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TYPE II - ENERGY EFFICIENCY IMPROVEMENT PROJECTS

Project participants shall take into account the general guidance to the methodologies, information on additionality, abbreviations and general guidance on leakage provided at http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html.

II.C. Demand-side energy efficiency activities for specific technologies

Technology/measure

1. This methodology comprises activities that encourage the adoption of energy-efficient equipment, lamps, ballasts, refrigerators, motors, fans, air conditioners, appliances, etc. at many sites. These technologies may replace existing equipment or be installed at new sites. In the case of new facilities, the determination of baseline scenario shall be as per the procedures described in the general guidance to SSC methodologies under the section 'Type II and III Greenfield projects (new facilities)'. The aggregate energy savings by a single project may not exceed the equivalent of 60 GWh per year for electrical end use energy efficiency technologies. For fossil fuel end use energy efficient technologies, the limit is 180 GWh thermal per year in fuel input.

2. For each replaced appliance/equipment the capacity or output or level of service (e.g., light output, room temperature and comfort, the rated output capacity of air-conditioners etc.) is not significantly smaller (maximum - 10%) than the baseline or significantly larger (maximum + 50%) than the baseline.

3. If the energy efficient equipment contains refrigerants, then the refrigerant used in the project case shall be CFC free. Project emissions from the baseline refrigerant and/or project refrigerants shall be considered in accordance with the guidance of the Board (EB 34, paragraph 17). This methodology credits emission reductions only due to the reduction in electricity consumption from use of more efficient equipment/appliances.

Boundary

4. The project boundary is the physical, geographical location of each measure (each piece of equipment) installed.

Baseline

5. If the energy displaced is fossil fuel based, the energy baseline is the existing level of fuel consumption or the amount of fuel that would be used by the technology that would have been implemented otherwise. The emissions baseline is the energy baseline multiplied by an emission factor for the fossil fuel displaced. Reliable local or national data for the emission factor shall be used; IPCC default values should be used only when country or project specific data are not available or difficult to obtain.

6. If the energy displaced is electricity, the emission baseline is determined as the product of the baseline energy consumption of equipment/appliances and the emission factor for the electricity displaced:

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II.C. Demand-side energy efficiency activities for specific technologies (cont)

$$BE_y = E_{BL,y} * EF_{CO2,ELEC,y} \quad \textbf{(1)}$$

$$E_{BL,y} = \sum_i (n_i * p_i * o_i)/(1 - l_y) \quad \textbf{(2)}$$

Where:

BE_y	Baseline emissions in year y (tCO_{2e})
$E_{BL,y}$	Energy consumption in the baseline in year y (kWh)
$EF_{CO2,ELEC,y}$	Emission factor in year y calculated in accordance with the provisions in AMS-I.D (tCO_2/MWh)
Σ_i	Sum over the group of "i" devices (e.g. 40W incandescent bulb, 5hp motor) replaced, for which the project energy efficient equipment is operating during the year, implemented as part of the project activity
n_i	Number of devices of the group of "i" devices (e.g. 40W incandescent bulb, 5hp motor) replaced, for which the project energy efficient equipment is operating during the year
p_i	Power of the devices of the group of "i" baseline devices (e.g. 40W incandescent bulb, 5hp motor). In the case of a retrofit activity, "power" is the weighted average of the devices replaced. In the case of new installations, "power" is the weighted average of devices on the market
o_i	Average annual operating hours of the devices of the group of "i" baseline devices
l_y	Average annual technical grid losses (transmission and distribution) during year y for the grid serving the locations where the devices are installed, expressed as a fraction. This value shall not include non-technical losses such as commercial losses (e.g., theft/pilferage). The average annual technical grid losses shall be determined using recent, accurate and reliable data available for the host country and cannot exceed 0.2 for rural areas and 0.15 for non-rural areas. This value can be determined from recent data published either by a national utility or an official governmental body. Reliability of the data used (e.g. appropriateness, accuracy/uncertainty, especially exclusion of non technical grid losses) shall be established and documented by the project participant. A default value of 0.1 shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable.

7. For project activities that seek to retrofit or modify an existing unit or equipment resulting in an increase in capacity, the determination of the baseline scenario for the incremental capacity shall be based on the procedures described in the general guidance to SSC methodologies under the sections 'retrofit' and 'capacity increase'.

