



**PROJECT DESIGN DOCUMENT FORM
FOR SMALL-SCALE CDM PROJECT ACTIVITIES (F-CDM-SSC-PDD)
Version 04.1**

PROJECT DESIGN DOCUMENT (PDD)

Title of the project activity	Replacement of electric heater with steam heater
Version number of the PDD	01
Completion date of the PDD	21/11/2012
Project participant(s)	Konkola Copper Mines PLC
Host Party(ies)	Zambia
Sectoral scope(s) and selected methodology(ies)	04 Manufacturing Industries, AMS II D, Energy Efficiency and fuel switching measures for industrial facilities (Version 12.0)
Estimated amount of annual average GHG emission reductions	2676



SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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Konkola Copper mines PLC (hereafter referred as KCM or PP) is a subsidiary of Vedanta Resources having mining operations in India, Australia, Namibia, South Africa, Ireland and Zambia. They are mainly involved with the production of copper cathode, cobalt pyrites and sulphuric acid. Main product copper is mined from its ore and is recovered from various impurities using a smelter. This smelting operation involves the treatment of mined copper ore at temperatures of around 1200°C. The production process requires pumping of oxygen into the smelter to recover metal from the ore. The oxygen utilized in the smelting process is extracted by passing atmospheric air through the Compressors. The compressors compress the air, rapidly decompress it then compress it again, this process is repeated over and over again, to reduce the air temperature that the different gasses (nitrogen and oxygen) separate out at different temperatures. Nitrogen which is collected after the separation is passed through heater to increase the temperature of nitrogen from 15 °C to 240 °C. This is called the heating cycle where the temperature of the Nitrogen is increased. The heated nitrogen is then used for regenerating the adsorbent to remove the moisture, CO₂ and the hydrocarbons from the atmospheric air before it enters into the cold box. This process is called the cooling cycle which takes place for 4 hrs for every 1 hour of the heating process. Thus the total time for the heating process for Nitrogen in the day will be around 6 hours.

In the baseline scenario the PP was operating electric heater to heat 16,000 Nm³/hr of Nitrogen from 15 °C to 240 °C. The operation of the electric heater resulted in consumption of an average of 2141746.667 kWh of electricity for the period from 2008-2011.

In the effort to contribute towards the global efforts for combating climate change, the PP has taken up the project activity which involves the replacement of electric heater with steam heater to heat nitrogen from 16 °C to 240 °C operating for 6 hours a day. The steam used in the steam heater will be sourced from the waste heat recovery boiler (WHRB). The WHRB utilizes the waste heat from the gases of the smelting process to generate the steam.

The project activity thus reduces the anthropogenic Green House Gas emissions into the atmosphere by displacing the electricity consumption for heating of Nitrogen.

A.2. Location of project activity

A.2.1. Host Party(ies)

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Zambia

A.2.2. Region/State/Province etc.

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Fern avenue, Republic of Zambia, Copper belt province

A.2.3. City/Town/Community etc.

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Chingola

A.2.4. Physical/ Geographical location

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Latitude: 12° 31'54"S

Longitude: 27° 51'54"E

A.3. Technologies and/or measures

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The implemented project activity will there by displace electricity supplied to the electric heater in the baseline scenario and the associated GHG emissions. The steam heater used for the project activity is a shell and tube heat exchanger in which steam will be passed through tube side and nitrogen is passed through the shell side. The technical details of heat exchanger are mentioned here with in the table.

Effective surface area	157.96 m ²	Size: 0.850 X 3.5 m, TEMA Class C, Horizontal type heat exchanger					
	Units	In	Shell Side	Out	In	Tube Side	Out
Fluid Name		Waste Nitrogen	Waste Nitrogen	Steam	Condensate		
Total Fluid Quantity	kg/hr	20000	20000	3017.6	3017.6		
Vapour	kg/hr	20000	20000				
Steam	kg/hr			3017.6			
Water	Kg/hr					3017.6	
Temperature	°C	14	243	270	270		
Viscosity of vapour / liquid	cP	0.0172	0.026	0.0183	0.0975 (liquid)		
Specific heat of vapour / liquid	kcal / kg °C	0.25	0.26	1.1122	1.2233 (liquid)		
Thermal Conductivity of vapour / liquid	kcal / hr m °C	0.0209	0.033	0.500	0.509 (liquid)		
Heat exchanged	kcal/h	1387200		1387200			
Heat transfer rate	Kcal / hr m ² °C	Service:	103.9	Dirty:	82.65		
Passes per shell		1		2			
Design temperature	°C	275		300			
Design pressure	kg/cm ² g	6.6		60			
Material of Construction		CARBON STEEL		CARBON STEEL			

A.4. Parties and project participants

Party involved (host) indicates a host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Zambia (host)	Konkola Copper Mines PLC – Private Entity	No

A.5. Public funding of project activity

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Public Funding from Annex I countries is not involved in this project.

