CLEAN DEVELOPMENT MECHANISM
PROPOSED NEW METHODOLOGY: MONITORING (CDM-NMM)
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CONTENTS

SECTION A. Identification of methodology

A.1. Title of the proposed methodology:

>> Baseline methodology for energy efficiency through technological improvements in the metals production industry through smelting.

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

>>9 -Metal Production

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

>> This methodology is applicable where the following conditions apply:

- Electricity and potentially other fossil fuel consumption is reduced at the project site through the introduction of new technologies that lead to energy efficiency;
- The geographic and system boundaries for the relevant electricity grid can be clearly identified; and
- Information on the characteristics of the grid is available.

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

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Strengths:

- The methodology builds existing approved monitoring methodologies (ACM0002 and other methodologies approved for grid connected electricity generation where information is insufficient to support application of ACM0002). It extends the scope of these methodologies by making them applicable to energy efficiency in industrial process activities affecting amounts of electricity taken from a grid system.

- The methodology also builds on processes set out in the small scale methodologies and AM0008 (for example) to monitor any emissions from other fossil fuels.

Weaknesses:

- The methodology does not attempt to incorporate transport and distribution losses in the grid system. Such losses, and emissions associated with them, are extremely hard to reliably quantify. Where the power produced is consumed on site as opposed to taking energy from the grid, the emissions reduction will be underestimated. This is in fact positive, as it will add to methodology conservatism.

SECTION B. Proposed new monitoring methodology

>> This methodology is designed to capture data for energy efficiency CDM projects in the metal smelting sector. The methodology sets out a process whereby the project proponent is guided in the collection and archiving of a range of data sources that may be relevant to the project- depending upon where project and baseline boundaries are set.

In most project situations electricity consumption may be a major aspect of project and baseline emissions, and will feature heavily in the monitoring process. In some situations other fossil fuels may require to be monitored for quantification purposes where they are deemed material to emissions. In the case of this methodology, guidance is offered that fossil fuel emissions should still be monitored to ensure no leakage occurs (the potential for which is as discussed in the accompanying new baseline methodology NMB000XX).

Given the industrial nature of most of the sites upon which projects may be developed to which this methodology is to be applied, a continuous, rigorous process of monitoring should be implemented, underpinned by robust QA/QC procedures.

B.1. Brief description of the new methodology:

>> The methodology is devised to monitor emissions as a result of both baseline (where possible) and project activities arising from project implementation. Where monitoring of grid electricity related emission is to be carried out, the monitoring methodology relies on the already approved monitoring methodologies as set out in ACM0002, and potentially other approved methodologies where applied as a result of lack of data availability to support ACM0002.

Where material changes in on-site fossil fuel consumption is identified in the project scenario (vs the baseline) this emissions source must also be monitored utilising procedures similar to those set out in the SSC methodologies and AM0008

A note is made here that data collection set out below to monitor both project and baseline emissions are in addition to any monitoring elements set out in the relevant approved grid connected monitoring methodology being applied (such as ACM0002), and these monitoring elements are also to be included in any project monitoring plan.

B.2. Option 1: Monitoring of the emissions in the project scenario and the baseline scenario:

B.2.1. Data to be collected or used in order to monitor emissions from the project activity, and how this data will be archived:								
ID number *(Please use numbers to ease cross-referencing to table B.7)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
1 QP_y	*Quantity of metal produced in the facility*	*Project Proponent*	*Tonnes of metal produced*	*M*	*Constant*	*100%*	*Electronic and Paper*	*Data should be archived for at least two years after the last issuance of CERs for the project* *This information can be evidenced through sales receipts for metal produced*
2 $EG_{py/t}$	*Quantity of grid electricity consumed per tonne of metal produced*	*Project Proponent*	*MWh/ tonne metal produced*	*M*	*Constant*	*100%*	*Electronic and Paper*	*Data should be archived for at least two years after the last issuance of CERs for the project* *The quantity of electricity consumed from a grid will be metered, and this information will be used by the electricity supplier for billing purposes*
3 A_{pny}	*Quantity of any fossil fuel utilised per tonne of metal produced (source n)*		*Relevant units for source (n), tonnes (coal), m^3(natural gas), etc per tonne of metal produced*	*M*	*Constant*	*100%*	*Electronic and Paper*	*Data should be archived for at least two years after the last issuance of CERs for the project* *Where fossil fuel consumption for source (n) is identified as material in the baseline analysis, this information should be monitored. Where it is not, it may be ignored to reduce monitoring transaction costs.* *As with electricity, billing dockets can be used to verify*

