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.

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.

I.A. Electricity generation by the user

Technology/measure

1. This category comprises renewable energy generation units that supply individual households or users with a small amount of electricity. The applicability is limited to households and users that do not have a grid connection. These units include technologies such as solar power, hydropower, wind power, and other technologies that produce electricity all of which is used on-site by the user, such as solar home systems, and wind battery chargers. The renewable generating units may be new or replace existing fossil fuel fired generation. The capacity of these renewable energy generators shall not exceed 15 MW.

2. Combined heat and power (co-generation) systems are not eligible under this category. ~~ies I.C and I.D.~~

3. 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 [non-] renewable biomass and fossil fuel, the capacity of the entire unit shall not exceed the limit of 15MW.

4. 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.

5. In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct[1] from the existing units.

Boundary

6. The physical, geographical site of the renewable energy generating unit and the equipment that uses the electricity produced delineates the project boundary.

[1] Physically distinct units are those that are capable of generating electricity without the operation of existing units, and that do not directly affect the mechanical, thermal, or electrical characteristics of the existing facility. For example, the replacement of the nacelle assembly or blades of a wind battery charger would not be considered "physically distinct".

Baseline

7. The energy baseline is the fuel consumption of the technology in use or that would have been used in the absence of the project activity. The project participants may use one of the following energy baseline formulae:

(a) Option 1:

$$E_B = \Sigma_i(n_i \,.\, c_i)/(1 - l)$$

Where:

E_B annual energy baseline in kWh per year.

Σ_i the sum over the group of "i" renewable energy technologies (e.g. residential, rural health centre, rural school, mills, water pump for irrigation, etc.) implemented as part of the project.

n_i number of consumers supplied by installations of the renewable energy technology belonging to the group of "i" renewable energy technologies during the year.

c_i estimate of average annual individual consumption (in kWh per year) observed in closest grid electricity systems among rural grid connected consumers belonging to the same group of "i" renewable energy technologies. If energy consumption is metered, c_i is the average energy consumed[2] by consumers belonging to the group of "i" renewable energy technologies.

l average technical distribution losses that would have been observed in diesel powered mini-grids installed by public programmes or distribution companies in isolated areas, expressed as a fraction.[3]

OR

(b) Option 2:

$$E_B = \Sigma_i O_i /(1 - l)$$

Where:

E_B annual energy baseline in kWh per year

Σ_i the sum over the group of "i" renewable energy technologies (e.g. solar home systems, solar pumps) implemented as part of the project.

Oi the estimated annual output of the renewable energy technologies of the group of "i" renewable energy technologies installed (in kWh per year)

---

[2] Potential over sizing of the power capacity installed or energy generated by the CDM project activity shall not be reflected in the baseline and emissions reduction calculation. For this reason, the energy value taken into account shall be the energy consumed. It cannot be the electricity output, except if the project participant justifies that it represent a reasonable estimate of the energy that would have been generated by a diesel generator larger than 35 kW and operating with a load factor of at least 50% to provide similar electricity services.

[3] A reasonable default value for distribution losses on low voltage rural distribution grid could be 20%.

l average technical distribution losses that would have been observed in diesel powered mini-grids installed by public programmes or distribution companies in isolated areas, expressed as a fraction.

OR

(c) Option 3: A trend adjusted projection of historic fuel consumption is acceptable in situations where an existing technology is replaced.

8. If the project participants wish to use a different formula to determine E_B, the proposal needs to be accepted in accordance with the modalities for new methodologies for small-scale project activities (see paragraph 2 of the general guidance).

9. The emissions baseline is the historic fuel consumption ~~energy baseline~~ calculated in accordance with paragraph 7 (c) above times the CO_2 emission coefficient for the fuel displaced. IPCC default values for emission coefficients may be used.

10. A default value 0.8 $KgCO_2e/kWh$ which is derived from diesel generation units, may be used for option 7(a) and 7(b). A small-scale project proponent may, with adequate justification use a higher emissions factor from Table I.D.1 under category I.D.

11. 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.

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:

$$\mathbf{EGy = TEy - WTEy}$$

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

12. In the case of project activities that involves the addition of renewable energy generation units at an existing renewable power generation facility, where the existing and new units share the use of common and limited renewable resources (e.g. streamflow, reservoir capacity, biomass residues), the potential for the project activity to reduce the amount of renewable resource available to, and thus electricity generation by, existing units must be considered in the determination of baseline emissions, project emissions, and/or leakage, as relevant.

For project activities that involve the addition of new generation units (e.g. turbines) at an existing facility, the increase in electricity production associated with the project (EGy in MWh/ year) should be calculated as follows:

$$\mathbf{EGy = TEy - WTEy}$$

Where:
TEy = the total electricity produced in year y by all units, existing and new project units
WTEy = the estimated electricity that would have been produced by existing units (installed before the project activity) in year y in the absence of the project activity, where

$$\mathbf{WTEy = MAX(WTE_{actual,y}\ ,WTE_{estimated,y})}$$

Where:
$\mathbf{WTE_{actual,y}}$ = the actual, measured electricity production of the existing units in year y;
$\mathbf{WTE_{estimated,y}}$ = the estimated electricity that would have been produced by the existing units under the observed availability of the renewable resource (e.g. hydrological conditions) for year y.

If the existing units shut down, are derated, or otherwise become limited in production, the project activity should not get credit for generating electricity from the same renewable resources that would have otherwise been used by the existing units (or their replacements). Therefore, the equation for WTE still holds, and the value for $WTE_{estimated,y}$ should continue to be estimated assuming the capacity and operating parameters same as that at the time of the start of the project activity.

If the existing units are subject to modifications or retrofits that increase production, then WTEy can be estimated using the procedures described for $EG_{baseline}$ below.

13. 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 (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 = MAX(EGhistorical, EGestimated,y) 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) , times the electricity supplied by the project activity (EG_y in MWh) minus the baseline electricity supplied 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 , 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 (60 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[4] 1 - a new methodology or methodology revision must be proposed.

EGestimated,y is the estimated electricity that would have been produced by the existing units under the observed availability of renewable resource (e.g. hydrological conditions) for year y.

All project electricity generation above baseline levels (EGbaseline) would have otherwise been generated by the operation of power plants and by the addition of new generation sources.

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 equipment type 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

14. 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.

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

Monitoring

15. Monitoring shall consist of:

(a) An annual check of all systems or a sample thereof to ensure that they are still operating (other evidence of continuing operation, such as on-going rental/lease payments could be a substitute).

OR

(b) Metering the electricity generated by all systems of a sample thereof.

16. In the case of co-fired and hybrid systems, the amount of fossil fuel input shall be monitored.