net electrical energy levels delivered by the existing facility, spanning all data from the most recent available year (or month, week or other time period) to the time at which the facility was constructed, retrofit, or modified in a manner that significantly affected output (i.e., by 5% or more) (MWh)*". It further requires a minimum of 5 years (excluding abnormal years) of historical generation data in the case of hydro facilities.

*In the Guidelines for objective demonstration and assessment of barriers Version 01 from EB50 Annex13 §7*, CDM EB members admit the particular situation of LDC with regards to data availability.

In the case of the Kasai province of Democratic Republic of the Congo, given the quasi-normality of *"usual circumstances" such as natural disasters, conflicts and transmission constraints* 12 continuous months of power generation have rarely been achieved over the past decade, making it quite impossible to gather 5 entire years of normal production.

➔ Is it acceptable to conservatively exclude abnormal months from the consolidation of the historic production and to cumulate 60 normal months regardless of entire years being accounted, provided the average is computed only based on the selected periods?

**4. Remaining lifetime**

The expert report states that Lubilanji I hydropower units have already outreached their estimated technical lifetime of 250,000 to 300,000 hours (35 to 42 years)[α] as they have been operating since 1953 without undergoing major rehabilitation.

[α] The «*Tool to determine the remaining lifetime of equipment*" proposed a default value of 150,000 hours for the technical lifetime of hydro turbines.

General Guidelines to SSC CDM methodologies (EB 55 Annex 35) state: *"§22. Lifetime of existing equipments: In case of replacement of existing equipment, project participants shall estimate the point in time where the existing equipment would be replaced in the absence of the project activity in accordance with the latest version of Tool to determine the remaining lifetime of equipment".*

AMS-I.D §14 further specifies that "*for project activities that involve retrofits or replacements of an existing facility for renewable energy generation the baseline scenario is the continuing operation of the existing plant. The methodology uses historical electricity generation data to determine the electricity generation of the existing plant in the baseline scenario, assuming that the historical situation observed prior to the implementation of the project activity would continue. In the absence of the CDM project activity, the existing facility would continue to provide electricity to the grid at historical average levels until the time at which the electrical generation facility would be likely to be replaced or retrofitted in the absence of the CDM project activity".*

It can be proved that under the current situation of routine maintenance only, they would actually keep operating for a few more years while progressively loosing available capacity until complete breakdown, and that in the absence of the project activity, deficit electrical supply will in all likeliness be increasingly compensated by diesel groups as the severe financial and political crisis circumstances would prevent any high upfront replacement investment initiative without the CDM incentive.

➔ Please kindly clarify if it is acceptable to conservatively assume that existing units would continue supplying a constant level of electric power during the crediting period, since the equipments would not be replaced after breakdown in the absence of the carbon credits revenues?

| **Request for revision of an approved SSC methodology** |
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| 2. If you are proposing an amendment/revision to an approved small-scale methodology (AMS), please provide justifications below: |
| NA |
| 3. If you are proposing an amendment/revision to an approved small-scale methodology (AMS) please provide the draft methodology with changes highlighted. |
| The following documents have been attached to this form:<br>❑ Draft methodology with changes highlighted in Word and PDF formats<br>❑ PDD in PDF format (optional)<br>❑ Additional information (please specify if you are providing any information note, published paper or a report in support of the request for revision of the SSC methodology) |
| **Proposal for a new SSC methodology** |
| 4. If you are proposing a new small scale methodology, please provide justifications below: |
| NA |

| 5. For submitting a new small scale methodology a filled in form "CDM: form for proposed new small scale methodologies (F-CDM-SSC-NM)" is required. | |
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| The following documents have been attached to this form:<br>❑ Completely filled in form "CDM: form for proposed new small scale methodologies (F-CDM-SSC-NM)" in Word and PDF formats[3]<br>❑ A draft PDD (with sections A to C completed):<br>○ Relevant annexes to the PDD are provided<br>❑ Additional information (please specify if you are providing any information note, published paper or a report in support of the new SSC methodology) | |
| *Date you are delivering the contribution:* | September the 21st, 2010 |
| **Information to be completed by the secretariat** | |
| SSC-Submission number | |

[3] The current version of the form (F-CDM-SSC-NM) is available on the UNFCCC CDM website (http://cdm.unfccc.int).