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

TYPE I - RENEWABLE ENERGY PROJECTS

Note: Categories I.A, I.B and I.C involve renewable energy technologies that supply electricity, mechanical and thermal energy, respectively, to the user directly. Renewable energy technologies that supply electricity to a grid fall into category I.D.

Follow the link to find General guidance / Abbreviations

I.D. 'Grid connected renewable electricity generation'

Technology/measure

1. This category comprises renewable energy generation units, such as photovoltaics, hydro, tidal/wave, wind, geothermal, and renewable biomass, that supply electricity to and/or displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit.

2. If the unit added has both renewable and non-renewable components (e.g.. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15MW.

3. Biomass combined heat and power (co-generation) systems that supply electricity to and/or displace electricity from a grid are included in this category. To qualify under this category, the sum of all forms of energy output shall not exceed 45 $MW_{thermal}$. E.g., for a biomass based co-generating system the rating for all the boilers combined shall not exceed 45 $MW_{thermal}$.

4. Project activities adding renewable energy capacity should consider the following cases:
   1) Adding new units;
   2) Replacing old units for more efficient units.

To qualify as a small scale CDM project activity, the aggregate installed capacity after adding the new units (case 1) or of the more efficient units (case 2) should be lower than 15 MW[1].

5. Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category. To qualify as a small scale project, the total output of the modified or retrofitted unit shall not exceed the limit of 15 MW

Boundary

6. The project boundary encompasses the physical, geographical site of the renewable generation source.

Baseline

7. In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under category III.D. If the recovered methane is used for electricity generation the baseline shall be calculated in accordance with paragraphs 6 or 7 below. If the recovered methane is used for heat generation it is eligible under category I.C.

[1] Ex: 5 MW of new capacity is added to existing 9 MW to make the aggregate capacity of 14 MW which is within the allowed limits for capacity

8. For a system where all generators use exclusively fuel oil and/or diesel fuel, the baseline is the annual kWh generated by the renewable unit times an emission coefficient for a modern diesel generating unit of the relevant capacity operating at optimal load as given in Table I.D.1.

Table I.D.1
Emission factors for diesel generator systems (in kg CO_2equ/kWh*) for three different levels of load factor**

Cases:	Mini-grid with 24 hour service	i) Mini-grid with temporary service (4-6 hr/day) ii)Productive applications iii) Water pumps	Mini-grid with storage
Load factors [%]	25%	50%	100%
<15 kW	2.4	1.4	1.2
>=15 <35 kW	1.9	1.3	1.1
>=35 <135 kW	1.3	1.0	1.0
>=135<200 kW	0.9	0.8	0.8
> 200 kW***	0.8	0.8	0.8

*) A conversion factor of 3.2 kg CO_2 per kg of diesel has been used (following revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories)
**) Figures are derived from fuel curves in the online manual of RETScreen lnternational's PV 2000 model, downloadable from http://retscreen.net/
***) default values

9. For all other systems, the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO_2equ/kWh) calculated in a transparent and conservative manner as:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology ACM0002. Any of the four procedures to calculate the operating margin can be chosen, but the restrictions to use the Simple OM and the Average OM calculations must be considered;

~~(a) The average of the "approximate operating margin" and the "build margin", where~~:

~~(i) The "approximate operating margin" is the weighted average emissions (in kg CO2equ/kWh) of all generating sources serving the system, excluding hydro, geothermal, wind, low cost biomass, nuclear and solar generation;~~

~~(ii) The "build margin" is the weighted average emissions (in kg CO2equ/kWh) of recent capacity additions to the system, based on the most recent information available on plants already built for sample group m at the time of PDD submission. The sample group m consists of either the five power plants that have been built most recently, or the power plant capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently. Project participants should use from these two options that sample group that comprises the larger annual generation. Power plant capacity additions registered as CDM project activities should be excluded from the sample group m. If 20% falls on part capacity of a plant, that plant is included in the calculation.~~

OR,

(b) The weighted average emissions (in kg CO_2equ/kWh) of the current generation mix. The data of the year in which project generation occurs must be used.

Calculations must be based on data from an official source (where available)[2] and made publicly available.

(c) ~~Approximate Operating Margin emission factor and the weighted average emission factor can be calculated using either of the two following data vintages for years(s) y:~~

~~Option 1:~~

~~A 3-year average, based on the most recent statistics available at the time of PDD submission.~~

~~Option 2:~~

~~The year in which project generation occurs, if emission factor is updated based on ex-post monitoring.~~

~~(d) Build margin emission factor can be calculated using either of the following data vintages for years(s) y:~~

~~Option 1~~

~~Most recent information available on plants already built at the time of PDD submission.~~

~~Option 2~~

~~For the first crediting period, emission factor is updated based on ex-post monitoring. For subsequent crediting periods, Emission factor should be calculated ex-ante, as described in option 1 above~~.

