



Capacity Development for CDM

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Baseline Determination for Small Scale Projects

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Small-scale projects

The scales:

- ★ Renewable energy project activities with a maximum output capacity equivalent of up to **15 MW**
- ★ Energy efficiency improvement project activities which reduce energy consumption, on the supply and/or demand side, by up to the equivalent of **15 GWh per year**
- ★ Other project activities that both reduce anthropogenic emissions by sources and directly emit **less than 15 ktCO₂eq annually**

Eligible Small-Scale CDM project categories

Project types	Small-scale CDM project activity categories
Type I: Renewable energy projects <15MW	A. Electricity generation by the user B. Mechanical energy for the user C. Thermal energy for the user D. Renewable electricity generation for a grid
Type II: Energy efficiency improvement projects Savings <15 GWh/yr	A. Supply side energy efficiency improvements - transmission and distribution B. Supply side energy efficiency improvements - generation C. Demand-side energy efficiency programmes for specific technologies D. Energy efficiency and fuel switching measures for industrial facilities E. Energy efficiency and fuel switching measures for buildings
Type III: Other project Activities Emissions and reduction <15ktCO₂ eq/yr	A. Agriculture B. Switching fossil fuels C. Emission reductions by low-greenhouse gas emission vehicles D. Methane recovery and avoidance
Other Types ???	Possibly to be added by project developers



Small-scale projects

- ★ The three project categories are mutually exclusive (“either-or” is not applicable):
 - A 20 MW Wind power plant is not eligible to Cat. I as it is >15MW
 - Neither eligible even though it avoids < 15 ktCO₂e annually





Small-scale projects are not always small

- ★ An efficient refrigerator saves 200 kWh/year. To be below 15 GWh of savings there is room for 75,000 refrigerators.
- ★ A Solar home system that uses a 100W solar PV. To be below the 15 MW there is room for 150,000 solar PVs
- ★ A private car running 20.000 km/year emitting 200 gCO₂/km emits 4tCO₂/year. To be below 15ktCO₂ there is room for about 4.000 hydrogen cars.



Modalities and Procedures (M&P) for the Small-Scale CDM

- ★ A special M&P for Small-Scale CDM was adopted at COP8, and can be found on the UNFCCC-CDM Web Site
- ★ At the seventh meeting of the Executive Board (EB7, 20-21 January 2003) → detailed rules for Small-Scale CDM were finalised
- ★ At COP9 the annex to the CDM M&P was finalised: Small scale LULUCF project must be <8 kt CO₂ and implemented by low-income communities or individuals. A technical paper must be prepared for the next SBSTA meeting in summer 2004



Additionality in the SSc M&P

- ★ Show that the project would not have occurred without CDM due to:
 - Investment barrier
 - Technological barriers
 - Barrier due to prevailing practice
 - Other barriers: Institutional, information, managerial, organizational capacity, financial, or capacity to absorb new technologies





Finnish small scale projects

Finland is preparing a number of small scale CDM projects
(See

<http://global.finland.fi/english/projects/cdm/projects.html> :

- ✓ Mini hydro in India
- ✓ CH₄ breakdown by biological filtering on a Landfill in Vietnam
- ✓ Bundle of 9 Biomass Gasifier based power plants in India
- ✓ Biogas plant in Costa Rica





Finnish small scale projects

- ✓ Biogas plant in Costa Rica
- ✓ Hydro power projects in Honduras
- ✓ Expansion of power plant in El Salvador using sugar cane leaves and crop residues + sawdust bricks (PIN available)
- ✓ Replacing a 0.84 MW diesel powered plant with a 2 MW hydro plant in Zambia (PIN available)





Debundling is not allowed

A small-scale project activity that is part of a larger project activity is not eligible.


A small-scale project activity is debundled → not eligible, if there is a registered (or application to be registered) small-scale CDM project activity:

- ✓ With the same project participants
- ✓ In the same project category and technology/measure
- ✓ Registered within the previous 2 years; and
- ✓ Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.





