CLEAN DEVELOPMENT MECHANISM
PROPOSED NEW METHODOLOGY: BASELINE (CDM-NMB)
Version 01 - in effect as of: 1 July 2004

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SECTION A. Identification of methodology

A.1. Proposed methodology title:

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Fuel switching and changes in self-generation and/or cogeneration at an industrial facility.

A.2. List of category(ies) of project activity to which the methodology may apply:

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The UNFCCC CDM web site appears not to provide a list of categories of project activities, from which one might choose that applicable for this proposed new methodology.

If one were to use the "Sectoral Scope" classification as applied to Designated Operational Entities, we would recommend the categories (1) Energy industries (renewable / non-renewable sources) and (5) Chemical industry.

A more specific category of project activity might be "industrial fuel switching, self-generation and cogeneration".

A.3. Conditions under which the methodology is applicable to CDM project activities:

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This methodology would apply to the case where the project activity involves any one or any combination of the following activities at the industrial site:

- Fuel switching for any equipment generating thermal energy
- Changes in electricity self-generation equipment
- Changes in electricity cogeneration equipment

The methodology only considers the *production* of heat and electricity, including emissions reductions to be achieved through fuel switching and improvements in thermodynamic cycles. It is *not* applicable to project activities involving improvements in end-use efficiency, i.e. where thermal energy and/or electricity is used more efficiently. The methodology proposed here can be applied to projects where end-use efficiency improvements also take place. However, resulting emissions reductions will not be accounted in the procedure described here.

A.4. What are the potential strengths and weaknesses of this proposed new methodology?

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The potential strengths of the proposed new methodology include the following:

- it is applicable to a number of types of project activities
- it is straightforward to apply

SECTION B. Overall summary description:

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The methodology considers emissions from fuel consumption by all equipment at the industrial site, both in the baseline and the project scenarios. Electricity purchased from the grid results in emissions elsewhere in the power grid and electricity sold from the industrial facility through the grid reduces such emissions. Assuming that the mitigation measure contemplates increasing electricity generation or cogeneration at the industrial site, power plant emissions would decrease as a result of project activity. Thus power plant emissions are part of baseline emissions and include both *net* electricity purchases in the baseline scenario and *net* electricity sales in the project scenario. This new methodology incorporates the following procedures and methodologies:

- Draft consolidated tools for demonstration of additionality (Version 3 Sept. 2004, published as Annex 3 to EB 15 Report).
- Approved consolidated baseline methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources".

This new methodology also would incorporate essential aspects of the following approved methodology, and is expected to be more generally applicable than the earlier methodology:

- AM0008 "Industrial fuel switching from coal and petroleum fuels to natural gas without extension of capacity and lifetime of the facility".

SECTION C. Choice of and justification as to why one of the baseline approaches listed in paragraph 48 of CDM modalities and procedures is considered to be the most appropriate:

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C.1. General baseline approach:

☒ Existing actual or historical emissions, as applicable;

☐ Emissions from a technology that represents an economically attractive course of action, taking into account barriers to investment;

☐ The average emissions of similar project activities undertaken in the previous five years, in similar social, economic, environmental and technological circumstances, and whose performance is among the top 20 per cent of their category.

C.2. Justification of why the approach chosen in C.1 above is considered the most appropriate:

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The approach chosen is applicable since the project activity may involve a combination of technologies so that no single technology can be used as a reference, as required in the second option. For the same reason, each project within the proposed set of applicable project activities is likely to be unique and cannot be readily identified with "similar" project activities elsewhere. The first option "existing actual or historical emissions" involves data that are uniquely determined, so that emissions and emissions reductions can be measured.

SECTION D. Explanation and justification of the proposed new baseline methodology:

D.1. Explanation of how the methodology determines the baseline scenario (that is, indicate the scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases (GHG) that would occur in the absence of the proposed project activity):

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The first step in determining the baseline scenario is to analyse all options available to project participants. These include the business-as-usual case, the project scenario, and any other scenarios that might be applicable. Since the project involves fuel switching, self-generation and cogeneration, the available scenarios are given below:

- Continue with the fuel or fuels currently being used at the facility and maintain all equipment currently in use.
- Switch some or all fuels with other fuels currently being used with others, without replacing any equipment to generate heat or electricity.
- Replace equipment used to produce heat at the industrial facility without any change in fuels used or modifying any electricity self generation or cogeneration equipment.

