



Indicative simplified baseline and monitoring methodologies  
for selected small-scale CDM project activity categories

**TYPE II - ENERGY EFFICIENCY IMPROVEMENT PROJECTS**

Project participants shall apply the general guidelines to SSC CDM methodologies, information on additionality (attachment A to Appendix B) provided at <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html> > *mutatis mutandis*.

**II.O. Dissemination of energy efficient household appliances**

**Technology/measure**

1. This methodology is applicable<sup>1</sup> to project activities that increase sales dissemination<sup>2</sup> of new household appliances, specifically refrigerating appliances<sup>3</sup> (refrigerators) that have very high efficiencies and are more energy-efficient than baseline refrigerators that are assumed to have lower baseline benchmark efficiencies. Project dissemination activities can include defined efforts that increase:
  - (a) Direct delivery by manufacturers to buyers (including distributors, retailers and end-use residential consumers); or
  - (b) Dissemination by market intermediaries to end-use residential consumers (such as utility demand-side management programs).
2. Eligible refrigerators include all categories of household refrigerating appliances defined in Appendix 1. Only appliance models utilising refrigerants and foam blowing agents having no ozone depleting potential (ODP) and low global warming potential (GWP <15, according to the latest IPCC Assessment Report) can be included in the project activity.
3. This methodology is applicable under the following conditions:
  - (a) The project refrigerators are designed to run on electricity;
  - (b) The serial numbers and model numbers for each project refrigerator is documented at the time they are disseminated;

<sup>1</sup> Project proponents wishing to apply for additional appliance categories are encouraged to submit a request for revision.

<sup>2</sup> The term “dissemination” refers to all means of distributing appliances in the host country (for example wholesale or retail sale), excluding sales intended for export. Units disseminated may be manufactured in the host country or imported. The mode of dissemination will depend on the nature of the project activity.

<sup>3</sup> “Household refrigerating appliance” means an insulated cabinet, with one or more compartments, intended for refrigerating or freezing foodstuffs, or for the storage of refrigerated or frozen foodstuffs for non-professional purposes, cooled by one or more energy-consuming processes, including appliances sold as building kits to be assembled by the end-user. These appliances and thus this methodology are only applicable to refrigerating appliances that are intended for or disseminated to single-family residential applications and not for community or commercial appliance applications. In this methodology “household refrigerating appliance” are referred to as “refrigerators” for simplicity but are intended to include all appliances under the category of refrigerating appliances.



**Indicative simplified baseline and monitoring methodologies  
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*II.O. Dissemination of energy efficient household appliances (cont)*

- (c) The manufacturers of the project refrigerators are ISO 9001 certified at the time of validation to ensure data reliability.

4. The project activity may involve more than one refrigerator model or type and the project activities can continue, with the dissemination of additional refrigerators, throughout the crediting period as long as the aggregate energy savings do not exceed the threshold for small-scale Type II CDM activities (i.e. 60 GWh per year).

5. The start date for crediting period for each refrigerator under this methodology is the date when the end-use residential consumer receives the refrigerator.<sup>4</sup> If the project dissemination activity does not include distribution to the end-use residential consumer, the start date of crediting period is one year after the date from when the dissemination activity is completed, for example delivery of project refrigerators from a manufacturer to a distributor.<sup>5</sup> Certified Emission Reductions (CERs) cannot be earned for any returned refrigerators (for which the dissemination is “reversed”).

**Boundary**

6. The project boundary is the geographical boundary of the host country or countries specified in the project design document.

**Baseline**

7. It is assumed that the baseline scenario is a new refrigerator that is less efficient than the project refrigerator, and which would have been purchased by the same residential end-use consumer instead of the project refrigerator for the same application.

**Emission reductions**

8. Emission reductions are calculated as follows:

$$ER_y = (EC_{BL,y} - EC_{PJ,y}) / (1 - TD_y) \times \frac{1}{1000} \times EF_{elec,y} \quad (1)$$

Where:

$ER_y$  Emission reductions in the year  $y$  (tCO<sub>2</sub>/year)

$EC_{BL,y}$  Energy consumption of the baseline refrigerators in year  $y$  (kWh/y), determined according to the procedures below

<sup>4</sup> As an illustration, if 10 year crediting period is selected, a refrigerator received by a consumer at the beginning of year 1 may receive up to 10 years of CERs while a refrigerator received by a consumer at the beginning of year 6 of the crediting period may receive up to five years of CERs.