Other issues

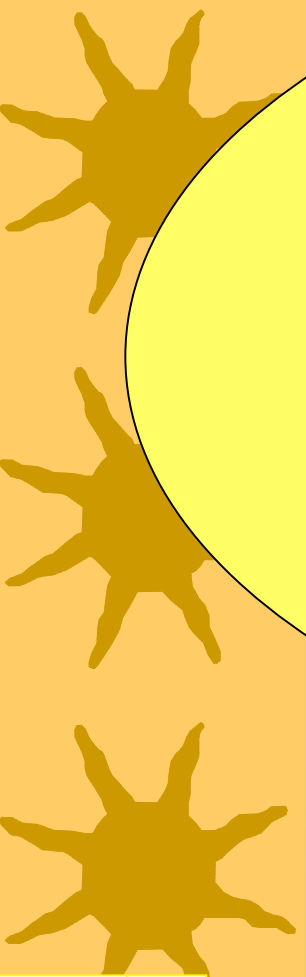


The crediting period can be 3*7 years or 1*10 years. For afforestation and reforestation projects it is 3*20 years or 30 years, with a mandatory verification and certification every 5 years.





Development of Baselines For Small Scale Projects






BL determination for Sscale projects

- ★ Standardized baselines are in place: See doc. “Simplified M&P for the Ss CDM” (<http://cdm.unfccc.int>)
- ★ Standardized baselines are meant to simplify the procedures
- ★ Leakage calculation not required

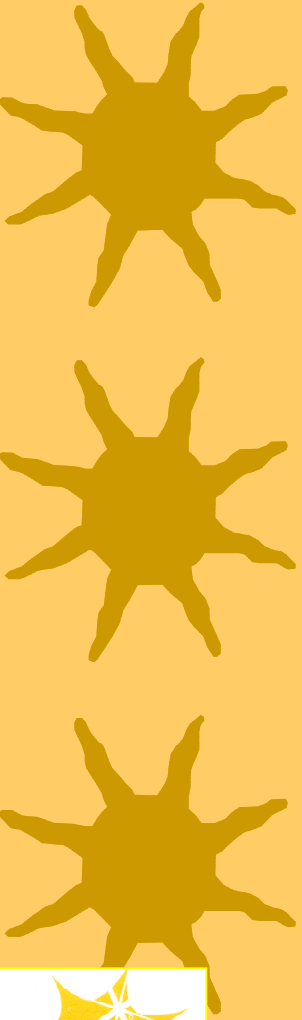


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<p>Type I: Renewable energy projects</p> <p><15MW </p>	<p>A. Electricity generation by the user</p> <p>B. Mechanical energy for the user</p> <p>C. Thermal energy for the user</p> <p>D. Renewable electricity generation for a grid</p>
<p>Type II: Energy efficiency improvement projects</p> <p>Savings <15 GWh/yr</p>	<p>A. Supply side energy efficiency improvements - transmission and distribution</p> <p>B. Supply side energy efficiency improvements - generation</p> <p>C. Demand-side energy efficiency programmes for specific technologies</p> <p>D. Energy efficiency and fuel switching measures for industrial facilities</p> <p>E. Energy efficiency and fuel switching measures for buildings</p>
<p>Type III: Other project Activities</p> <p>Emissions and reduction <15ktCO₂ eq/yr</p>	<p>A. Agriculture</p> <p>B. Switching fossil fuels</p> <p>C. Emission reductions by low-greenhouse gas emission vehicles</p> <p>D. Methane recovery and avoidance</p>



Category I

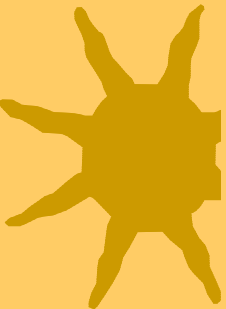
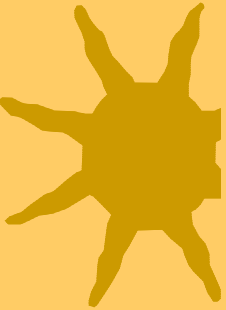
Renewable Energy Projects





Category 1.A. Electricity generation by the user

- ★ Comprises stand-alone (not connected to any grid) renewable technologies that supply individual users : Solar home systems, micro hydro, small wind power, solar/wind battery chargers
- ★ **Baseline:** (i) The energy produced by the equipment, or (ii) the electricity use among similar electricity consuming users in the nearest community. A default value of 0.9 kgCO₂/kWh can be used
- ★ **Monitoring:** metering or an annual check of a sample





Ex. Category 1.A. A bundle of 9 biomass gasifier based power plants

The power of the plants are in the range 50 kW – 1000 kW

The biomass used: Coconut shells, cashew waste, eucalyptus branches, fallen trees, Juliflora trees, forest waste.