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II.C. Demand-side energy efficiency activities for specific technologies (cont)

Project Activity Emissions

8. Project emissions consist of electricity and/or fossil fuel used in the project equipment, determined as follows.

$$PE_y = EP_{Pj,y} * EF_{CO2,y} \quad \textbf{(3)}$$

Where:

PE_y Project emissions in year y (tCO_2e)

$E_{PJ,y}$ Energy consumption in project activity in year y. This shall be determined *ex post* based on monitored values

$EF_{CO2,y}$ Emission factor for electricity or thermal baseline energy. The emissions associated with grid electricity consumption should be calculated in accordance with the procedures of AMS-I.D. For fossil fuel displaced reliable local or national data for the emission factor shall be used; IPCC default values should be used only when country or project specific data are not available or difficult to obtain.

Project energy consumption in case of project activities that displace grid electricity is determined as follows using the data of the project equipment:

$$E_{PJ,y} = \sum_i (n_i * p_i * o_i)/(1 - l_y)$$

9. The use of refrigerant in the energy efficient project equipment includes the initial charge of refrigerant before starting the operation of the new equipment and refrigerant used during the lifetime of the equipment to replace refrigerant that has leaked during operation or service. As a conservative simplification, it is assumed that all refrigerant used in the new equipment is released to the atmosphere. Moreover, the initial charge of refrigerant of the new equipment is accounted for over the first crediting period. All GHGs as defined per Article 1, paragraph 5 of the Convention shall be considered as per the guidance by the Board[1]. $PE_{ref,y}$ is calculated as follows:

$$PE_{ref,y} = ((Q_{ref,PJ,start}/CP) + Q_{ref,PJ,y}) \times GWP_{ref,PJ} + Q_{ref,BL} \times GWP_{ref,BL} \quad \textbf{(4)}$$

Where:

$PE_{ref,y}$ Project emissions from physical leakage of refrigerant from the project equipment in year y ($t\ CO_2e/yr$)

$Q_{ref,PJ,start}$ Quantity of refrigerant charge in the project equipment at its start of operation (tonnes)

[1] Paragraph 17 of report of EB34.

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II.C. Demand-side energy efficiency activities for specific technologies (cont)

$Q_{ref,PJ,y}$	Average annual quantity of refrigerant used in year *y* to replace refrigerant that has leaked in year *y* (tonnes/year). Values from Chapter 7: Emissions of fluorinated substitutes for Ozone depleting substances, Volume 3, Industrial Processes and Product Use, 2006 IPCC Guidelines for National Greenhouse Gas Inventories may be used
$GWP_{ref,PJ}$	Global Warming Potential of the refrigerant that is used in the project equipment (t CO_2e/t refrigerant)
$Q_{ref,BL}$	The total amount of refrigerant in the baseline equipment not recovered or recovered but not recycled, reclaimed or destroyed (tonnes/yr).
$GWP_{ref,BL}$	Global Warming Potential of the baseline refrigerant (t CO_2e/t refrigerant)
CP	The number of years in the first Crediting period (years)

(5)

Leakage

10. If the energy efficiency technology is equipment transferred from another activity, leakage is to be considered.

Monitoring

11. The emission reduction achieved by the project activity shall be determined as the difference between the baseline emissions and the project emissions and leakage.

$$ER_y = ((BE_y - PE_y) \times BP) - LE_y \quad \textbf{(6)}$$

Where:

ER_y	Emission reductions in year *y* (tCO_2e)
LE_y	Leakage emissions in year *y* (tCO_2e)
BP	Baseline penetration factor[2]. For example: In the case of replacing incandescent lamp with CFL, BP = 1- (# of pieces of screw-in or lock-in efficient lighting equipment/total # of pieces of screw-in or lock-in lighting equipment), based on *ex ante* representative sample survey; BP is only applicable to 'Project Activity under Programme of Activities (CPA of PoA)' and in other cases set BP to '1.0'

12. If the devices installed replace existing devices, the number and "power" of a representative sample of the replaced devices shall be recorded in a way to allow for a physical verification by DOE[3].

[2] Baseline Penetration factor captures the penetration of the project technology in the baseline situation. This factor is only applicable for project activities under a program of activities i.e. CPA of a PoA.

[3] This shall be monitored while replacement is underway to avoid, e.g., that 40W lamps are recorded as 100W lamps, greatly inflating the baseline.