								actual fuel use.
4 EF_{ny-on}	*Emissions factors for any fossil fuel utilised (as appropriate) and for the quantification of the grid emissions factor in the baseline analysis*	*IPCC*	*Relevant units*	*Pre-set by IPCC*	*N/A*	*N/A*	*N/A*	*Data should be archived for at least two years after the last issuance of CERs for the project* *IPCC emissions factors to be utilised throughout and are therefore a trusted source*
5 EF_y(offsite)	*Grid emissions factor*	*Project proponent*	*T CO_2/MWh*	*C*	*N/A*	*N/A*	*N/A*	*Data should be archived for at least two years after the last issuance of CERs for the project* *As validated in the baseline analysis*

B.2.2. Description of formulae used to estimate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

>>The following equations should be used to monitor emissions associated with material production in the project scenario. The procedures for monitoring of the electricity grid emissions factor as set out in ACM 0002 or other approved methodology to quantify emissions estimates under NMB000XX should also be followed here, and the reader is referred to the relevant document.

$$\mathbf{PE_y = PE_y(offsite) + PE_y(onsite)} \qquad \textbf{Equation 1}$$

Where:

PE_y: Project emissions in year y

PE_y(offsite): Offsite electricity emissions associated with the material being produced in year y (tCO_2e) (e.g., emissions associated with the use of grid electricity)

PE_y(onsite): Onsite project emissions associate with the material being produced in year y (such as coal/gas/oil use) (tCO_2e)

$$\mathbf{PE_y(offsite) = EG_{py} \times EF_y(offsite)} \qquad \textbf{Equation 2}$$

$$\mathbf{= (EG_{py/t} \times QP_y) \times EF_y(offsite)}$$

Where:

EG_{py}: Quantity of project grid electricity utilised in year y (MWh) – calculated through ($EG_{py/t}$ x QP_y)
EF_y(offsite): Grid electricity emissions factor determined in the baseline analysis in year y (tCO_2e/MWh)
$EG_{py/t}$: Grid electricity consumed per tonne of metal produced in the project scenario in year y
QP_y: Quantity of production in year y (relevant units)

Where system boundary setting excludes onsite fossil fuel emissions (following an assumption of their immateriality) equation 3 and equation 4 may be ignored from the analysis.

$$PE_y(onsite) = QP_y \times EF_{py}(onsite) \qquad \textbf{Equation 3}$$

Where:
QP_y: Quantity of production in year y (relevant units)
EF_{py}(onsite): Project emissions factor for onsite emissions in year y (tCO_2e/relevant production unit). EF_{py}(onsite) will be defined as the emission factor associated with production of a single unit of product through on site fossil fuel use in the project scenario

$$EF_y(onsite) = \sum(A_{pny} \times EF_{ny\text{-}on}) \qquad \textbf{Equation 4}$$

Where:
A_{pny}: Quantity of each individual source (n) of onsite fossil fuel in year y in relevant units (tonnes, m^3) per individual unit of product (in relevant units) in project case - i.e. amount of coal used per tonne of product produced
$EF_{ny\text{-}on}$: Emissions factor applied for that source (n) in year y, using the relevant IPCC emissions factor

B.2.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of greenhouse gases (GHG) within the project boundary and how such data will be collected and archived:								
ID number *(Please use numbers to ease cross-referencing to table B.7)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