Electricity production = 10.3 GWh/year will be used by micro industries and/or irrigation pumps in rural and semi-urban areas.

Emission reduction = $10.3 \text{ GWh} * 0.9 \text{ kgCO}_2/\text{kWh} = 9.3 \text{ ktCO}_2/\text{year}$

Additionality: Coal fired power is cheaper (investment barrier), perceived performance uncertainties in organizing the biomass supply and O&M of stand-alone systems (technology barrier), power purchase agreements will be too low (prevailing practice barrier)

All the equipment is new, therefore no leakage

Monitoring: Electricity produced by all generators



Category 1.B. Mechanical energy by the user

Examples: Hydromill, windmill and other technologies that provide mechanical energy used on site by the household or user: wind-powered pumps, solar water pumps

Baseline: (i) Emissions from the same load with a diesel generator (see table next page), or; (ii) Default emission factor for diesel = 3.2 kgCO₂/kg diesel

Monitoring: recording the annual number of systems operating and annual hours of operation for a sample.



Default Emission factors for a Diesel Mini-grid

Mini grid kg CO ₂ /kWh	2-4 h Service	4-6 h service	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	1
135-200 kW	0.9	0.8	0.8
>200 kW	0.8	0.8	0.8





Category 1.C. Thermal energy for the user

Examples: Solar water heaters, dryers & cookers; biomass energy for water heating, space heating and cogeneration

Baseline:

- the fuel consumption of the technologies that would have been used in the absence of the project activity \times an emission coefficient (IPCC value) for the fossil fuel displaced
- If non-renewable biomass displaced : the quantity of the Non-Renewable biomass \times EF (IPCC value)
- If electricity is displaced: the electricity consumption \times the relevant EF in the table (p.19)





Category 1.C. Thermal energy for the user

Monitoring: metering of the energy produced by a sample

If the emission reduction is $< 5 \text{ ktCO}_2/\text{year}$ the number of *operating* systems * annual hours of operation for an average system * output per hour.





Category 1.D. Renewable electricity generation for the grid

Examples: PVs, Hydro, wind, geothermal, biomass & landfill gas that supply electricity.

Baseline:

•If fuel oil or diesel are generally used in small grid systems to generate the electricity that is displaced: kWh produced by the RE x the relevant diesel emission coefficient mentioned in the table p.19

Category 1.D. Renewable electricity generation for the grid

Baseline:

- **For all other systems the combined margin approach must be used:**

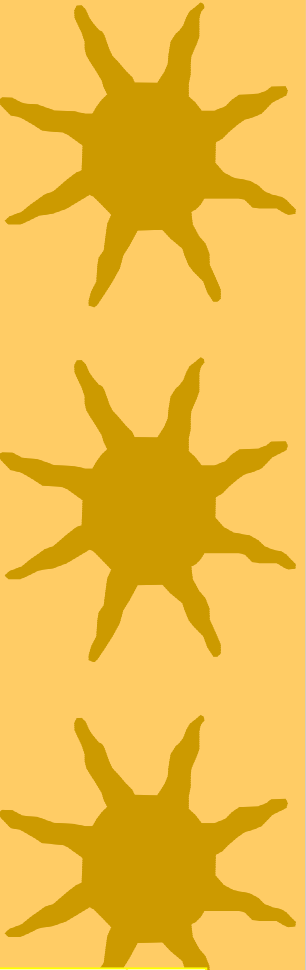
- ✓ **Approximate Operating Margin: weighed average emission (kgCO₂/kWh) of all the generating systems (excluding hydro, geothermal, wind, low-cost biomass, solar and nuclear generation)**

- ✓ **Build Margin: weighed average emission (kgCO₂/kWh) of Recent Capacity Additions → most recent 20% plants or the most recent 5 plants whichever is greater**

NB: If 20% falls on part of the capacity of a plant, that plant is included in the calculation

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Category II
Energy Efficiency
improvement projects



Category 2.A- Supply side Energy Efficiency improvements – Transmission and Distribution



Baselines:

- For a retrofit: the technical energy losses → measured performance of the existing grid or a performance standard
- For a new system: technical losses of energy calculated using a performance standard for the grid that would otherwise been installed
- Emission factor: See Category 1.D and the corresponding table



Category 2.B- Supply side Energy Efficiency improvements – Generation

Baselines:

- For a retrofit: monitored performance of the existing generating unit
- For a new facility: technical losses of energy calculated using a performance standard for the equipment that would have otherwise been installed
- Emission factor: IPCC default emission coefficient for the fuel used by the generating unit



Category 2.C - Demand-side energy efficiency for specific technologies

Baselines:

- Displacing fossil fuel: Existing fuel consumption or amount of fuel that would have been used by the technology that would have been implemented otherwise
- Emission Factor: IPCC default emission factor

- Displacing Electricity: Number of devices * power of device * average annual operating hours/grid loss * emission coefficient as for 1.D.

Category 2.D - Energy Efficiency & Fuel Switching for industrial facilities*

Baselines (same as 2.C)

- Displacing fossil fuel: Existing fuel consumption or amount of fuel that would have been used by the technology that would have been implemented otherwise
- Emission Factor: IPCC default emission factor
- Displacing Electricity: Number of devices * power of device * average annual operating hours/grid loss * emission coefficient as for 1.D.

*NB: A project that involves **primarily** fuel switching fall in category 3.B.*

Category 2.E - Energy Efficiency & Fuel Switching for buildings*

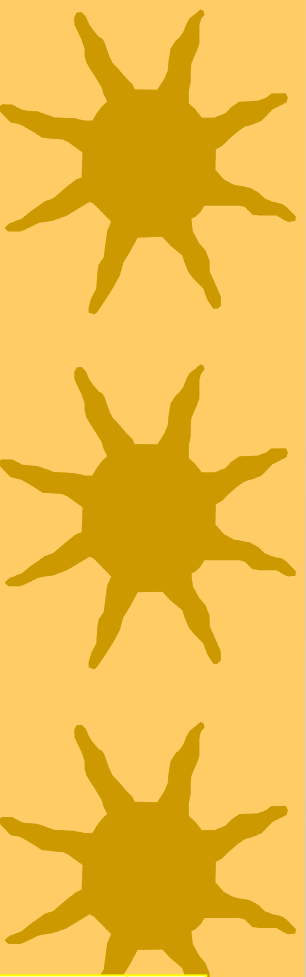
Baselines (same as 2.C)

- Displacing fossil fuel: Existing fuel consumption or amount of fuel that would have been used by the technology that would have been implemented otherwise
- Emission Factor: IPCC default emission factor
- Displacing Electricity: Number of devices * power of device * average annual operating hours/grid loss * emission coefficient as for 1.D

*NB: A project that involves **primarily** fuel switching fall in category 3.B*

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Category III
Other
Project activities





Category 3.A. Agriculture

Activities in this category are possible, but the EB thinks that more work is needed on this category before proposing simplified baselines and monitoring methodologies.

- Project type according to IPCC:
 - Reduction of enteric fermentation
 - Reduction of emissions from manure management
 - Reduced emissions from rice cultivation
 - Improved fertilizer usage





Category 3.B. Switching fossil fuels

This category comprises **existing** industrial, residential, commercial, institutional or electricity generation applications. If the project primarily focuses on energy efficiency it is eligible under 2.D. or 2.E.

Baseline: Current emission of the facility expressed as emission per unit of output.


Monitoring : of the fuel use and output for an appropriate period (e.g. records for a few years) before the fuel switch, and after the fuel switch.



Category 3.C. Emission reductions by low-greenhouse emission technologies



This category comprises low-greenhouse emission vehicles



Baseline: the energy use per unit of service (e.g. ton-km) for the vehicle that would otherwise have x the average annual unit of services per vehicle x nbr of vehicles x emission factor for the fuel used



If electricity is used: see cat. 1.D

Category 3.D. Methane recovery and avoidance

This category comprises CH₄ **capture and flaring only** from coal mines, landfills, wastewater treatment facilities etc.

- If the CH₄ is used for heating purposes the project is eligible under 1.C.
- If the CH₄ is used for electricity production the project is eligible under 1.D.

Baseline: The CH₄ emitted in the absence of the project

Monitoring: The CH₄ captured and flared + CH₄ content in the gas