- Add or modify self generation or cogeneration equipment capacity at industrial site without any change in fuels used or any change in equipment used to produce heat at the industrial facility.
- Switch some or all fuels with other fuels currently being used with others, and replace some or all equipment used to generate heat and/or electricity.

The choice of the baseline scenario will need to be determined by the additionality tests described in section D.3. Choice of baseline and project alternatives would be affected by legal requirements, economic and financial considerations, and barriers that may favour one or other alternative.

D.2. Criteria used in developing the proposed baseline methodology:

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The proposed methodology is based on a number of already approved methodologies and a revised draft of consolidated tools for demonstration of additionality:

- AM0008 "Industrial fuel switching from coal and petroleum fuels to natural gas without extension of capacity and lifetime of the facility"
- AM0014 "Natural gas-based package cogeneration"
- ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"
- Draft consolidated tools for demonstration of additionality

The proposed methodology would generalize the approved methodology AM0008 by incorporating a wider range of mitigation options than just fuel switching. These options could involve electricity generation and self generation, and the impact of such generation on an interconnected power system is similar to that from CDM projects involving renewable electricity generation connected to the grid. The Approved Consolidated Methodology ACM0002 would thus be applicable even though the project does not involve renewable energy. Indeed, this methodology was recommended to be used as part of AM0014 which involves cogeneration of electricity at an industrial facility using a non-renewable fuel.

The proposed methodology also widens the additionality tests incorporated into AM0008 and AM0014, by recommending the use of the Consolidated tools for demonstration of additionality, developed by the CDM Methodologies Panel and the CDM Executive Board.

We believe that the proposed methodology would be applicable to several types of mitigation options involving the production of heat and electricity at an industrial facility while remaining simple to use.

D.3. Explanation of how, through the methodology, it can be demonstrated that a project activity is additional and therefore not the baseline scenario (section B.3 of the CDM-PDD):

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The methodology proposed here recommends the use of the Draft consolidated tools for demonstration of additionality (Annex 3 to the report of the 15th meeting of the CDM Executive Board, Sept. 2004). While this is still a Draft at the time of preparing this methodology, it should be noted that these tools are based on a review and consolidation of additionality tools presented in a number of new methodologies approved by the CDM Executive Board. Moreover, a previous draft was published and the tools were modified taking into consideration most of the key issues. We expect the final version to be similar to the Draft cited here, and should be applied to determine additionality.

D.4. How national and/or sectoral policies and circumstances can been taken into account by the methodology:

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The type of activity involves equipment changes at an industrial facility. Such changes generally must meet legal requirements, including environmental impact assessment. If the proposed project is required

by the laws or regulations, the project scenario would not be additional. Similarly if there are special incentives to promote project activities similar to those proposed, again the activity would not be additional. All these issues are taken into consideration in the Consolidated tools for determination of additionality mentioned in section D.3. As a part of that determination, the project proponent is required to:

- Analyse legal requirements and obligations with respect to the project activities.
- Analyse national incentives to promote similar project activities.
- Analyse sectoral policies to promote similar project activities.

D.5. Project boundary (gases and sources included, physical delineation):

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The project boundary could encompass the physical, geographical site of the industrial plant. If there is an energy facility at the industrial plant, where fuels are consumed to produce heat and/or electricity then it might be convenient to limit the project boundary to this energy facility. Schematically, Figure D.5.1 shows the project boundary, indicating energy flows into the boundary and GHG emissions associated with fuel combustion within the project boundary. We consider all fuels used both in the baseline scenario and in the project case. This indicates that the project boundary is applicable both for the baseline analysis as well as for monitoring of emissions following project implementation, and emissions reductions.

