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RECOMMENDATION BY THE PANEL ON BASELINE AND MONITORING METHODOLOGIES (METH PANEL)

Annex B

INDICATIVE SIMPLIFIED BASELINE AND MONITORING METHODOLOGIES FOR SELECTED SMALL-SCALE CDM PROJECT ACTIVITY CATEGORIES

A. General guidance

1.   This annex contains indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories, including recommendations for determining the project boundary, leakage, baseline and monitoring.

2.   In accordance with paragraphs 7 and 8 of the simplified modalities and procedures for small-scale CDM project activities, project participants involved in small-scale CDM project activities may propose changes to the simplified baseline and monitoring methodologies specified in this Annex or propose additional project categories for consideration by the Executive Board. Project participants willing to submit a new small-scale project activity category or revisions to a methodology shall make a request in writing to the Board providing information about the technology/activity and proposals on how a simplified baseline and monitoring methodology would be applied to this category. The Board may draw on expertise, as appropriate, in considering new project categories and/or revisions of and amendments to simplified methodologies. The Executive Board shall expeditiously, if possible at its next meeting, review the proposed methodology. Once approved, the Executive Board shall amend annex B.

3.   The annex reflects the following guidance regarding equipment performance, project boundary and biomass projects:

4.   Equipment performance: To determine equipment performance project participants shall use:

(a)   The appropriate value specified in Annex B;

(b)   If the value specified in sub-paragraph (a) is not available, the national standard for the performance of the equipment type (project participants shall identify the standard used);

(c)   If the value specified in sub-paragraph (b) is not available, an international standard for the performance of the equipment type, such as ISO or IEC standards (project participants shall identify the standard used);

(d)   If a value specified in sub-paragraph (c) is not available, the manufacturer's specifications provided that they are tested and certified by national or international certifiers.

5.   Project participants have the option of using performance data from test results conducted by an independent entity for equipment installed under the project activity.

6.   Project boundary: The project boundary shall be limited to the physical project activity. Project activities that displace energy supplied by external sources shall earn CERs for the emission reductions associated with the reduced supply of energy by those external sources.

7.   Biomass projects: In the case of project activities using biomass, leakage shall be considered.

CONTENTS

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.

I.A.   Electricity Generation by the User

Technology/Measure

1.   This category comprises renewable technologies that supply individual households or users with a small amount of electricity. These technologies include 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, solar water pumps, 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 eligible under categories I.C and I.D.

Boundary

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

Baseline

4.   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:

$$E_B = S(n_i \cdot c_i) / (1 - l)$$

Where

E_B = annual energy baseline
n_i = number of consumers supplied by installations of the renewable energy technology belonging to category i (residential, rural health center, rural school, mills, water pump for irrigation, etc.)
c_i = estimate of average annual individual consumption (in kWh) observed in closest grid electricity systems among rural grid connected consumers belonging to the same category. If energy consumption is metered, c_i is the average energy consumed[1] by consumers belonging to category i.
l = average technical distribution losses that would have been observed in diesel powered mini-grids installed by public programs or distribution companies in isolated areas, expressed as a fraction.[2]

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[1] Potential oversizing 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 that 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.

OR

(b)   Option 2:

$$E_B = SOi\ /(1 - l)$$

Where

E_B = annual energy baseline
Oi = the estimated annual output of the renewable energy technologies of type i (solar home systems, solar pumps) installed (in kWh)
l = average technical distribution losses that would have been observed in diesel powered mini-grids installed by public programs or distribution companies in isolated areas, expressed as a fraction.

5.   If the project participants wish to use a different formulae to determine EB 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 (Section A) above).

6.   The emissions baseline is the energy baseline calculated in accordance with paragraph 4 above times the CO_2 emission coefficient for the fuel displaced. IPCC default values for emissions coefficients may be used. A default value 0.9 $kgCO_2$/kWh, which is derived from diesel generation units, may be used.

Leakage

7.   If the renewable energy technology is new equipment being installed for the first time, no leakage calculation is required.

Monitoring

8.   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.

I.B.   *Mechanical Energy for the User*

Technology/Measure

9.   This category comprises renewable energy technologies that supply individual households or users with a small amount of mechanical energy. These technologies include hydropower, wind power, and other technologies that provide mechanical energy all of which is used on? site by the household or user, such as wind-powered pumps, solar water pumps, water mills and wind mills.