13. If the devices installed have a constant current (ampere) characteristics, monitoring shall consist of monitoring either the "power" and "operating hours" or the "energy use" of the devices installed using an appropriate method. Appropriate methods include:

(a) Recording the "power" of the device installed (e.g., lamp or refrigerator) using nameplate data or bench tests of a sample of the units installed and metering a sample of the units installed for their operating hours using run time meters;

OR

(b) Metering the "energy use" of an appropriate sample of the devices installed.

14. In either case, monitoring shall include annual checks of a sample of non-metered systems to ensure that they are still operating.

15. If the devices have variable current (ampere) characteristics, monitoring shall consist of metering the "energy use" of an appropriate sample of the devices installed. Monitoring shall also include annual checks of a sample of non-metered systems to ensure that they are still operating.

Project activity under a programme of activities

The following conditions apply for use of this methodology in a project activity under a programme of activities:

16. In case the project activity involves the replacement of equipment, and the leakage effect of the use of the replaced equipment in another activity is neglected, because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.

17. An assessment of Baseline Penetration Factor (BP) shall be done for each of the CPA of PoA separately through *ex ante* baseline survey for use in emission reduction calculation as per Equation 5.

18. Leakage on account of cross effects (interactive effects, for example increased heating load due to introduction of efficient lighting technologies) shall be considered.[4]

For the case of increased heating load due to introduction of efficient lighting technologies, leakage should be considered unless it is demonstrated that any one of the following conditions are met:

(a) Heating Degree Days (HDDs) to base 18^{o}C in the geographic location of the project are equal to or less than 1000 in a year;

[4] Consideration of interactive effects may be proposed through the request for revision process.

(b) The *ex ante* survey determines that space heating in the project location is not done for more than two months in a year;

(c) There is less than 10% penetration of space heating equipment in the location of the project activity;

(d) If the project activity is for distribution or installation of compact fluorescent lamps (CFLs) in residential applications the number of CFLs distributed per household is four or less.

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History of the document *

Version	Date	Nature of revision
11	EB 44, Annex # 28 November 2008	The revisions clarify the consideration of capacity increase of the project equipment, electricity transmission and distribution (T&D) losses in the baseline and cross effects of lighting and heating. With regard to equipment containing refrigerants, the revisions clarify the calculations of direct emissions from refrigerants.
10	EB 41, Annex 17 02 August 2008	Additional guidance on baseline selection for new facilities and for capacity increase due to retrofit; consideration of electricity transmission and distribution losses; guidance on treatment of direct emissions from refrigerants where relevant.
09	EB 33, Annex 26 27 July 2007	Revision of the approved small-scale methodology AMS II.C to allow for its application under a programme of activities (PoA)
08	EB 28, Annex 29 15 December 2006	The threshold of small-scale Type II methodologies was increased from 15 GWh to 60 GWh. The consideration of transmission and distribution losses in the baseline estimation was removed.

* This document, together with the 'General Guidance' and all other approved SSC methodologies, was part of a single document entitled: Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities until version 07.

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II.C. Demand-side energy efficiency activities for specific technologies (cont)

History of the document: Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities

Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities contained both the General Guidance and Approved Methodologies until version 07. After version 07 the document was divided into separate documents: 'General Guidance' and separate approved small-scale methodologies (AMS).		
Version	**Date**	**Nature of revision**
07	EB 22, Para. 59 25 November 2005	References to "non-renewable biomass" in Appendix B deleted.
06	EB 21, Annex 22 20 September 2005	Guidance on consideration of non-renewable biomass in Type I methodologies, thermal equivalence of Type II GWhe limits included.
05	EB 18, Annex 6 25 February 2005	Guidance on 'capacity addition' and 'cofiring' in Type I methodologies and monitoring of methane in AMS III.D included.
04	EB 16, Annex 2 22 October 2004	AMS II.F was adopted, leakage due to equipment transfer was included in all Type I and Type II methodologies.
03	EB 14, Annex 2 30 June 2004	New methodology AMS III.E was adopted.
02	EB 12, Annex 2 28 November 2003	Definition of build margin included in AMS I.D, minor revisions to AMS I.A, AMS III.D, AMS II.E.
01	EB 7, Annex 6 21 January 2003	Initial adoption. The Board at its seventh meeting noted the adoption by the Conference of the Parties (COP), by its decision 21/CP.8, of simplified modalities and procedures for small-scale CDM project activities (SSC M&P).