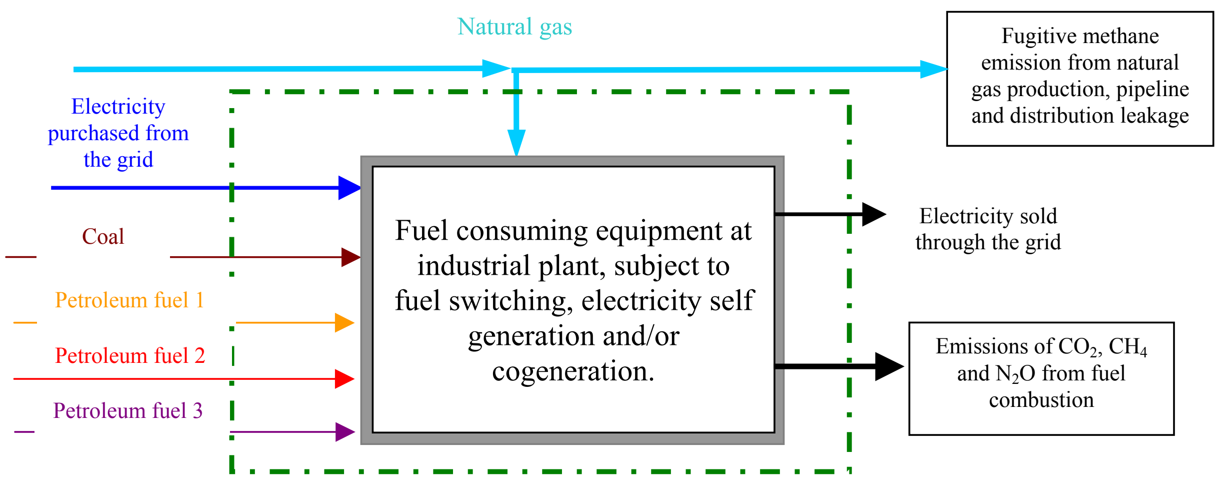

Fig. D.5.1. Project boundary

D.6. Elaborate and justify formulae/algorithms used to determine the baseline scenario. Variables, fixed parameters and values have to be reported (e.g. fuel(s) used, fuel consumption rates):

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The baseline scenario for the project, which is eligible to use this methodology, is that the current fuels (coal and/or petroleum fuels; denoted by *i* in the formula below) are continued to be used in the existing facility to produce heat and electricity without any substantial investments in equipment to increase the electric power output of the facility. Existing equipment is expected to have a lifetime exceeding that of the crediting period.

Baseline emissions *BE* (expressed in tonne CO_2equivalent per year, tonne CO_2e/yr) are given by:

$$BE = \sum_i BFC_i (EF_i + MEF_i \cdot GWP(CH_4) + NEF_i \cdot GWP(N_2O)) + (NBEP + NPES) \cdot EF_{elec\ gen}$$

where:

BFC_i	consumption of fuel i used in the baseline scenario, measured in energy units (e.g. gigajoule, GJ)
EF_i	carbon dioxide emission factor per unit energy of fuel i (e.g. tCO_2/GJ) (combustion)
MEF_i	methane emission factor per unit energy of fuel i (e.g. $tCH_4/$ GJ) (combustion)
$GWP(CH_4)$	global warming potential of CH_4 set as 21 tCO_2e/tCH_4 for the 1st commitment period
NEF_i	nitrous oxide emission factor per unit of energy of fuel i (e.g. $tN_2O/$ GJ) (combustion)
$GWP(N_2O)$	global warming potential of N_2O set as 310 tCO_2e/tN_2O for the 1st commitment period
$NBEP$	net electricity purchased (electricity purchased less electricity sold) through the grid in the baseline (e.g. MWh)
$NPES$	net electricity sold (electricity sold less electricity purchased) through the grid in the project scenario (e.g. MWh)
$EF_{elec\ gen}$	baseline emission factor for grid electricity generation (e.g. kg CO_2e/MWh)

Baseline emissions correspond to the emissions from fuels burnt at the industrial facility (or an energy facility located within the industrial facility) in the baseline scenario. Electricity purchased through the connected power grid to meet a part or all of the demand at the facility would cause emissions elsewhere in the power grid. Such emissions are included. If, following project implementation, electricity is sold from the industrial facility through the power grid, then emissions would be offset elsewhere in the grid. In the absence of such electricity supply in the baseline scenario, there would be additional emissions in electricity generation, which are also included in baseline emissions.