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

10.   Where generation capacity is specified, it shall be less than 15MW. If the generation capacity is not specified, the estimated diesel-based electricity generating capacity that would be required to provide the same service or mechanical energy shall be less than 15 MW. In the case of irrigation where diesel pumps are used directly, the cumulative rating of diesel pumps shall not exceed 15 MW. The size of diesel based generator or the diesel pump that would be required shall be justified.

Boundary

11.   The physical, geographical site of the renewable energy technology and the equipment that uses the mechanical energy produced delineates the project boundary.

Baseline

12.   The simplified baseline is the estimated emissions due to serving the same load with a diesel generator consumption saved times the emission coefficient for diesel. The diesel emissions displaced annually are calculated either as:

      (a)   the power requirements times hours of operation per year times the emission factor for diesel generator systems in Table I.D.1

<div align="center">OR</div>

      (b)   the diesel fuel consumption per hour times hours of operation per year times the IPCC coefficient for diesel fuel (3.2 kg CO_2 per kg of diesel fuel).

Leakage

13.   If the renewable energy technology is new equipment being installed for the first time, no leakage calculation is required.

Monitoring

14.   Monitoring shall consist of:

      (a)   Recording annually the number of systems operating (evidence of continuing operation, such as on-going rental/lease payments could be a substitute) and

      (b)   Estimating the annual hours of operation for the equipment that uses the mechanical energy produced, if necessary using sampling methods. Annual hours of operation can be estimated from total output (tonnes of grain milled) and output per hour if an accurate value of output per hour is available.

I.C. Thermal Energy for the User

Technology/Measure

15.   This category comprises renewable energy technologies that supply individual households or users with thermal energy that displaces fossil fuel or non-renewable sources of biomass. Examples include solar thermal water heaters and dryers, solar cookers, energy derived from biomass for water heating, space heating, or drying, and other technologies that provide thermal energy that displaces fossil fuel. Biomass based co-generating systems that produce heat and electricity for use on-site are included in this category.

16.   Where generation capacity is specified by the manufacturer, it shall be less than 15MW. For co-generation systems 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 the primary boiler shall not exceed 45 $MW_{thermal}$.

Boundary

17.   The physical, geographical site of the renewable energy technologies generating the thermal energy and the equipment that uses the thermal energy produced delineates the project boundary.

Baseline

18.   For renewable energy technologies that displace technologies using fossil fuels, the simplified baseline is the fuel consumption of the technologies that would have been used in the absence of the project activity times an emission coefficient for the fossil fuel displaced. IPCC default values may be used.

19.   For renewable energy technologies that displace non-renewable sources of biomass, the simplified baseline is the non-renewable sources of biomass consumption of the technologies times an emission coefficient for the non-renewable sources of biomass displaced. IPCC default values may be used.

20.   For renewable energy technologies that displace electricity the simplified baseline is the electricity consumption times the relevant emission factor calculated as described in category I.D, paragraphs 28 and 29.

Leakage

21.   If the renewable energy technology is new equipment being installed for the first time, no leakage calculation is required.

Monitoring

22.   Monitoring shall consist of:

(a)   Metering the energy produced by a sample of the systems where the simplified baseline is based on the energy produced multiplied by an emission coefficient.

OR

(b)   Metering the thermal and electrical energy generated for co-generation projects;

OR

(c)   If the emissions reduction per system is less than 5 tonnes of CO_2 a year:

(i)   Recording annually the number of systems operating (evidence of continuing operation, such as on-going rental/lease payments could be a substitute); and

(ii)   Estimating the annual hours of operation of an average system, if necessary using survey methods. Annual hours of operation can be estimated from total output (e.g. tonnes of grain dried) and output per hour if an accurate value of output per hour is available.

I.D.   *Renewable Electricity Generation for a Grid*

Technology/Measure

23.   This category comprises renewables, such as photovoltaics, hydro, tidal/wave, wind, geothermal, and biomass, that supply electricity to an electricity distribution system that is or would have been supplied by at least one fossil fuel or non-renewable biomass fired generating unit.

24.   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.

25.   Biomass combined heat and power (co-generation) systems that supply electricity to 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 the primary boiler shall not exceed 45 $MW_{thermal}$.

Boundary

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

Baseline

27.   In the case of landfill gas, waste gas, waste water 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 paragraph 28 or 29 below. If the recovered methane is used for heat generation it is eligible under category I.C.

