CDM: Recommendation Form for Small Scale Methodologies (version 01)

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

Date of SSC WG meeting:	19–22 October 2010, SSC WG 28
Title/Subject (give a small title or specify the subject of your submission, maximum 200 characters):	Clarification on the applicability of AMS-I.F to small hydropower rehabilitations
Indicative methodology to which your submission relates (refer the items of Appendix B of the Simplified Modalities and Procedures), if applicable.	AMS-I.F "Renewable electricity generation for captive use and mini-grid"
Name of the authors of the query:	Alexandre Dunod Institution: ecosur Afrique a.dunod@ecosurafrique.com

Summary of the query:

Please use the space below to summarize the query related to SSC methodologies/categories SSC Modalities and Procedures provide recommendation/analysis of the SSC WG.

Original text from Stakeholder:

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:

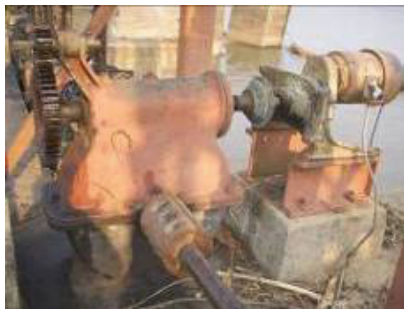
- three hydropower stations, served by the Lubilanji river in the Kasai province and operated by MIBA, a government mining agency:
  - Tshiala I (1.4 MW installed in 1933; out-of-order)
  - Lubilanji I (4 x 1.75 MW installed in 1953; 1 unit out-of-order; 3 x 1.68 MW currently available)
  - Lubilanji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

Recommendation by the SSC WG:

Please use the space below to provide amendments/change (in your expert view, if necessary).

Please refer to paragraph 24 of the meeting report of the SSC WG 28 <http://cdm.unfccc.int/Panels/ssc_wg>.

Answer to authors of query by the SSC WG:

Please use the space below to provide answer to the authors of the above query.

The small-scale working group of the CDM Executive Board would like to thank the author for the submission.

The SSC WG agreed to clarify as follows:

Query 1: Can baseline emission factor be used as an emission factor for a modern diesel generating unit of the relevant capacity operating at optimal load as given in Table I.F.1 as prescribed in paragraph 13 of AMS-I.F?

Paragraph 13 of AMS-I.F states "For a mini-grid system where all generators use exclusively fuel oil and/or diesel fuel, the baseline emissions is the annual electricity generated by the renewable energy unit times an emission factor for a modern diesel generating unit of the relevant capacity operating at optimal load as given in Table I.F.1". In the project case, it is understood that the mini-grid in the baseline is supplied by a mix of hydro and diesel generators and hence the underlying project activity does not comply with the required condition of paragraph 13, and the emission factor for a diesel generator as stipulated in Table I.F.1 cannot be applied.

Query 2 (a): Please clarify if the available generation capacity of 7.44 MW rated by the expert study can be retained as maximum output compared to the nominal capacity in operation of 10.29 MW and to the initially installed capacity of 18.48 MW. If not, which other value should be taken into account.

As specified in the methodology the sum of the installed capacities of all generators connected to the mini-grid should be used as the maximum output (i.e. total capacity).

Query 2 (b): Please clarify whether back-up diesel groups in the mini-grid can be excluded in calculating the installed capacity of the mini-grid.

As per the definition of mini-grid stipulated in AMS-I.F "For the purpose of this methodology, a mini-grid is defined as small-scale power system with a total capacity not exceeding 15 MW (i.e. the sum of installed capacities of all generators connected to the mini-grid is equal to or less than 15 MW) which is not connected to a national or a regional grid", all generators connected to the mini-grid shall be included for the purpose of establishing the SSC threshold.

Query 3: Please 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.

The SSC WG failed to see how this query is related to the application of the methodology and thus needs further clarification from the author. This appears to be a validation issue as the conservativeness of the assumptions made in the PDD is subject to validation by a DOE. See, for example, paragraph 30 of the validation and verification manual (EB 55, annex 1).

Query 4: 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?

In principle, from the information included in the submission, this proposal is not acceptable. The project proponent is requested to further clarify how it would be possible "to conservatively exclude abnormal months".

As noted by the SSC WG in the above responses the proposals made by the author of the query do not comply with AMS-I.F, based on the limited information included in this submission. The project proponent, however, may wish to submit additional information as detailed above for further consideration by the SSC WG.

Signed by the Chair, Mr. Peer Stiansen

Date: 22/10/2010

Signed by the Vice-Chair, Mr. Hugh Sealy

Date: 22/10/2010

Information to be completed by the secretariat	
SSC-Submission number	SSC_471
Date when the form was received at UNFCCC secretariat	22 October 2010
Date of transmission to the EB	22 October 2010
Date of posting in the UNFCCC CDM web site	22 October 2010