6 QP_{by}	*Quantity of metal produced in the facility*	*Project Proponent*	*Tonnes of metal produced*	*M*	*Constant*	*100%*	*Electronic and Paper*	*Data should be archived for at least two years after the last issuance of CERs for the project* *This information can be evidenced through sales receipts for metal produced* *This is the same data point as for ID 1 in Table B.2.1*
7 $EG_{by/t}$	*Quantity of grid electricity consumed per tonne of metal produced*	*Project Proponent*	*MWh/ tonne metal produced*	*C*	*N/A*	*N/A*	*N/A*	*Data should be archived for at least two years after the last issuance of CERs for the project* *Preset as quantified in the baseline analysis* *The quantity of historic electricity consumed from a grid will have been metered, and this information will be used by the electricity supplier for billing purposes*

8 A_{bny}	*Quantity of any fossil fuel utilised per tonne of metal produced (source n)*	*Project Proponent*	*Relevant units for source (n), tonnes (coal), m^3(natural gas), etc per tonne of metal produced*	*C*	*Once, at the beginning of the crediting period*	*100%*	*Electronic/paper*	*Data should be archived for at least two years after the last issuance of CERs for the project Preset as quantified in the baseline analysis* *Where fossil fuel consumption for source (n) is identified as material in the baseline analysis, this information should be monitored. Where it is not, it may be ignored to reduce monitoring transaction costs.* *As with electricity, billing dockets will have been used to verify actual fuel use.*
9 $EF_{ny\text{-}on}$	*Emissions factors for any fossil fuel utilised (as appropriate) and for the quantification of the grid emissions factor in the baseline analysis*	*IPCC*	*Relevant units*	*Pre-set by IPCC*	*Once, at the beginning of the crediting period*	*100%*	*Electronic/paper*	*Data should be archived for at least two years after the last issuance of CERs for the project* *IPCC emissions factors to be utilised throughout and are therefore a trusted source*
10 EF_y(offsite)	*Grid emissions factor*	*Project proponent*	*T CO_2/MWh*	*C*	*Once, at the beginning of the crediting period*	*100%*	*Electronic/paper*	*Data should be archived for at least two years after the last issuance of CERs for the project* *As validated in the baseline analysis*

B.2.4. Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

>>The following equations should be used to monitor emissions associated with material production in the baseline scenario. The procedures for monitoring of the electricity grid emissions factor as set out in ACM 0002 or other approved methodology to quantify emissions estimates under NMB000XX should also be followed here, and the reader is referred to the relevant document.

$$\mathbf{BE_y = BE_y(offsite) + BE_y(onsite)} \qquad \textbf{Equation 5}$$

Where:

BE_y: Baseline emissions (year y)

BE_y (offsite): Offsite electricity emissions associated with the material being produced (tCO_2e in year y) (e.g., emissions associated with the use of grid electricity)

BE_y (onsite): Onsite baseline emissions associated with the material being produced (such as coal/gas/oil use) (tCO_2e in year y)

$$\mathbf{BE_y(offsite) = EG_{by} \times EF_y(offsite) = (EG_{by/t} \times QP_{by}) \times EF_y(offsite)} \qquad \textbf{Equation 6}$$

Where:

EG_{by}: Quantity of baseline grid electricity in year y (MWh) – calculated through ($EG_{by/t}$ x QP_{by})

EF_y (offsite): Grid electricity emissions factor in year y (tCO_2e/MWh)
NB: This emissions factor for grid electricity is defined by following ACM0002 or another approved methodology for calculation of emissions associated with grid connected renewable electricity generation if sufficient data to underpin ACM0002 is not available, as appropriate

$EG_{by/t}$: Grid electricity consumed per tonne of metal produced in the baseline scenario in year y

QP_{by}: Quantity of production in year y (relevant units)

Where system boundary setting excludes onsite fossil fuel emissions (following an assumption of their immateriality) equation 7 and equation 8 may be ignored from the analysis.