28.   For a system where all fossil fuel fired generating units use fuel oil 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%
I.			
<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 3.2kg CO_2 per kg of diesel has been used (following IPCC guidelines)

**) Figures are derived from fuel curves in the online manual of RETScreen lnternational's PV 2000 model, downloadable from http://retscreen. net/

***) default values

29.   For all other systems, the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in $KgCO_2$/kWh) calculated in a transparent and conservative manner as:

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

(i)   The "approximate operating margin" is the weighted average emissions (in $KgCO_2$/kWh) of all generating sources serving the system, excluding hydro, geothermal, wind, low-cost biomass and solar generation;

(ii)   The "build margin" is the weighted average emissions (in $KgCO_2$/kWh) of recent capacity additions to the system, defined as the lower of most recent 20% of plants built or the 5 most recent plants;

OR

(b)   The weighted average emissions (in $KgCO_2$/kWh) of the current generation mix.

Leakage

30.   If the renewable energy technology is new equipment being installed for the first time, no leakage calculation is required.

Monitoring

31.   Monitoring shall consist of metering the electricity generated by the renewable technology. In the case of co-fired plants, the amount of biomass input and its energy content shall be monitored.

TYPE II - ENERGY EFFICIENCY IMPROVEMENT PROJECTS

II.A.   *Supply Side Energy Efficiency Improvements – Transmission and Distribution*

Technology/Measure

32.   This category comprises technologies or measures to improve the energy efficiency of an electricity or district heating transmission and distribution system by up to the equivalent of 15 GWh per year. Examples include upgrading the voltage on a transmission line, replacing a transformer, and increased insulation of the pipes in a district heating system. The technologies or measures may be applied to existing transmission or distribution systems or be part of an expansion of a transmission or distribution system.

Boundary

33.   The project boundary is the physical, geographical boundary of the portion of the transmission and/or distribution system where the energy efficiency measures are implemented.

Baseline

34.   For retrofit projects, the energy baseline is the technical losses of energy within the project boundary calculated as either:

      (a)   The measured performance of the existing equipment;

<div align="center">OR</div>

      (b)   The performance of the existing equipment as determined using a standard selected in accordance with paragraphs 4 and 5 of the general guidance above.

35.   In the case of new facilities the energy baseline is the technical losses of energy within the project boundary calculated using a standard for the equipment that would otherwise have been installed selected in accordance with paragraphs 4 and 5 of the general guidance above.

36.   The emissions baseline is the energy baseline multiplied by an emission coefficient. If the energy displaced is electricity, the emissions coefficient (in $KgCO_2/kWh$) shall be calculated as described in paragraphs 28 and 29 for category I.D. For measures implemented to improve the efficiency of a district heating system, the emissions coefficient is that of the fossil fuel used by the system. IPCC default values for emission coefficients can be used.

Leakage

37.   If the energy efficiency technology is new equipment being installed for the first time no leakage calculation is required.

Monitoring

38.	The energy performance of the project activity shall be the measured technical energy losses of the equipment installed unless such losses cannot be metered.[3] If the technical energy losses cannot be determined from metered data, they shall be calculated using the test results when the installed equipment is commissioned, and if these are not available use the value determined in paragraphs 34 or 35 as appropriate.

**II. B.	*Supply Side Energy Efficiency Improvements – Generation***

Technology/Measure

39.	This category comprises technologies or measures to improve the efficiency of fossil fuel generating units that supply an electricity or thermal system by reducing energy or fuel consumption by up to the equivalent of 15 GWh per year.[4] Examples include efficiency improvements at power stations and district heating plants and co-generation.[5] The technologies or measures may be applied to existing stations or be part of a new facility.

Boundary

40.	The project boundary is the physical, geographical site of the fossil fuel fired power station unit affected by the efficiency measures.

Baseline

41.	The energy baseline is the technical losses of energy within the project boundary. In the case of retrofit measures, the energy baseline is calculated as the monitored performance of the existing generating unit. In the case of new facilities, the energy baseline is calculated using a standard for the equipment that would otherwise have been installed selected in accordance with paragraphs 4 and 5 of the general guidance above.

42.	The emissions baseline is the energy baseline multiplied by an emission coefficient for the fuel used by the generating unit. IPCC default emission factors may be used.