Note that we consider *net* electricity purchase from the grid in the baseline scenario and *net* electricity sold through the grid in the project scenario, as explained in the definitions of *NBEP* and *NPES*. This equation allows for one or other of these quantities to be negative. To avoid confusion these emissions are included in the baseline emissions equation only. In the typical project, both terms are expected to be positive.

The emissions associated with electric power generation depend on the sum $NBEP + NPES$ and $EF_{elec\ gen}$, the emissions factor for electricity generation in the connected power grid.

The CDM Methodology Panel and Executive Board have already proposed a consolidated methodology for determining $EF_{elec\ gen}$. We recommend the Approved Consolidated Baseline Methodology denominated ACM0002 as a component of the proposed new methodology, for the purpose of determining $EF_{elec\ gen}$. ACM0002 offers some alternative pathways for determining $EF_{elec\ gen}$, and each specific PDD should adopt a specific procedure, according to its circumstances.

Note that ACM0002 is actually designated “Consolidated baseline methodology for grid-connected electricity generation from renewable sources.” When the project involves electricity generation from renewable sources, project emissions for electricity generation are negligible, and the baseline emissions are emissions avoided elsewhere in the power grid. The new methodology being proposed here is related to electricity generation at an industrial facility using fuels which need not be renewable. However, the emissions from these fuels are being estimated and counted as part of project emissions, and thus, as far as the baseline is concerned, ACM0002 should be perfectly applicable. Indeed, another new methodology submission, “Natural gas-based package cogeneration”, was accepted as AM0014 under the condition that the consolidated methodology for grid-connected electricity generation from renewable sources be used.

AM0014 offers an alternative procedure for estimating $EF_{elec\ gen}$, namely the "Simplified Methodology for Small-scale CDM Project activities" which would be applicable in case electricity displaced is less than or equal to 15 MW equivalent.

Thus, this proposed new methodology recommends the use of either ACM0002 or the simplified methodology for small-scale projects, as appropriate.

This methodology proposes two alternative procedures for determining *ex-ante* baseline emissions:

1. Baseline emissions may be determined using values of FC_i based on trends in consumption prior to project implementation, e.g. assuming a fixed rate of increase in fuel consumption.
2. Alternatively, *ex-ante* emissions may be determined from a thermodynamic analysis of the heat and electricity producing system.

While the first is obviously accurate, this approach does not permit an *ex-ante* estimation of project emissions where complex thermodynamic cycles are involved. There are many possible modifications of the thermodynamic cycle as a part of the project so that *ex-ante* project emissions are best determined from a thermodynamic cycle analysis. For the analysis to be internally consistent, leading to reliable *ex-ante* estimates of emissions reductions, it is advisable to use the thermodynamic cycle analysis for both baseline and project emissions.

Similarly, there are two alternative procedures for determining *ex-post* baseline emissions:

1. Where historical values of fuel consumption FC_i suggest that baseline emissions are constant, then a fixed value of baseline emissions may be considered.
2. Where past trends in fuel consumption FC_i shows that fuel consumption and therefore emissions have been growing, or that there are significant variations in consumption, then *ex post*, baseline emissions may be determined in a dynamic manner from project monitoring data. The scaling factor for baseline emissions could be some measured surrogate variable that defines activity levels, e.g. the heat output of equipment involved in fuel switching at the industrial facility (as in AM0008) or the electricity output of the power plant at an industrial facility subject to fuel switching and/or equipment changes. In each case, the approach is the same: to calculate, from past data, what would be the fuel consumption levels in the baseline scenario at the activity levels indicated by the surrogate variable actually monitored. An appropriate surrogate variable should be selected and justified in the PDD for a specific project covered by this methodology. Additional details and appropriate equations are provided in the following section D.7.

D.7. Elaborate and justify formulae/algorithms used to determine the emissions from the project activity. Variables, fixed parameters and values have to be reported (e.g. fuel(s) used, fuel consumption rates):

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The project activity involves replacing some or all fossil fuels currently being used by other lower carbon fuels for providing heat and electricity at the industrial facility. The project activity may also include increased electricity generation at the facility with increased export to the connected power grid. Either of these components would reduce GHG emissions compared to the baseline.