<sup>5</sup> This one-year period is intended to conservatively account for the time lag between the start of the dissemination activity and the household receiving and starting to use the refrigerator.



**Indicative simplified baseline and monitoring methodologies  
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*II.O. Dissemination of energy efficient household appliances (cont)*

$EC_{PJ,y}$	Energy consumption in project activity in year $y$ (kWh/y), determined according to the procedures below
$TD_y$	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. 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
$\frac{1}{1000}$	Conversion factor from kWh to MWh
$EF_{elec,y}$	Emission factor for grid electricity (tCO <sub>2</sub> /MWh), determined in accordance with the provisions in AMS-I.D

9. The baseline refrigerator electricity consumption in year  $y$  ( $EC_{BL,y}$ ) is calculated as follows:

$$EC_{BL,y} = \sum_{k=1}^n (SN_{y,k} - SN_{h,k}) * AEC_{BL,k} \quad (2)$$

Where:

$SN_{h,k}$	Average number of units of project refrigerators of model $k$ disseminated into the project boundary annually, averaged over the three years prior to year $y = 1$ (at the start date of the crediting period)
$SN_{y,k}$	Number of units of project refrigerators of model $k$ disseminated into the project boundary under the project activity in year $y$
$AEC_{BL,k}$	Annual energy consumption of the baseline refrigerating appliance corresponding to project model $k$ (kWh/y), determined according to the procedure below

10. The annual energy consumption of each baseline model  $k$  ( $AEC_{BL,k}$ ) is calculated as follows:

$$AEC_{BL,k} = (EEI / 100) * (V_{eq,k} * M_k + N_k + 50) \quad (3)$$



**Indicative simplified baseline and monitoring methodologies  
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*II.O. Dissemination of energy efficient household appliances (cont)*

Where<sup>6</sup>:

<i>EEI</i>	Energy Efficiency Index. A default value of 49.5 shall be used. This value shall be updated to be the mid-point value of the EEI rating of Class A (or equivalent) refrigerators
$V_{eq,k}$	Equivalent volume and features of the refrigerator of project model $k$ , determined according to procedure in the EU directive indicated in footnote 6
$M_k$	Constant value for appliance category of model $k$ per Appendix 2 (unitless)
$N_k$	Constant value for appliance category of model $k$ per Appendix 2 (unitless)

11. The annual electricity consumption of refrigeration appliances sold under the project activity in year  $y$  ( $EC_{PJ,y}$ ) is calculated as follows:

$$EC_{PJ,y} = \sum_{k=1}^n (SN_{y,k} - SN_{h,k}) * AEC_{PJ,k} \quad (4)$$

Where:

$AEC_{PJ,k}$	Equal to annual electricity consumption of the project refrigerating appliance model $k$ (kWh/y). Value is to be provided, and certified, by the appliance manufacturer and determined according to the same standard used in the EU label system; i.e. CENELEC Standard (European Committee for Electrotechnical Standardization) EN 153, February 2006/EN ISO 15502, October 2005 (or subsequent standard) (kWh)
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12. At the time of renewal of a crediting period, baseline refrigerator data shall be updated, including EEI of baseline refrigerator, class of refrigerator selected as baseline. Refer to the latest approved version of the methodological tool “Assessment of the validity of the original/current baseline and to update of the baseline at the renewal of the crediting period”.

### Leakage

13. Leakage is considered negligible under this methodology and hence not considered.

<sup>6</sup> Annex VIII of Directive 2010/30/EU. This method is based on the following assumptions: (a) the energy efficiency index (EEI) of the baseline refrigerator is equal to 49.5 (This EEI level corresponds to the mid-point requirement of energy efficiency class A of Annex IX of the Commission Delegated Regulation (EU) No 1060/2010 of 28 September 2010 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labeling of household refrigerating appliances); (b) the refrigerator is the same category and has the same equivalent volume and functions (e.g., freezer compartment, ice maker) as the project appliance model.