Leakage

43.	If the energy efficiency technology is new equipment being installed for the first time no leakage calculation is required.

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[3] When non-technical energy losses are small relative to technical energy losses, technical energy losses after implementation of the efficiency measures can be determined from metered data if available. The electricity or steam delivered to the portion of the system affected by the efficiency improvements as well as the electricity or steam received at the end of the portion of the system affected by the improvements are metered. If the portion of the transmission/distribution system affected by the energy efficiency improvements is not already separately metered, the reduced technical energy losses could be expressed as a percentage of the losses on a portion of the system that is already metered.

[4] Efficiency improvements to non-fossil fuel generating units, such as turbine replacement for hydro projects, shall be treated in the same way as renewable energy projects. The efficiency improvement is calculated or measured, this improvement, expressed as a percentage, is applied to the measured output of the unit and multiplied by the emission factor calculated in accordance with category I.D projects.

[5] Biomass co-generation projects shall be considered as category I.C or I.D activities.

Monitoring

44.   Energy savings shall be measured after implementation of the efficiency measures, by calculating the energy content of the fuel used by the generating unit and the energy content of the electricity or steam produced by the unit. Thus both fuel use and output need to be metered.

45.   A standard emission coefficient for the fuel used by the generating unit is also needed. IPCC default emission coefficients may be used. In the case of coal, the emission coefficient shall be based on test results for samples of the coal purchased if such tests are part of the normal practice for coal purchases.

II.C.   *Demand-Side Energy Efficiency Programmes for Specific Technologies*

Technology/Measure

46.   This category comprises programmes 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. The aggregate energy savings by a single project may not exceed the equivalent of 15 GWh per year.

Boundary

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

Baseline

48.   If the energy displaced is a fossil fuel, the energy baseline is the existing 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 emissions coefficient for the fossil fuel displaced. IPCC default emission coefficients may be used.

49.   If the energy displaced is electricity, the energy baseline is calculated as follows:

$$E_B = S\ (ni\ .\ pi\ .\ oi)\ /(1 - l)$$

Where

E_B = annual energy baseline
ni = the number of devices of type i replaced (e.g. 40 W incandescent bulb, 5hp motor) for which the replacement is operating during the year
pi = the power of the devices of type i replaced (e.g. 40 W, 5 hp). In the case of a retrofit programme, "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.
oi = the average annual operating hours of the devic es of type i replaced
l = average technical distribution losses for the grid serving the locations where the devices are installed, expressed as a fraction.

50.   The energy baseline is multiplied by an emission coefficient (measured in $KgCO_2$/kWh) for the electricity displaced calculated in accordance with provisions of paragraphs 28 and 29 for category I.D projects.

Leakage

51.   If the energy efficiency technology is new equipment being installed for the first time no leakage calculation is required.

Monitoring

52.   If the devices installed replace existing devices, the number and "power" of the replaced devices shall be recorded and monitored.[6]

53.   Monitoring shall consist of monitoring either the "power" and "operating hours" or the "energy use" of the devices installed using an appropriate methodology. Possible methodologies 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.

<div align="center">OR</div>

        (b)   Metering the "energy use" of an appropriate sample of the devices installed. For technologies that represent fixed loads while operating, such as lamps, the sample can be small while for technologies that involve variable loads, such as air conditioners, the sample may need to be relatively large.

54.   In either case, monitoring shall include annual checks of a sample of non-metered systems to ensure that they are still operating (other evidence of continuing operation, such as on-going rental/lease payments could be a substitute).

55.   Published values for technical transmission and distribution losses may be used. Alternatively, technical transmission and distribution losses for the grid that supplies energy to the equipment installed may be monitored.

II.D. *Energy Efficiency and Fuel Switching Measures for Industrial Facilities*

Technology/Measure

56.   This category comprises any energy efficiency and fuel switching measure implemented at a single industrial facility. This category covers project activities aimed primarily at energy efficiency; a project activity that involves primarily fuel switching falls into category III.B.[7] Examples include energy efficiency measures (such as efficient motors), fuel switching measures (such as switching from steam or compressed air to electricity) and efficiency measures for specific industrial processes (such as steel furnaces, paper drying, tobacco curing, etc.). The measures may replace existing equipment or be installed in a new facility. The aggregate energy savings of a single project may not exceed the equivalent of 15 GWh per year.

