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:	20−23 March 2012, SSC WG 36
Title/Subject (give a small title or specify the subject of your submission, maximum 200 characters):	Clarification on AMS-III.AH for element process whose energy output can not be measured directly
Indicative methodology to which your submission relates (refer the items of Appendix B of the Simplified Modalities and Procedures), if applicable.	AMS-III.AH "Shift from high carbon intensive fuel mix ratio to low carbon intensive fuel mix ratio"
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:

The project involves utilisation of a fuel mix of FO and Refinery fuel gas (RFG) in heaters of an existing refinery during the baseline period, as part of project NG is being piped and mixed along with RFG thus replacing FO in the heater operations.

As compared to other thermal energy generation equipment refinery heater units are more complex as although being a single unit there are multiple feeds and multiple outputs, eg. In a typical heater setup the main influent would be the hydrocarbon stream which would take heat either for only rise in sensible heat or for part vaporisation of the hydrocarbon stream as well thus resulting in rise in sensible heat as well as addition of heat of vaporisation depending on the need of the heater unit. Steam is fed to the convection zone to extract the heat from the hot effluent gas stream and is used for superheating the steam stream. The hot effluent gas is further contacted with air in the APH to preheat air before it is fed to the burner units for further efficiency improvement of the heater unit.

Thus typically a heater unit would have multiple inputs and outputs and the same is depicted below.

Input Streams	Type of energy	Output Streams
Hydrocarbon stream	Sensible Heat + Heat of vaporisation	heated or partially vaporised stream
Steam	Sensible Heat	Superheated Steam
Air	Sensible Heat	Hot air to burner front.

The major influent in the Heater unit is the Hydrocarbon stream which is not a pure stream component or it does not constitute on one pure stream but a combination of different streams whose true boiling points range from 15 Deg C to 540+ Deg C (bottom residue). A typical assay of crude stream is enclosed herewith for reference (annexure -01) .

Being a mixed stream with several constituents and the thermal energy being partly utilised for sensible energy transfer and part vaporisation of the streams it is not possible to measure the "output" from a Heater unit as is possible in a simple boiler system or turbine system.

To sum up in a heater unit the "output" cannot be measured as

- Part heat is utilised for vaporisation of the feed stream and it is not possible to be "measured" using any measuring instrument.
- The feed stream being a mixture of hydrocarbon streams there are several components of varied specific heat and thus specific heat of the mixed stream has to be calculated and can't be determined as in a pure stream.

As per Para 15 of the methodology the ER for the project is calculated based on the evaluation of $FC_{bl,i,j,y}$ which in turn is calculated based on the monitored output (heat or electricity, etc) during the year y and proportion of baseline fuels as used in the baseline scenarios.

Clarification is sought on the use of Energy input values (from input fuel streams) in place of the Energy output from the heater units.

The Energy input could be used for determination of the baseline energy setup with the following pre conditions that

- There would not be any marked change in plant performance with respect of efficiency of the Heater unit in the baseline as well as project fuel setup. This could be further ascertained by incorporating the countermeasure that calorific value of NG has to at least to or more than that of the baseline fuel (i.e FO) as is in methodology AMS III P for waste gas recovery in refinery.
- The energy output streams in the project case would not change as compared to the baseline.

Clarification is sought on using the following algorithm for monitoring of amount of project fuel used in the heater unit as mixed feed is fed to the burner front.