The project emissions E (expressed in tonnes of CO_2 equivalent, tCO_2e/yr) are given by:

$$E = \sum_i FC_i \cdot (EF_i + MEF_i \cdot GWP(CH_4) + NEF_i \cdot GWP(N_2O)) \quad \text{(Eq. D.7.1)}$$

FC_i consumption of fuel i used in the project scenario, measured in energy units (e.g. gigajoule, GJ)

EF_i	carbon dioxide emission factor per unit energy of fuel *i* (e.g. tCO_2e/GJ) (combustion)
MEF_i	methane emission factor per unit energy of fuel *i* (e.g. tCH_4/GJ) (combustion)
$GWP(CH_4)$	global warming potential of CH_4 set as 21 tCO_2e/tCH_4 for the 1st commitment period
NEF_i	nitrous oxide emission factor per unit energy of fuel *i* (e.g. tN_2O/GJ) (combustion)
$GWP(N_2O)$	global warming potential of N_2O set as 310 tCO_2e/tN_2O for the 1st commitment period

Project emissions correspond to the emissions from fuels burnt at the industrial facility. These fuels may produce both heat and electricity. If any electricity is exported from the facility through the connected grid, this would offset emissions elsewhere in the grid. Such emissions are thus counted in baseline emissions, as also emissions associated with net electricity purchases from the grid in the baseline scenario. Additional details on emissions associated with electricity generation in the power grid outside the project facility, including the methodology to be used in order to estimate such emissions, were presented in D.6.

When the project activity involves fuel switching, whereby it is possible to estimate fuel consumption prior to project implementation, (Eq. D.7.1) may be used for *ex-ante* estimates of project emissions.

However, where several fuels are involved, and potential changes in a number of boilers and electricity generation and/or cogeneration equipment are involved in the project activity, there are many combinations of values of FC_i that could apply to the project scenario. Thus (Eq. D.7.1) alone cannot be used for *ex-ante* estimates of project emissions. In this case, a thermodynamic analysis should be conducted, based on design configuration and operation of equipment involved in the project activity, in order to determine expected fuel consumption and changes in electricity generation following project implementation, and thereby conduct *ex-ante* estimations of project emissions.

Note that if the thermodynamic approach based on design parameters is applied to determine *ex-ante* project emissions, the same approach should be used to determine *ex-ante* baseline emissions. This would avoid errors from differences in assumptions with respect to equipment load factor, industrial demand, etc.

As mentioned in Sec. D.6, baseline emissions may be considered fixed, based on historical data, if these indicate that fuel consumption patterns have been essentially constant.

Alternatively, baseline emissions may be determined in a dynamic manner from monitored data following project implementation. Baseline emissions are adjusted by a surrogate variable that reflects industrial production or energy demand. An example of this approach was proposed earlier for industrial fuel switching projects, and that has now been approved as AM0008. In that case, the surrogate variable was heat output from the equipment involved in fuel switching. The procedure for determining the dynamic baseline for this example is given below.

The variables in the baseline emissions and the project emissions are linked with the constraint relation:

$$\sum_i BFC_{n,i} \bullet \eta_{n,i} = \sum_i FC_{n,i} \bullet \eta_{n,i}$$

for each element process (or equipment) *n* which uses the fuel *i* in either the baseline or the project scenario. Here $\eta_{n,i}$ is the efficiency of process (or equipment) n for use of fuel i, measured either in unit of output per unit of thermal energy (e.g., tonne of steam output/Joule) or ratio of the output thermal energy to the input energy (i.e. percentage). To the extent possible, $\eta_{n,i}$ should be representative of actual operating conditions, such as typical load factor. In this sense a direct measurement of heat output vs. fuel

input provides a more reliable indicator than an efficiency measurement based on flue gas analysis, which usually correspond to full-load conditions, and moreover does not take into account jacket losses from boilers and furnaces.

For equipment and fuel combinations that are used in the baseline but not in the project scenario, it will not be possible to monitor the efficiency of the equipment as it would apply to the baseline scenario. In such cases, and in any other data limitations, conservative values should be assumed, i.e. assumptions that would tend to reduce baseline emissions and increase project emissions. Thus conservative assumptions for efficiency estimates imply high values for the baseline and low for the project scenarios.