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

[7] Thus, fuel switching measures that are part of a package of energy efficiency measures at a single location may be part of a project activity included in this project category.

Boundary

57.   The project boundary is the physical, geographical site of the industrial facility, processes or equipment that are affected by the project activity.

Baseline

58.   The energy baseline consists of the energy use of the existing equipment that is replaced in the case of retrofit measures and of the facility that would otherwise be built in the case of a new facility. In both cases, the electricity component of the energy baseline is adjusted for technical transmission and distribution losses for the electrical grid serving the industrial facility.

59.   Each energy form in the emission baseline is multiplied by an emission coefficient (in $KgCO_2/kWh$). For the electricity displaced, the emission coefficient is calculated in accordance with provisions or paragraphs 28 and 29 for category I.D projects. For fossil fuels, the IPCC default values for emission coefficients may be used.

Leakage

60.   If the energy efficiency technology is new equipment being installed for the first time no leakage calculation is required.

Monitoring

61.   In the case of retrofit measures, monitoring shall consist of:

        (a)   Documenting the specifications of the equipment replaced;

        (b)   Metering the energy use of the industrial facility, processes or the equipment affected by the project activity;

        (c)   Calculating the energy savings using the metered energy obtained from sub-paragraph (b).

62.   In the case of a new facility, monitoring shall consist of:

        (a)   Metering the energy use of the equipment installed;

        (b)   Calculating the energy savings due to the equipment installed.

63.   Published values for technical transmission and distribution losses may be used. Alternatively, technical transmission and distribution losses for the grid that supplies the industrial facility may be monitored.

II.E.   *Energy Efficiency and Fuel Switching Measures for Buildings*

Technology/Measure

64.   This category comprises any energy efficiency and fuel switching measure implemented at a single building, such as a commercial, institutional or residential building, or group of similar buildings, such as a school, district or university. This category covers project activities aimed primarily at energy

efficiency; a project activity that involves primarily fuel switching falls into category III.B[8] Examples include technical energy efficiency measures (such as efficient appliances, better insulation and optimal arrangement of equipment) and fuel switching measures (such as switching from oil to gas). The technologies may replace existing equipment or be installed in new facilities. The aggregate energy savings of a single project may not exceed the equivalent of 15 GWh per year.

Boundary

65.   The project boundary is the physical, geographical site of the building(s).

Baseline

66.   The energy baseline consists of the energy use of the existing equipment that is replaced in the case of retrofit measures and of the facility that would otherwise be built in the case of a new facility. In both cases, the electricity component of the energy baseline is adjusted for technical transmission and distribution losses for the electrical grid serving the building(s).

67.   Each energy form in the emission baseline is multiplied by an emission coefficient. For the electricity displaced, the emission coefficient is calculated in accordance with provisions of paragraphs 28 and 29 for category I.D projects. For fossil fuels, the IPCC default values may be used.

Leakage

68.   If the energy efficiency technology is new equipment being installed for the first time no leakage calculation is required.

Monitoring

69.   In the case of retrofit measures, monitoring shall consist of:

(a)   Documenting the specifications of the equipment replaced;

(b)   Metering the energy use of the building(s) before and after the replacement equipment is installed;

(c)   Calculating the energy savings due to the measures installed.

70.   In the case of a new facility, monitoring shall consist of:

(a)   Metering the energy use of the building(s);

(b)   Calculating the energy savings of the new building(s).

71.   Published values for technical transmission and distribution losses may be used. Alternatively technical transmission and distribution losses for the grid that supplies the building(s) may be monitored.

TYPE III - OTHER PROJECT ACTIVITIES

III. A. Agriculture

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[8] Thus, fuel switching measures that are part of a package of energy efficiency measures at a single location, may be part of a project activity included in this project category.

Note: The panel recognizes that activities under this category are possible however it considers that more work is needed on this category before proposing simplified baseline and monitoring methodologies.

Technology/Measure

Boundary

Baseline

Leakage

Monitoring

III. B. Switching Fossil Fuels

Technology/Measure

72.   This category comprises fossil fuel switching in existing industrial, residential, commercial, institutional or electricity generation applications. Fuel switching may change efficiency as well. If the project activity primarily aims at reducing emissions through fuel switching it falls into this category. If fuel switching is part of a project activity focussed primarily on energy efficiency the project activity falls in category II.D or II.E. Measures shall both reduce anthropogenic emissions by sources and directly emit less than 15 kilotonnes of carbon dioxide equivalent annually.

