



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:	15–18 March 2011, SSC WG 30
Title/Subject (give a small title or specify the subject of your submission, maximum 200 characters):	Clarification on the requirements of AMS-I.C/AMS-I.D for a co-fired project producing electricity
Indicative methodology to which your submission relates (refer the items of Appendix B of the Simplified Modalities and Procedures), if applicable.	AMC-I.C “Thermal energy production with or without electricity” AMS-I.D “Grid connected renewable electricity generation”
Name of the authors of the query:	Subhendu Biswas Institution: First Climate (India) Pvt. Ltd. Subhendu.biswas@firstclimate.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:

AMS-I.C, AMS-I.D and AMS-I.F require that for **project activities** involving installation of plants capable of co-firing biomass and fossil fuel, the energy generation is to be proportioned based on the amount of biomass / fossil fuel consumed and specific fuel consumption for biomass / fossil fuel which is to be specified *ex-ante*. However, following are the observations with respect to application of methodologies AMS-I.D and AMS-I.C to co-fired projects.

As per AMS-I.C, paragraph 42: “For the co-fired systems, baseline emissions calculated as per paragraph 31 shall be compared with the baseline emissions calculated as per paragraph 41. The lower of the two values shall be used to calculate emission reductions.” paragraph 31 in turn relates to a situation where the **baseline** is a co-fired plant (corresponding to scenario 15(h) of AMS IC). Hence for **project activities** where the **baseline scenario** is not a co-fired plant (eg. solely fossil fuel fired unit) paragraph 42 does not have any relevance.

As per methodology AMS I.C the specific energy generation for each type of fuel (biomass or fossil) is to be specified *ex-ante*. But the equation (number 10) used for determination of the same ($SEC_{j,PJ,y,measured}$) involves parameters which are monitored *ex-post*, eg. Quantity of fuel type combusted in the **project activity in year y**, Average net calorific value of fuel type j **combusted during the year y**.

For AMS-I.D, as per monitoring table (Para 22): “The net electricity export/supplied to a grid is the difference between the measured quantities of the grid electricity export and the import. If applicable, cross check net electricity supplied to a grid as gross energy generation in the project activity power plant minus the auxiliary/station electricity consumption, technical losses and electricity import from the grid to the project power plant measured at the grid interface/connection used for billing purposes”. Please note that for co-fired projects this cross-check mechanism is not feasible. For co-fired projects the monitored electricity delivered to the grid as mentioned above will not match with the adjusted gross electricity generation based on the monitored amount of fossil fuel consumption and specific energy consumption of the fuel (it will always be higher). In case of co-fired projects the applicable gross generation from project can be derived (calculated and considering the conservative figure) as per provisions provided in point 6

of Table 1 of the methodology. The auxiliary electricity consumed can be conservatively assumed to be entirely from biomass and hence the qualifying net electricity generation can be calculated by deducting the auxiliary electricity consumption from the calculated gross energy generation (adjusted) from biomass consumption as per point 6 of Table 1. This approach is already built-in in AMS-I.F which states that *“The net electricity displaced is the gross energy generation by the project activity power plant minus the auxiliary/station electricity consumption”*. The amount of net power measured at the grid interface need not be monitored as it is not relevant for calculating emission reductions in the project.

We seek clarification on the following points:

- a. Relevance of paragraph 41 and 42 for co-fired project plant under AMS-I.C where the baseline is not a co-fired plant
- b. Mechanism to determine specific energy consumption for each type of fuel *ex-ante* for a co-fired project
- c. Whether we can use the approach indicated in AMS-I.F for determination of net power generated from co-fired project activities under AMS-I.D and conclude that cross checking mechanism (as specified under point no. 05 of table 01 of AMS-I.D) is not relevant for co-firing projects.

Responses from Stakeholder to additional queries submitted 14 Feb 2011:

Based on our preliminary assessment, the following additional information are required in order to consider your submission complete:

Query: If your queries are related to a project under development or implementation, could you please describe the context in which they arose with a brief description of its baseline and project scenario.

The query is not related to any particular project activity but is applicable to any grid connected project activity which co-fires fossil fuel along with biomass residue.

Query: Please elaborate your query regarding paragraph 22 of AMS-I.D why in the case of a co-fired project activity supplying electricity to a grid, the amount of net electricity delivered to the grid need not be measured at the grid interface for calculating emission reductions. If possible please illustrate through an example that your proposal is more conservative.

We request the Working Group to note the following equations for calculating the electricity generation in case of co-fired projects.