Another possible surrogate variable is the electricity demand of the industrial facility. This would be applicable to project activities involving power plants located within an industrial facility intended basically to provide electricity to the rest of the facility. The power plants may provide more or less than the demand, exporting or importing electricity from an interconnected power grid. However, the electricity exported or imported is not a measure of industrial production, and should not be included as the surrogate variable.

The two examples given above are applicable to project activities that principally involve changes in equipment providing heat and electricity respectively. Potential project activities may involve changes in heat and electricity output. In this case, other surrogate variables would be needed. One possibility is to use the primary energy concept, whereby the electricity demand is multiplied by three prior to adding to the heat demand, reflecting the higher thermodynamic (and economic) value of electricity. While the scaling parameter of three is somewhat arbitrary, especially nowadays with high efficiency combined cycle power plants, we may note that this may not be important. Since industrial output is likely to scale equally with heat and electricity demand, in most cases this assumption is unlikely to introduce a significant error in estimating fuel consumption.

D.8. Description of how the baseline methodology addresses any potential leakage of the project activity:

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This section is similar to that in AM0008.

Fugitive CH_4 emissions from fuel production and CO_2 emissions from fuel transportation are categorized as leakage. Emissions from fuel production/transportation is counted only if the fuel is produced/transported in a non-Annex I country.

The leakage LE_y is expressed as

$$LE = (FC_i - BFC_i) \bullet FE_i(CH_4) \bullet GWP(CH_4) \\ + \sum_j TF_j \bullet EF_j - \sum_k BTF_k \bullet EF_k$$

where $FE_i(CH_4)$ is the IPCC default methane emission factor of fuel i associated with fugitive emissions. Typical fuels might be natural gas and coal, the former more likely in the project scenario and that latter more likely in the baseline. Fugitive methane emissions are associated with natural gas production and pipeline leakage. Fugitive methane emissions are also associated with coal mining. In case that the effect of these methane emissions cannot be neglected, they should be included here.

The second line in the above formula refers to emissions from fuel transportation, shown as a product of the transportation fuels used and the corresponding CO_2 emissions factor for the fuel. The first sum applies to transport fuels used in the project scenario while the second corresponds to the baseline scenario (such as marine, railroad or truck). In case those information and data are not available due to

uncertainties and diversities in energy market, the IPCC default value could apply. Otherwise, it could be estimated qualitatively in view of the relatively small magnitude of CO_2 emissions from fuel transportation in typical industrial fuels.

D.9. Elaborate and justify formulae/algorithms used to determine the emissions reductions from the project activity. Variables, fixed parameters and values have to be reported (e.g. fuel(s) used, fuel consumption rates):

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The emission reduction ER by the project activity is given by:

$$ER = BE - E - LE$$

expressed in tonnes of CO_2 equivalent (tCO_2e/yr).

Total emission reductions should be calculated *ex ant*e, using an estimated value for BE, corresponding to fuel consumption prior to project implementation, possibly adjusted by a fixed percentage growth rate, determined from past consumption trends. Ex post emissions reductions may be determined using a dynamic baseline as explained in Sec. D.6. The estimation of total emission reductions shall be reported in the PDD submitted for validation.

SECTION E. Data sources and assumptions:

E.1. Describe parameters and or assumptions (including emission factors and activity levels):

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The parameters are listed together with data sources in section E.2, below.

E.2. List of data used indicating sources (e.g. official statistics, expert judgement, proprietary data, IPCC, commercial and scientific literature) and precise references and justify the appropriateness of the choice of such data:

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The determination of baseline emissions depends on measurements of the consumption of each fuel used in the baseline scenario as well as electricity purchases and sales in the baseline and project scenarios. Fuel consumption is measured prior to and following project implementation.

