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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):	Revision of AMS-II.K to include the use of chillers with GWP refrigerants
Indicative methodology to which your submission relates (refer the items of Appendix B of the Simplified Modalities and Procedures), if applicable.	AMS-II.K "Installation of co-generation or tri-generation systems supplying energy to commercial building"
Name of the authors of the query:	Juan Francisco Garcia Koch Institution: South Pole Carbon Asset Management Ltd f.koch@southpolecarbon.com poa@southpolecarbon.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 objective of the submission is to broaden the applicability of AMS IIK / version 01 to enable the installation of cooling equipment that use non ODP refrigerants which do have a GWP. The current version of AMS II.K. does not offer a means to determine project emissions associated with the loss of such refrigerants. The proposed revision aims to provide a means to determine such project emissions.

Refrigerant Project emissions

The calculation of refrigerant project emissions is based on the approach given in the Large Scale Methodology AM0060/Version 1.1 to determine the Project Emissions associated with the use of GWP refrigerants in new chillers:

$$PE_{ref,y} = \left(Q_{ref,PJ,start} + Q_{ref,PJ,y}\right) \times GWP_{ref,PJ} - Q_{ref,BL} \times GWP_{ref,BL} \qquad (1)$$

Where:

PEref,y	=	Project emissions from physical leakage of refrigerant from the new chiller in year y (t CO2e/yr)
Qref,PJ,start	=	Quantity of refrigerant charge in the new chiller at its start of operation (only accounted in the first year of the first crediting period) (tonnes/year)
Qref,PJ,y	=	Average annual quantity of refrigerant used in year y to replace refrigerant that has leaked in year y (tonnes/year).
GWPref,PJ	=	Global Warming Potential valid for the commitment period of the refrigerant that is used in new chiller (only to be accounted if the refrigerant is classified as a GHG) (t CO2e/t refrigerant)
Qref,BL	=	In case the refrigerant used in the existing chiller is listed in Annex A of KP, three year average quantity of refrigerant used by existing chiller in baseline, prior to implementation of project activity (tonnes/yr).

$GWP_{ref,BL}$ = Global Warming Potential valid for the commitment period of the refrigerant that is used in new chiller (only to be accounted if the refrigerant is classified as a GHG listed in Annex A of Kyoto protocol) (t CO2e/t refrigerant)

The proposed revision offers a simplified and more conservative approach to determine the project emissions due to the leakage of refrigerant in new cooling equipment by assuming that no refrigerant leaks take place in the baseline scenario, i.e., eqn (1) above is expressed as:

$$PE_{ref,y} = (Q_{ref,PJ,start} + Q_{ref,PJ,y}) \times GWP_{ref,PJ}$$

The average annual quantity of refrigerant used in year *y* to replace refrigerant that has leaked in year y *Qref,PJ,y* is monitored annually and determined as specified in the Monitoring Methodology given in AM0060 /version 1.1 i.e., from inventory data, by the project participants, of refrigerant cylinders consumed in year *y*, (e.g. by adding up the total amount of refrigerant purchased in any year *y* , as given in the refrigerant purchase orders and compared with supplier invoices). The total amount of refrigerant used in any given year is cross-checked against typical refrigerant leakage rates for the relevant type of cooling equipment as per the relevant QA/QC procedure given in AM0060 / Version 1.1. Typical annual refrigerant leakage rates are determined by applying the upper limit of the range of Emissions Factors (expressed in % of the initial refrigerant charge/year) and given in table 7.9 of the IPCC 2006 Guidelines, Volume 7 for a range of cooling applications. *PEref,y* is then calculated based on the higher of the two values obtained for *Qref,PJ,y* (i.e. the annually monitored vs typical annual leakage rates based on the above referred IPCC document).

The proposed submission also allows for a simpler and *even more conservative* option to determine *Qref,PJ,y* in the case of chillers and hence the project emissions due to refrigerant lost in such type of cooling equipment. This is based on the assumption that 35% of the initial refrigerant charge would leak every single year during the crediting period. This value (35%) is the upper Refrigerant Emission factor Default given for ***Medium & Large Commercial Refrigeration systems*** in the IPCC 2006 Guidelines, Volume 7, Table 7.9. The equivalent upper Emission Factor Default given for ***chillers*** is 15%.

The proposed chiller refrigerant leakage emissions factor default is thus more than twice that of the highest emissions factor quoted for chillers in the same IPCC document. The Medium & Large Commercial Refrigeration category includes many types of installation which are assembled, built and tested on site, as opposed to being manufactured, assembled, inspected and tested in a factory under controlled conditions. Thus, Medium & Large Commercial Refrigeration systems are inevitably more prone to refrigerant leakage than packaged chillers. Moreover, the refrigerant charge in Medium & Large Commercial Refrigeration systems typically circulates over longer circuits and greater numbers of components than the equivalent charge in a chiller, which further increases the likelihood of leakage in the former system type. For these reasons, assuming a 35% refrigerant loss ***each and every year*** must be considered a highly conservative refrigerant emissions factor for chillers. Consequently, the annual quantity of refrigerant used to replace refrigerant that has leaked in year y (Qref,PJ,y), determined from the proposed default refrigerant emissions factor for chillers, and hence the Project Emissions from physical leakage of refrigerant from the new chiller in year y, will also be highly conservative.

Recommendation by the SSC WG:

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

Please refer to paragraph 12 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 recommend a revision to AMS-II.K, as contained in annex 4 of the SSC WG 36 meeting report in order to broaden the applicability of AMS-II.K by allowing the installation of cooling equipment that use refrigerants which do not have ozone depletion potential (ODP), but which do have a global warming potential (GWP). The current version of AMS-II.K does not offer a means to determine project emissions associated such GWP refrigerants. The proposed revision provides a means to determine such project emissions, while baseline refrigerant emissions are conservatively assumed to be zero.

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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