10. In the case of project activities adding renewable energy capacity, if the availability of renewable resources is limited, the impact of a decrease in electricity production from the units installed before the project implementation must be considered.

[2] Plant emission factors used for the calculation of emission factors should be obtained in the following priority:
1. *Acquired directly* from the dispatch center or power producers, if available; or
2. *Calculated*, if data on fuel type, fuel emission factor, fuel input and power output can be obtained for each plant; if confidential data available from the relevant host Party authority are used, the calculation carried out by the project participants shall be verified by the DOE and the CDM-PDD may only show the resultant carbon emission factor and the corresponding list of plants;
3. *Calculated*, as above, but using estimates such as: default IPCC values from the *IPCC 1996 Revised Guidelines and the IPCC Good Practice Guidance* for net calorific values and carbon emission factors for fuels instead of plant-specific values (note that the *IPCC Good Practice Guidance* includes some updates from the IPCC 1996 Revised Guidelines); technology provider's name plate power plant efficiency or the anticipated energy efficiency documented in official sources (instead of calculating it from fuel consumption and power output). This is likely to be a conservative estimate, because under actual operating conditions plants usually have lower efficiencies and higher emissions than name plate performance would imply; conservative estimates of power plant efficiencies, based on expert judgements on the basis of the plant's technology, size and commissioning date; or
4. *Calculated*, for the simple OM and the average OM, using aggregated generation and fuel consumption data, in cases where more disaggregated data is not available.

For the specific case of hydropower plants, this effect could be considered calculating the production of electricity that must be used for emission reduction calculation with the following procedure:

1) To estimate every year during the crediting period, the energy that would have been produced in the same hydrological conditions by the units installed before the project;
2) The electricity production EGy (MWh/ year) that must be considered to calculate emission reductions is calculated with the following formula:

EGy = TEy – WTEy

where:

TEy = the actual electricity produced in year y in the plant (all units)
WTEy = the electricity that would have been produced by the units installed before the project under the hydrological conditions of year y

11. For project activities that seek to retrofit or modify an existing facility for renewable energy generation the baseline scenario is the following:

In the absence of the CDM project activity, the existing facility would continue to provide electricity to the grid (EGbaseline, in MWh/year) at historical average levels (EGhistorical, in MWh/year), until the time at which the generation facility would be likely to be replaced or retrofitted in the absence of the CDM project activity (DATEBaselineRetrofit). From that point of time onwards, the baseline scenario is assumed to correspond to the project activity, and baseline electricity production (EGbaseline) is assumed to equal project electricity production (EGy, in MWh/year), and no emission reductions are assumed to occur.

EGbaseline = EGhistorical until DATEBaselineRetrofit
EGbaseline = EGy on/after DATEBaselineRetrofit

Baseline emissions (BE_y in tCO_2) are then, the product of the baseline emissions factor (EF_y in tCO_2/MWh) calculated in paragraph 8 and 9, times the electricity supplied by the project activity to the grid (EG_y in MWh) minus the baseline electricity supplied to the grid in the case of modified or retrofit facilities ($EG_{baseline}$ in MWh), as follows:

$$BE_y = (EG_y - EG_{baseline}) \cdot EF_y$$

EGhistorical is the average of historical electricity delivered by the existing facility to the grid, spanning all data from the most recent available year (or month, week or other time period) to the time at which the facility was constructed, retrofit, or modified in a manner that significantly affected output (i.e., by 5% or more), expressed in MWh per year. A minimum of 5 years (120 months) (excluding abnormal years) of historical generation data is required in the case of hydro facilities. For other facilities, a minimum of 3 years data is required. In the case that 5 years of historical data (or three years in the case of non hydro project activities) are not available - e.g., due to recent retrofits or exceptional circumstances as described in footnote[3] 1 - a new methodology or methodology revision must be proposed.

All project electricity generation above baseline levels (EGbaseline) would have otherwise been generated

[3] Data for periods affected by unusual circumstances such as natural disasters, conflicts, and transmission constraints shall be excluded

by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described.

In order to estimate the point in time when the existing equipment would need to be replaced in the absence of the project activity (DATEBaselineRetrofit), project participants may take the following approaches into account:

(a) The typical average technical lifetime of the type equipment may be determined and documented, taking into account common practices in the sector and country, e.g. based on industry surveys, statistics, technical literature, etc.

(b) The common practices of the responsible company regarding replacement schedules may be evaluated and documented, e.g. based on historical replacement records for similar equipment. The point in time when the existing equipment would need to be replaced in the absence of the project activity should be chosen in a conservative manner, i.e. if a range is identified, the earliest date should be chosen.

Leakage

12. If the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity, leakage is to be considered.

Monitoring

13. Monitoring shall consist of metering the electricity generated by the renewable technology. In the case of co-fired plants, the amount of biomass and fossil fuel input shall be monitored.