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

TYPE II - ENERGY EFFICIENCY IMPROVEMENT PROJECTS

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.

II.I. Efficient utilization of waste energy in industrial facilities

Technology/measure

1. This methodology comprises technologies and measures to improve the efficiency of electricity or thermal energy generation from recovered waste energy from a single source at an industrial, mining or mineral production facility. The ratio of waste energy to production output is constant for the targeted production process. Examples include replacement of a wet-type dust removal system by a dry-type system prior to a top gas pressure recovery turbine (TRT) in iron and steel industry.

2. The methodology is applicable under the following conditions:

(a) Production process has homogeneous outputs and it is possible to directly measure and record energy efficiency parameters such as production output, thermal and/or electrical energy produced including the sources used for energy production;

(b) The impact of the measures implemented (improvements in energy efficiency) by the project activity can be clearly distinguished from changes in energy use due to other variables not influenced by the project activity (signal to noise ratio);

(c) Production outputs (e.g., hot metal) in baseline and project scenario remain homogenous and within a range of ±10% with no change in installed capacity. The methodology is not applicable to project activities for retrofit of an existing facility to increase production outputs;

(d) No auxiliary fuel is used and/or co-firing for energy generation in the project activity does not take place.

3. The methodology covers both new and existing facilities; in the case of capacity expansion, added capacity shall be treated as a new facility.

4. For new facilities the most plausible baseline scenario for the project activity shall be evaluated based on the assessment of the alternatives to the project activity. For this purpose steps 1 to 3 of the most recent version of “Combined tool to identify the baseline scenario and demonstrate additionality” shall be used. If the identified baseline scenario is the same as the baseline of the methodology, and it can be demonstrated that the implementation of the project as ‘the proposed project activity undertaken without being registered as CDM’, is not the common practice in the region, project participants can apply this methodology.

5. Project activities involving use of waste gas/heat or waste pressure that would have been flared or released into the atmosphere in the absence of the project activity are eligible under AMS III.Q.

6. The aggregate energy saving of a single project shall not exceed the equivalent of 60 GWh of electricity per year. For fossil fuel use, the limit is 180 GWh thermal per year in fuel input.

Boundary

7. The project boundary is the physical, geographical site of the industrial or mining and mineral production facility and processes or equipment that are affected by the project activity.

Baseline

8. Based on historical data from the existing process the baseline energy efficiency parameter is defined. A benchmark Energy Generation Ratio (EGR), which is the amount of thermal energy/electricity generated per unit of main product, is used for this purpose. The improvement of the benchmark EGR after project implementation is monitored and the incremental EGR is calculated. The corresponding incremental gain of thermal energy/electricity generation is determined.

9. Baseline emissions during year *y* (BE_y) are determined as follows:

$$BE_y = EG_{diff,y} \times EF_{CO_2,ELEC,y} \qquad \textbf{(1)}$$

Where:

BE_y	The baseline emissions in year *y* (tCO_2e)
$EG_{diff,y}$	Incremental gain of thermal energy or electricity generation in the project activity during year *y* (MWh)
$EF_{CO_2,ELEC,y}$	CO_2 emission factor for electricity displaced due to project activity in year *y* shall be calculated as per the procedures described in AMS I.D (tCO_2 /MWh)

10. Incremental gain of thermal energy or electricity generation in the project activity during year y ($EG_{diff,y}$) is determined ex post by multiplying the improvement of the baseline EGR with the actual monitored output of the project activity after implementation. This is done as follows:

$$EG_{diff,y} = EGR_{diff,y} \times P_y \qquad \textbf{(2)}$$

Where:

$EGR_{diff,y}$	Difference in EGR of baseline and project activity in year *y* (kWh/tonne)
P_y	Annual production output (e.g. hot metal) in year *y*. In case the production output generated in year *y* is larger than the average of historical production output of the three most recent years (excluding abnormal years) before the implementation of the project activity, then the value of the production output is capped at the value of this historical average production level (tonnes)

11. Difference in EGR of baseline and project activity in year *y* ($EGR_{diff\,,\,y}$) is determined as follows:

$$EGR_{diff\,,\,y} = EGR_{PJ\,,\,y} - EGR_{BL} \quad \textbf{(3)}$$

Where:

EGR_{BL}	Energy Generation Ratio in the baseline (kWh/tonne)
$EGR_{PJ,\,y}$	Energy Generation Ratio in the project activity in year *y* (kWh/tonne)

12. The Energy Generation Ratio in the baseline (EGR_{BL}) is determined as follows:

$$EGR_{BL} = \frac{EG_{HY}}{P_{HY}} \quad \textbf{(4)}$$

Where:

EG_{HY}	Average of historical electricity or thermal energy delivered after deducting internal consumption, spanning all historic data (hourly or weekly or monthly data) up to the time at which the unit was constructed, retrofitted, or modified in a manner that significantly affected output (i.e. by 5% or more), a minimum of 3 years data is required (MWh)
P_{HY}	Average of the historical annual production output of the process based on the 3-year historical data; extreme values are to be excluded from the available values of output rate, a normal production range can be defined as the range in which production levels are 10% above or below the verifiable[1] nameplate capacity (tonnes)

In case the historical data on energy generation or production output of the existing facility is not available for three consecutive years, the manufacturer's data shall be used for comparable capacity, product and ambient conditions. Documentation of such an assessment shall be included in the project design document.

13. Energy Generation Ratio in the project activity in year y ($EGR_{PJ,\,y}$) is determined as follows:

$$EGR_{PJ} = \frac{EG_{PJ\,,y}}{P_{PJ\,,y}} \quad \textbf{(5)}$$

[1] For examples on the basis of the construction or design specifications.

Where:

$EG_{PJ,y}$ Net electricity or thermal energy generation, which is the difference between the gross energy generation and internal consumption in year *y* (MWh)

$P_{PJ,y}$ Actual annual production output (e.g. hot metal) in year *y* (tonnes)

14. If the energy displaced is electricity, the emission factor (tCO_2/MWh) shall be calculated as per the procedures described in AMS I.D. If the energy displaced is fossil fuel, reliable local or national data shall be used. IPCC default values should be used only when country or project specific data are not available or difficult to obtain.

15. For project activity that seeks to retrofit or modify an existing facility, the length of the crediting period is limited to the lifetime of the existing equipment:

In the absence of the CDM project activity, the existing unit would continue to produce energy (EG_{BL} in GWh/y) at historical average levels (EG_{HY} in GWh/y), until the time at which the facility would be likely to be replaced, modified or retrofitted in the absence of the CDM project activity ($DATE_{BL\ Retrofit}$). From that point of time onwards, the baseline scenario is assumed to correspond to the project activity, and baseline energy generation (EG_{BL}) is assumed to equal project energy generation (EG_{PJ}, in GWh/y), and no emission reductions are assumed to occur.

$EG_{BL} = EG_{HY}$ until $DATE_{BL\ Retrofit}$

$EG_{BL} = EG_{PJ}$ on/after $DATE_{BL\ Retrofit}$

In order to estimate the point in time when the existing equipment would need to be replaced in the absence of the project activity ($DATE_{BL\ Retrofit}$), 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 industry 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

16. If the energy efficiency technology is equipment transferred from another activity or if the existing equipment is transferred to another activity, leakage is to be considered.

Project activity emissions

17. No project emissions are anticipated to occur, since the emission reductions are calculated as an incremental gain of energy in the project activity as compared to the baseline scenario. This incremental gain is the energy that would have been outsourced from the grid or the fossil fuel that would have been consumed in the absence of the project activity.

Monitoring

18. The monitoring shall include:

- Metering the energy produced and consumed by the generating unit. The net energy is the difference between the gross electricity generation and internal consumption;
- Production output of the facility.

19. No changes are expected to take place outside the project boundary. However for the purpose of cross-check other parameters such as 'Flue Gas (FG) enthalpy per unit of production output (e.g. hot metal from the blast furnace)' are monitored and the levels before and after the project implementation are compared in the following steps:

- Monitoring of FG enthalpy (for example at the inlet and outlet of the dust removal system located prior to a top gas pressure recovery turbine in iron and steel industry). FG pressure and temperature are recorded;
- Measuring directly, by using flow meter, the mass flow of output FG (NM^3/second);
- Production output of the facility (e.g. blast furnace output).

Project activity under a programme of activities

The following conditions apply for use of this methodology in a project activity under a programme of activities

20. In case the project activity involves the replacement of equipment, and the leakage effect of the use of the replaced equipment in another activity is neglected because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose, scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.

- - - - -