Boundary

73.   The project boundary is the physical, geographical site where the fuel combustion affected by the fuel-switching measure occurs.

Baseline

74.   The emission baseline is the current emissions of the facility expressed as emissions per unit of output (e.g., $KgCO_2$/kWh). Emission coefficients for the fuel used by the generating unit before and after the fuel switch are also needed. IPCC default emission factors may be used.

Leakage

75.   No leakage calculation is required.

Monitoring

76.   Monitoring shall involve:

        (a)   Monitoring of the fuel use and output for an appropriate period (e.g., a few years, but records of fuel use may be used) prior to the fuel switch being implemented - e.g. coal use and heat output by a district heating plant, liquid fuel oil use and electricity generated by a generating unit (records of fuel used and output can be used *in lieu* of actual monitoring);

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(b)   Monitoring fuel use and output after the fuel switch has been implemented - e.g. gas use and heat output by a district heating plant, gas use and electricity generated by a generating unit.[9]

77.   In the case of coal, the emission coefficient shall be based on test results for periodic samples of the coal purchased if such tests are part of the normal practice for coal purchases.

III. C. Emission reductions by low-greenhouse emission vehicles

Technology/Measure

78.   This category comprises low-greenhouse gas emission vehicles. A project activity in this category shall both reduce anthropogenic emissions by sources and directly emit less than 15 kilotonnes of carbon dioxide equivalent annually.

Boundary

79.   The project boundary is the low-greenhouse gas emission vehicles that are part of the project activity.

Baseline

80.   The baseline is the energy use per unit of service for the vehicle that would otherwise have been used times the average annual units of service per vehicle times the number of vehicles affected times the emission coefficient for the fuel used by vehicle that would otherwise have been used. If electricity is used by the vehicles the associated emissions shall be estimated in accordance with paragraphs 28 and 29 for category I.D project activities.

Leakage

81.   No leakage calculation is required.

Monitoring

82.   Monitoring shall track the number of low-emission vehicles operated under the small-scale CDM project activity and the annual units of service for a sample of the vehicles. Emissions from electricity generation shall be taken into account for electric vehicles.

III. D. Methane Recovery and Avoidance

Technology/Measure

83.   This project category comprises methane recovery from coal mines, agro-industries, landfills, wastewater treatment facilities and other sources. Measures shall both reduce anthropogenic emissions by sources and directly emit less than 15 kilotonnes of carbon dioxide equivalent annually.

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[9] The necessary data are probably readily available, but may need to be organized into appropriate records and be supported by receipts for fuel purchases.

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84. CO_2 emissions from combustion of non-biogenic methane shall be accounted for in the project activity.

Boundary

85.   The project boundary is the physical, geographical site of the methane recovery facility.

Baseline

86.   The emission baseline is the amount of methane that would be emitted to the atmosphere during the crediting period in the absence of the project activity.

87.   The baseline shall cover only the capture and flaring would not have happened in the absence of the project activity.

88.   In the case of landfill gas, waste gas, waste water treatment and agro-industries projects: If the recovered methane is used for electricity generation the project activity is also eligible under category I.D. If the recovered methane is used for heat generation it is also eligible under category I.C. In these cases project participants may submit one single project design document for all of the components of the project activity.

Leakage

89.   No leakage calculation is required.

Monitoring

90.   The amount of methane recovered and used as fuel or combusted shall be monitored. Periodic samples of the methane content of the gas recovered may be needed to calculate the amount of methane recovered.

Appendix A to Annex B

1. Project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:

(a)   Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions;

(b)   Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;

(c)   Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;

(d)   Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

Appendix B to Annex B

ACRONYMS, ABBREVIATIONS AND UNITS OF MEASURE

Acronyms and abbreviations	
EB	Executive Board
EE	Energy Efficiency
CER	Certified emission reduction
CO_2	Carbon Dioxide
BAU	Business as Usual
ESCO	Energy Service Company
GHG	Greenhouse gas
IEC	International Electrotechnical Commission
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
PV	2. Photovoltaic
T&D	Transmission and distribution
Units of measure	
h	Hour
d	Day
y	Year
k	Kilo (10^3)
M	Mega (10^6)
G	Giga (10^9)
T	Tera (10^{12})
g	Gramme
W	Watt
m	Metre
J	Joule