1. EG_{export} : Total electricity exported to the grid; monitored through electricity meters
2. EG_{import} : Total electricity imported from the grid; monitored through electricity meters
3. EG_{net} : Net electricity imported from the grid; monitored through electricity meters or calculated as a difference of parameter 1 and 2, i.e $EG_{\text{export}} - EG_{\text{import}}$
4. EG_{total} : Total gross electricity generation at generator outlet ; monitored through electricity meters
5. EG_{b} : Electricity generated from biomass; calculated from biomass consumption and specific generation rate
6. EG_{ff} : Electricity generated from fossil fuel co-fired; calculated from fossil fuel consumption and specific generation rate
7. EG_{aux} : Auxiliary electricity consumption in the project activity; monitored through electricity meters.
8. Q_i : Quantity of fuel ($i=b$ for biomass, $i=ff$ for fossil fuel) consumed in energy terms; calculated through monitored values of fuel consumption and NCV of fuel
9. SFC_i : Specific fuel consumption ($i=b$ for biomass, $i=ff$ for fossil fuel) in energy terms; calculated *ex-ante* during design values
10. EF_y = Emission factor of grid

11. ER_y = Emission reductions

As per AMS-I.D, paragraph 22, point 5, “the net electricity delivered to the grid will be monitored and it is the difference between the measured quantities of the grid electricity export and the import. If applicable, cross check net electricity supplied to a grid as gross energy generation in the project activity power plant minus the auxiliary/station electricity consumption, technical losses and electricity import from the grid to the project power plant measured at the grid interface/connection used for billing purposes “

The general operation philosophy of a grid-connected stand-alone power plant is that electricity is imported from the grid only when the power plant is under shutdown or during the initial phases of start-up after a shutdown to meet the auxiliary demand of the power plant. For the rest of the period the power plant generation itself caters for the auxiliary load. Hence electricity imported is in most cases gets accounted for in the auxiliary meter itself.

Hence with the above clarification, as per the methodology:

$$EG_{net} = EG_{export} - EG_{import} = EG_{total} - EG_{aux} \quad (1)$$

Technical losses has been neglected for simplicity since this is very negligible in most cases.

Now, as per AMS-I.D, paragraph 22, point 6, *For projects consuming biomass and fossil fuel to produce electricity, a specific energy consumption of each type of fuel (biomass or fossil) to be used should be specified ex ante. The consumption of each type of fuel (biomass or fossil) shall be monitored.*

If fossil fuel is used, the electricity generation metered should be adjusted by deducting the electricity generation from fossil fuels using the specific energy consumption and the quantity of fossil fuel consumed.

The amount of electricity generated using biomass fuels calculated then shall be compared with the amount of electricity generated calculated using specific energy consumption and amount of each type of biomass fuel used. The lower of the two values should be used to calculate emission reductions.

Hence as per the methodology;

$$\text{Energy generated from Biomass} = EG_b = Q_b / SCF_b \quad (2)$$

$$\text{Energy generated from Fossil fuel} = EG_{ff} = Q_{ff} / SCF_{ff} \quad (3)$$

$$\text{Conservative estimation of Energy generation} = EG_{min} = \min(EG_b, EG_{total} - EG_{ff}) \quad (4)$$

$$\text{Emission reduction} = ER_y = EG_{min} \times EF_y \quad (5)$$

However, please note that this equation does not take into account the auxiliary consumption in the plant and hence leads to an over-estimation of emission reductions which is neither correct nor conservative.

Our suggestion is to calculate the emission reductions from the project activity from electricity generated from biomass using equation (4) and deduct the entire auxiliary electricity consumed in the power plant from the same as a conservative estimate, i.e,

$$ER_y = (EG_{min} - EG_{aux}) \times EF_y \quad (6)$$

Please note that in all case $EG_{total} > EG_{min}$,

Hence replacing EG_{total} in equation (1) will in all cases result in $EG_{net} > (EG_{min} - EG_{aux})$

Hence using equation (6) will always result in conservative and proper estimate of emission reductions.

Further please note that in the case of co-firing, following the provisions of the methodology to cross verify the net power generation EG_{net} using equation 1 is no longer required and the same is never used to calculate the emission reductions and hence becomes a redundant parameter and is not utilised in the emission reduction calculations.

Query : Please note that AMS-I.D is limited to renewable energy generation units that supply electricity to a national or a regional grid and AMS-I.F is for project activities that displace electricity from an

electricity distribution system that is or would have been supplied by one or more energy sources defined in the methodology. Our understanding is that the monitoring of net electricity supplied to a grid (AMS-I.D case) is different than the net electricity displaced (AMS-I.F case).