**Indicative simplified baseline and monitoring methodologies  
for selected small-scale CDM project activity categories**

*II.O. Dissemination of energy efficient household appliances (cont)*

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**Monitoring**

14. During project activity implementation, the following data shall be recorded:
- (a) Parameters needed to calculate the grid emission factor ( $EF_{elec,y}$ );
  - (b) Average annual technical grid losses ( $TD_y$ ), unless the default value in Equation 1 is used (annually);
  - (c) Number of refrigerators of each model type disseminated and the date of such dissemination for each refrigerator disseminated under the project activity within the geographic boundary of the host country and intended for domestic use ( $SN_{y,k}$ ) and their serial and model numbers. Such data shall be recorded at the time of the dissemination activity and compiled at least annually. The source of data depends on the nature of the project activity:
    - Direct sales by manufacturers: Units of each model sold by the manufacturer directly, based on manufacturer sales records;
    - Dissemination by market intermediaries (e.g. retailers or utilities): Units of each model disseminated under the program, as reported by participating market intermediaries;
    - Purchases by refrigerator end-users: Units of each model purchased, based on records collected at the time of sale;
  - (d) Electricity consumption of each refrigerator model disseminated under the project activity, recorded for each model  $k$ , Annual energy consumption ( $AEC_{P,J,k}$ ), as specified on the EU Energy Label or in accordance with the provisions of the EU Regulation cited above;
  - (e) Parameters needed to calculate baseline electricity consumption ( $V_{eq,k}$ ,  $M_k$ , and  $N_k$ ). Such data to be provided by manufacturers per the following:
    - Equivalent volume ( $V_{eq,k}$ ), determined according to Annex VIII of the EU Regulation cited above;
    - The constants  $M_k$  and  $N_k$ , for which default values are specified in Appendix 2 of this methodology;
  - (f) Historical sales of the project appliances ( $SN_{h,k}$ ): Average number of units of each refrigerating appliance model  $k$  sold into the project boundary annually for the three years prior to year=1.

**Project activity under a programme of activities**

15. The methodology is applicable to a programme of activities, no additional leakage estimations are necessary other than that indicated under leakage section above.



Indicative simplified baseline and monitoring methodologies  
for selected small-scale CDM project activity categories

*II.O. Dissemination of energy efficient household appliances (cont)*

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**Appendix 1**

HOUSEHOLD REFRIGERATING APPLIANCES CATEGORIES<sup>7</sup>

Category	Designation
1	Refrigerators with one or more fresh-food storage compartments
2	Refrigerators-cellar, Cellar and Wine storage appliances
3	Refrigerator-chiller and Refrigerator with a 0-star compartment
4	Refrigerator with a one-star compartment
5	Refrigerator with a two-start compartment
6	Refrigerator with a three-star compartment
7	Refrigerator-freezer
8	Upright freezer
9	Chest freezer
10	Multi-use and other refrigerating appliances

Household refrigerating appliances that cannot be classified in categories 1 to 9 because of compartment temperature are classified in category 10.

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<sup>7</sup> Reproduced from Table 1 of Annex VIII of “Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labeling of household refrigerating appliances”.

Indicative simplified baseline and monitoring methodologies  
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## II.O. Dissemination of energy efficient household appliances (cont)

## Appendix 2

**M AND N VALUES BY HOUSEHOLD REFRIGERATING  
APPLIANCE CATEGORY<sup>8</sup>**

Category	<i>M</i>	<i>N</i>
1	0.233	245
2	0.233	245
3	0.233	245
4	0.643	191
5	0.450	245
6	0.777	303
7	0.777	303
8	0.539	315
9	0.472	286
10	(*)	(*)

(\*) **Note:** for Category 10 household refrigerating appliances the *M* and *N* values depend on the temperature and star rating of the compartment with the lowest storage temperature capable of being set by the end-user and maintained continuously according to the manufacturer's instructions. When only an 'other compartment' as defined in Table 2 and Annex I<sup>7</sup>, point (n), is present, the *M* and *N* values for Category 1 are used. Appliances with three-star compartments or food-freezer compartments are considered to be refrigerator-freezers.

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## History of the document

Version	Date	Nature of revision
01.0	EB 66, Annex 51 2 March 2012	Initial adoption.
<b>Decision Class:</b> Regulatory <b>Document Type:</b> Standard <b>Business Function:</b> Methodology		

<sup>8</sup> Reproduced from Table 7 of Annex VIII of "Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labeling of household refrigerating appliances".