$$BE_y(onsite) = QP_{by} \times EF_{by}(onsite) \qquad \textbf{Equation 7}$$

Where:

QP_{by}: Quantity of production in year y (relevant units)

EF_{by}(onsite): Baseline emissions factor for any emissions taking place onsite (if appropriate) in tCO_2e/ production unit. EF_{by}(onsite) will be defined as the emission factor associated with production of a single unit of product through on site fossil fuel use

$$EF_{by}(onsite) = \sum(A_{bny} \times EF_{ny\text{-}on}) \qquad \textbf{Equation 8}$$

Where:

A_{bny}: Quantity of each individual source (n) of onsite fossil fuel in relevant units (tonnes, m^3) per individual unit of product (in relevant units) in year y - e.g. amount of coal used per tonne of product produced

$EF_{ny\text{-}on}$: Emissions factor applied for that source (n), in year y, using the relevant IPCC emissions factor (tCO_2)

B.3. Option 2: Direct monitoring of emission reductions from the project activity:

>> N/A

B.3.1. Data to be collected or used in order to monitor emissions from the project activity, and how this data will be archived:

ID number *(Please use numbers to ease cross-referencing to table B.7)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

B.3.2. Description of formulae used to calculate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

>>Not Applicable

B.4. Treatment of leakage in the monitoring plan:

>> Electricity Related Leakage

As defined in ACM0002, "the main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as plant construction, fuel handling (extraction, processing, and transport), and land inundation (for hydroelectric projects – not applicable here). Project participants do not need to consider these emission sources as leakage in applying this methodology. Project activities using this baseline methodology shall not claim any credit for the project on account of reducing these emissions below the level of the baseline scenario."

Onsite Fossil Fuel Leakage

Section D8 of the accompanying new baseline methodology (NMB000XX) indicates leakage can occur when an assumption is made that emissions from on site fossil fuel consumption is immaterial to justify an exclusion of these emissions sources from system boundaries, and this assumption is incorrect.

Project proponents are instructed in the accompanying baseline methodology to characterize historic fossil fuel consumption on site by using the relevant data set to characterise a value from the particular fossil fuel used per tonne of metal produced. Fossil fuel use must be monitored. Where, upon annual quantification of emission for verification proposes, it can be seen that this assumption was in fact incorrect and emissions have increased as a result of the project activity the project proponent must utilise equations 3 and 4 from section B.2.2 to quantify project emissions, and equations 7 and 8 from B.2.4 to quantify baseline emissions and determine emissions leakage (L_y) as per B.4.2 .

Where the annual verification of this assumption leads to the conclusion that it is indeed correct, onsite fossil fuel emissions may continue to be excluded from the relevant calculations.

Other Leakage Sources

The methodology does not anticipate that any other forms of offsite leakage will arise as a result of the project activities covered, but this assumption should be verified when a project is developed to validate this assumption and relevant leakage elements identified.

B.4.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project activity:

ID number *(Please use numbers to ease cross-referencing to table B.7)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

N/A, as per monitoring processes set out in B.2.1 and B.2.3

B.4.2. Description of formulae used to estimate leakage (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

Specific equations set out in this monitoring methodology to manage potential leakage (L_y) (as per B.4 above) are given below:

$$L_y = PE_y(onsite) - BE_y(onsite) \qquad \text{Equation 9}$$

Project Fossil Fuel Emissions:

$$PE_y(onsite) = QP_y \times EF_{py}(onsite) \qquad \text{Equation 10}$$

Where:

QP_y: Quantity of production in year y (relevant units)

EF_{py}(onsite): Project emissions factor for onsite emissions in year y (tCO_2e/relevant production unit). EF_{py}(onsite) will be defined as the emission factor associated with production of a single unit of product through on site fossil fuel use in the project scenario

$$EF_y(onsite) = \sum(A_{pny} \times EF_{ny\text{-}on}) \qquad \text{Equation 11}$$

Where:

A_{pny}: Quantity of each individual source (n) of onsite fossil fuel in year y in relevant units (tonnes, m^3) per individual unit of product (in relevant units) in project case - e.g. amount of coal used per tonne of product produced

$EF_{ny\text{-}on}$: Emissions factor applied for that source (n) in year y, using the relevant IPCC emissions factor

Baseline Fossil Fuel Emissions:

$$BE_y(onsite) = QP_{by} \times EF_{by}(onsite) \quad \text{Equation 12}$$

Where:

QP_{by}: Quantity of production in year y (relevant units)

EF_{by}(onsite): Baseline emissions factor for any emissions taking place onsite (if appropriate) in tCO_2e/ production unit. EF_{by}(onsite) will be defined as the emission factor associated with production of a single unit of product through on site fossil fuel use

$$EF_{by}(onsite) = \sum(A_{bny} \times EF_{ny\text{-}on}) \quad \text{Equation 13}$$

Where:

A_{bny}: Quantity of each individual source (n) of onsite fossil fuel in relevant units (tonnes, m^3) per individual unit of product (in relevant units) in year y - e.g. amount of coal used per tonne of product produced

$EF_{ny\text{-}on}$: Emissions factor applied for that source (n), in year y, using the relevant IPCC emissions factor (tCO_2)

B.5. Description of formulae used to estimate emission reductions for the project activity (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

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Following monitoring and quantification of project (PE_y) and baseline (BE_y) emissions project emissions reductions (ER_y) in year y can be determined. The emission reductions (ER_y) of the project activity during a given year y is the difference between the monitored baseline, monitored project emissions and emissions due to leakage, as expressed in the formula below.

$$ER_y = BE_y - PE_y - L_y \quad \text{Equation 14}$$

Where

ER_y: Emissions Reductions (t CO_2e) in year y

BE_y: Emissions in the baseline scenario (t CO_2e) in year y

EP_y: Emissions in the project scenario (t CO_2e) in year y

L_y: Leakage (t CO_2e) in year y

B.6. Assumptions used in elaborating the new methodology:

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- Emission factors, conversion factors or default data used for this analysis needs to be gathered from scientific publications, specialized institutions and consultants, the IPCC, or any other recognized sources, or from validated/documented data gathered by the project company. Full references must be given for the sources of data used. These will need to be checked by Designated Operational Entity (DOE).

- It is assumed that the monitoring methodology ACM0002 (or the methodology used for monitoring of emissions associated with electricity generation) is a suitable methodology for determining baseline and project emissions associated with any grid electricity use. As such all assumptions made in the ACM0002 monitoring methodology are also applicable in this methodology, other than where required to extend this methodology to the cohort of projects identified in A.2 above.

- It is assumed that other approved grid connected monitoring methodologies are acceptable where sufficient quality information required to apply ACM0002 in the baseline analysis is not available and the relevant baseline methodology is applied under such circumstances.

- Similar principles have been followed here to monitor fossil fuel emissions as have been established MM008 and SSC methodologies.

B.7. Please indicate whether quality control (QC) and quality assurance (QA) procedures are being undertaken for the items monitored:

Data *(Indicate table and ID number e.g. 3.-1.; 3.2.)*	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
2.1-1 & 2.3-6: Metal production	*Low*	*Internal procedures to track and verify metal production will be utilised, these will be subject to site specific QA/QC procedures*
2.1-2: Grid electricity consumption	*Low*	*Internal procedures to track and verify electricity consumption will be utilised, these will be subject to site specific QA/QC procedures*
2.1-3: Fossil fuel utilised	*Low*	*Internal procedures to track and verify fossil fuel consumption production will be utilised, these will be subject to site specific QA/QC procedures*
2.1-4 & 2.3-9: Emissions factors	*Low*	*External emissions factors from trusted sources will be utilised and therefore will not e subject to QA/QC*

B.8. Has the methodology been applied successfully elsewhere and, if so, in which circumstances?

>>The methodology approach to quantify grid emissions is currently as accepted in ACM0002 and other potential approved methodologies

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