We understand and agree that the monitoring of net electricity supplied to a grid (AMS-I.D case) is different than the net electricity displaced (AMS-I.F case). However as per the explanation provided above, for co-firing, the approach opted above is in line with AMS-I.D and is also similar to the approach as described in AMS-I.F. The net power in case of AMS I-D would be injected to the grid and in case of AMS I F would be sent to the captive consumption points.

Query: Are you suggesting that in the case of a co-fired project activity that delivers electricity to a grid, the net electricity supplied to the grid can be cross-checked with the monitored values of total gross electricity generation and aux consumption/losses since calculated values (adjusted) of those may not be required since the amount of fossil fuel- energy input would be deducted under project emissions?

We are suggesting that the net electricity supplied to the grid can still be cross-checked with monitored values of total gross electricity generation and aux consumption/losses. However, this has no bearing with the emission reduction calculations as per the explanation provided in response to point 2 above as for conservative estimation the proportionate amount of power (proportioned against amount of biomass consumed) would be used for ER estimation.

Recommendation by the SSC WG:

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

Please refer to paragraph 35 of the meeting report of the SSC WG 30
<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: As per the methodology AMS-I.C the specific energy generation for each type of fuel (biomass or fossil) is to be specified *ex ante*, but paragraph 40/equation (number 10) used for determination of the same ($SEC_{j,Pj,y,measured}$) involves parameters which are monitored *ex post*, e.g. quantity of fuel type combusted in the project activity in year *y*, average net calorific value of fuel type *j* combusted during the year *y*.

The SSC WG agreed to clarify that the purpose of having SECs *ex ante* (each for biomass and fossil fuel) is for *ex ante* estimation of emissions reductions in the PDD, while consumption of each type of biomass and fossil fuel shall be monitored during the crediting period.

The group further agreed to clarify that paragraph 40 covers project activity where fossil fuel is combusted in the project activity equipment (for example in circumstances where biomass is not available due to seasonal effects) or where fossil fuel and biomass is combusted simultaneously in the project activity equipment. The group is of the opinion that if the baseline for such project activity is solely fossil fuel fired unit, the author may explore equation 1 (for electricity) and equation 2 (for heat output) of AMS-I.C for estimating baseline emissions while fossil fuel used in the project activity is taken into account under project emissions.

Query 2: As per AMS-I.C, paragraph 42: “For the co-fired systems, baseline emissions calculated as per paragraph 31 shall be compared with the baseline emissions calculated as per paragraph 41. The lower of the two values shall be used to calculate emission reductions.” paragraph 31 in turn relates to a situation where the baseline is a co-fired plant (corresponding to scenario 15(h) of AMS IC). Hence for project activities where the baseline scenario is not a co-fired plant (e.g. solely fossil fuel fired unit) paragraph 42

does not have any relevance.

The group noted that paragraph 42 refers to paragraph 31 which relates to the baseline scenario defined in 15 (h) of a cogeneration project. Paragraph 42 applies for co-firing project activity (cogeneration or non-cogeneration project activity) whose baseline could be with or without co-firing. The co-fired project activity whose baseline scenario is not a co-fired plant (e.g. solely fossil fuel fired unit in the baseline), the use of equation under paragraph 31 would yield the baseline emissions only associated with fossil fuels use (similar to equation 1 or 2 discussed above); since emission factor of biomass would be zero.

The group agreed to provide further clarification in the next revision of the methodology.

Query 3: For AMS-I.D, as per monitoring table (Para 22): “The net electricity export/supplied to a grid is the difference between the measured quantities of the grid electricity export and the import. If applicable, cross check net electricity supplied to a grid as gross energy generation in the project activity power plant minus the auxiliary/station electricity consumption, technical losses and electricity import from the grid to the project power plant measured at the grid interface/connection used for billing purposes”. Please note that for co-fired projects this cross-check mechanism is not feasible. For co-fired projects the monitored electricity delivered to the grid as mentioned above will not match with the adjusted gross electricity generation based on the monitored amount of fossil fuel consumption and specific energy consumption of the fuel (it will always be higher).

The SSC WG noted the monitoring issues highlighted by the author in the case of co-fired project activity supplying electricity to a grid. The group agreed to address the issue in a further revision of the methodology.

Signed by the Chair, Ms. Fatou Gaye

Date: 18/03/2011

Signed by the Vice-Chair, Mr. Peer Stiansen

Date: 18/03/2011

Information to be completed by the secretariat

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