Proportion of NG in mixed feed stream (RFG + NG) $P_{ng} = F1/ F2 * 100$

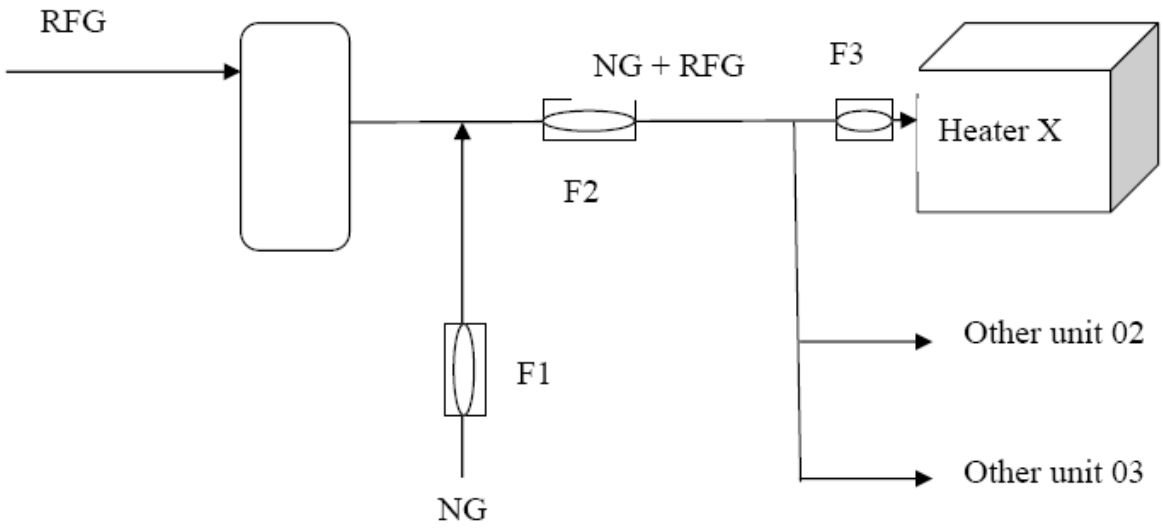
Amount of natural gas fed to Heater unit = F3 tonnes * $(P_{ng})\% = P_{ng,Heater}$

- Any other modifications in the equipment which could have effect to the project performance would be monitored and its effect on the input energy would be assessed during the lifetime of the project.

Clarification is thus sought on the usage of energy Input (in terms of input fuel energy) parameter instead of the energy output parameter as used in equation 2 of the methodology AMS III AH Ver 01. Due to the peculiar nature of a process heater as used in refinery operation.

In case of Input energy measurement the NG which is consumed as part of the project activity is fed into the RFG network and piped to the burner front for use in heater units.

This network is akin to the setup as envisaged in AMS IIIP ver1.0 and the setup is depicted below.



Clarification is sought on using the following algorithm for monitoring of amount of project fuel used in the heater unit as mixed feed is fed to the burner front.

Proportion of NG in mixed feed stream (RFG + NG) $P_{ng} = F_{1,y} / F_{2,y} * 100$ where

(RFG + NG) P_{ng} = Amount of NG in mixed feed stream %

$F_{1,y}$ = Flow of Natural gas (NG) in tonnes in period y

$F_{2,y}$ = Flow of mixed feed at KOD outlet (NG+RFG) in tonnes in period y

Amount of natural gas fed to Heater unit = $F_{3,y} * (P_{ng})\% = P_{ng,Heater\ x\ ,y}$ where

$P_{ng,Heater\ x}$ = Amount of NG fired in Heater X during period y

$F_{3,y}$ = Amount of mixed feed to Heater unit X in period y

Recommendation by the SSC WG:

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

Please refer to paragraph 30 of the meeting report of the SSC WG 36 <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 that the proposed approach for determining the baseline energy consumption based on fuel input is not acceptable under AMS-III.AH, because of the following reasons:

- AMS-III.AH, as currently written, is only applicable to project activities where it is possible to directly measure and record the energy use and consumption within the project boundary and to element process generating single output (Please, refer to paragraph 6 and footnote 1 of the methodology, respectively). The described heat exchanger networks with multiple inputs and outputs, is not covered under the methodology AMS-III.AH;
- Furthermore, the SSC WG is of the opinion that it will be challenging to accommodate the described complex process equipment and at the same time maintain the simplified form of the small scale methodology. For example, a number of factors other than fuel switch measures, such as varying load, changing process conditions, changes in feed stock and its quality that may influence baseline and project emissions in refinery/petrochemical complex are not covered in the current version of the methodology.

Signed by the Chair, Mr. Peer Stiansen
Date: 23/03/2012

Signed by the Vice-Chair, Ms. Fatou Gaye
Date: 23/03/2012

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