Moreover, the calculation depends on the values of the following parameters, whose sources are given below:

Symbol	Definition	Data source (in order or preference) and justification
EF_i	carbon dioxide emission factor per unit energy of fuel *i* (e.g. tCO_2/GJ) (combustion)	1. National inventory of GHG emissions, prepared as part of National Communications to the UNFCCC or other official documents. This is the most important emissions factor and thus needs to be based on the most reliable and specific data source as possible. 2. On-site measurements of carbon content and calorific value of fuels. This would be recommended for fuels where there is significant variation in properties and/or when the fuel is not widely commercialised. 3. IPCC default emissions factors. This is the last

		choice, and should be used only where data from other sources are not available.
MEF_i	methane emission factor per unit energy of fuel *i* (e.g. tCH_4/GJ) (combustion)	IPCC default values. Methane emissions from fuel combustion are likely to be insignificant so that standard values should suffice to provide an adequate estimate.
NEF_i	nitrous oxide emission factor per unit of energy of fuel *i* (e.g. tN_2O/GJ) (combustion)	IPCC default values. Nitrous oxide emissions from fuel combustion are likely to be insignificant so that standard values should suffice to provide an adequate estimate.
$EF_{elec\ gen}$	baseline emission factor for grid electricity generation (e.g. kg CO_2e/MWh)	Determined using either: ▪ ACM0002 Approved consolidated methodology for grid-connected renewable electricity generation from renewable sources. ▪ (for generation less than 15 MW) Simplified methodology for small-scale CDM project activities.

One alternative for *ex-ante* baseline calculation requires an assumption on the fuel consumption growth rate. This is based preferably on fuel consumption data for three years prior to project implementation.

The other approach to *ex-ante* baseline emissions estimate depends on a thermodynamic analysis of the process involved. The results depend on mass flow rates as well as efficiency of heat and electricity producing equipment. All values should be based on historically measured values. A preferred source of thermal efficiency data would be based on direct measurements of heat output and fuel input. When this is not possible, efficiency measurements may be based on stack gas analysis (measurements of temperature and oxygen or CO_2 concentration).

Similarly, *ex-ante* project emissions based on thermodynamic analysis should be based on the same assumptions on mass flows, overall heat and electricity output as in the *ex-ante* baseline estimates. For new equipment introduced as part of the project activity, catalogue or design values of equipment performance may be used.

Emissions from grid-connected electricity generation require data that are specified in ACM0002, and depend on the specific methodological option chosen among various alternatives proposed therein.

Leakage calculations require estimates of fugitive methane emissions from fuel production. Since these are likely to be small compared to other components of baseline and project emissions, default values from IPCC may be chosen to make these estimates.

Leakage calculations also require estimates of fuel consumption for fuel transport, where applicable. These need to be estimated on the basis of fuel intensity of the transport mode and distances involved, and fuel-specific CO_2 emissions factors, all based on IPCC default values. Again, this is justified since these emissions are likely to be small.

E.3. Vintage of data (e.g. relative to starting date of the project activity):

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Fuel consumption data are required for three years prior to project implementation in order to determine *ex-ante* baseline and project emissions.

E.4. Spatial level of data (local, regional, national):

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Fuel consumption and equipment efficiency data correspond to the industrial facility or to a boiler room / power plant providing heat and/or electricity to the industrial facility.

Parameters needed to determine the emissions factor for grid-connected electricity generation depend on the power plants connected to the grid in question.

SECTION F. Assessment of uncertainties (sensitivity to key factors and assumptions):

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The most important components of emissions depend on fuel consumption at the industrial facility prior to and following project implementation, and the CO_2 emissions factor of the fuels involved. These variables and parameters are very well known. Equipment efficiency values are needed when thermodynamic analysis is used for *ex-ante* estimates of baseline and project emissions. Methane and nitrous oxide emissions from fuel combustion as well as leakage emissions are small, and the procedures and data sources indicated permit an adequate determination of the emissions involved.

One potentially large source of emissions and emissions reductions is associated with grid-connected power generation. The methodology proposed here is the approved consolidated methodology ACM0002. This ACM includes multiple options for determining the emissions factor for grid-connected electricity. The result is likely to be sensitive to the option chosen.

SECTION G. Explanation of how the baseline methodology allows for the development of baselines in a transparent and conservative manner:

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All equations that make up the determination of baseline emissions are straightforward and transparent. Wherever data limitations might exist, this methodology proposes alternative procedures and, in case of doubt, how to make conservative assumptions.

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