A.6. Debundling for project activity

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As per the EB 54 Annex 13 “GUIDELINES ON ASSESSMENT OF DEBUNDLING FOR SSC PROJECT ACTIVITIES,”(Version 03) :“a proposed small-scale project activity shall be deemed to be

a debundled component of a large project activity if there is a registered small-scale CDM project activity of an application to register another small-scale CDM project activity:

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

The proposed project activity is not a debundled component of any larger project activity as there is no other small-scale registered project activity with the same project participants.

SECTION B. Application of selected approved baseline and monitoring methodology

B.1. Reference of methodology

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The implemented project activity falls under

Type II - Energy efficiency improvement projects

**Category – AMS – II D – “Energy efficiency and fuel switching measures for industrial facilities”
Version 12.0 valid from 18th December 2009.**

Sectoral Scope – IV

B.2. Project activity eligibility

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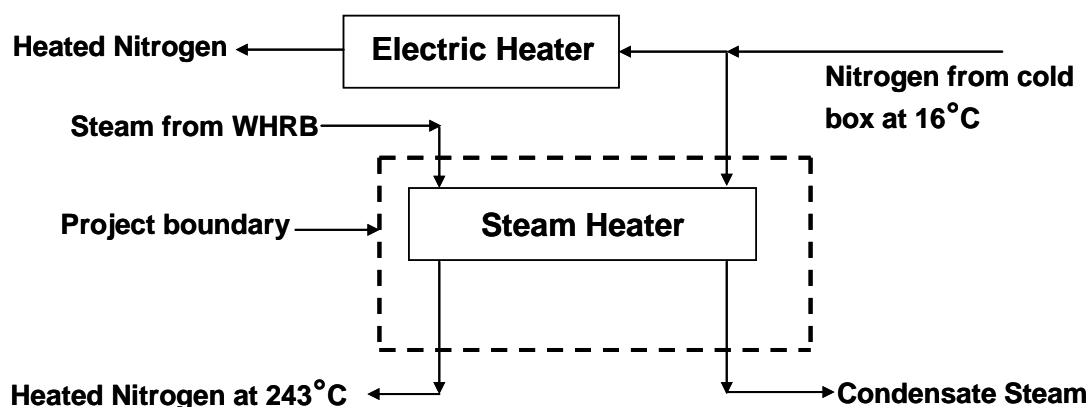
The proposed project activity involves replacement of an installed electric heater of rating 1.35 MW by a steam heater which uses the steam from WHRB as heating medium. Thus the implemented project activity reduces the electricity consumption for heater displacing the associated emissions due to electricity consumption from the grid. Justification as per the implemented methodology in detailed in the table mentioned here with

S.No,	Technology /Measure as per AMS II.D/version 12	Measure of project activity
1.	This category comprises any renewable energy efficiency and fuel switching measures implemented at a single or several industrial or mining and mineral production facility(ies). This category covers project activities aimed primarily at energy efficiency. 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 or mining and mineral production processes (such as steel furnaces, paper drying, tobacco curing, etc.)	The implemented project activity is an energy efficiency project implemented at industrial facility. The project activity involves energy efficiency measures by replacing the electric heater with steam heater.
2.	The measures may replace, modify or retrofit existing facilities or be installed in a new facility	The project activity is implemented at an existing facility.
3.	This category is applicable to project activities where it is possible to directly measure and record the energy use within the project boundary e.g., electricity and/or fossil fuel consumption).	The steam flow into the steam heater can be measured along with the temperature and pressure parameters of steam. it is possible to directly measure and record the energy use within the project boundary.

4.	This category is applicable to project activities where 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).	The improvement in the energy efficiency by the project activity is due to the replacement of electric heater with steam heater. Hence the improvement in the energy efficiency can be clearly distinguished from the changes in the energy use due to other variables not influenced by the project activity.
5.	The aggregate energy savings of a single project (inclusive of a single facility or several facilities) may not exceed the equivalent of 60 GWh _e per year. A total saving of 60 GWh _e per year is equivalent to a maximal saving of 180 GWh _{th} per year in fuel input.	The calculated aggregate energy savings for the project activity is around 2.14 GWh _e which is well with in the limits of 60 GWh _e , as specified by the methodology.

B.3. Project boundary

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B.4. Establishment and description of baseline scenario

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As per the paragraph 7 of AMS II D version 12, project baseline is

In the case of replacement, modification or retrofit measures, the baseline consists of the energy baseline of the existing facility or sub-system that is replaced, modified or retrofitted. Therefore the project proponent can continue the current business as usual practice of using electric heater to heat the Nitrogen from 15⁰C to 240⁰C which is the baseline scenario.

In the absence of the CDM project activity, the existing facility (ies) would continue to consume energy (EC_{BL} in GWh/year) at historical average levels (EC_{HY} in GWh/year), until the time at which the industrial or mining and mineral production facility(ies) would be likely to be replaced, modified or retrofitted in the absence of the CDM project activity (DATE_{BaselineRetrofit}). From that point of time onwards, the baseline scenario is assumed to correspond to the project activity, and baseline energy



consumption (EC_{BL}) is assumed to equal project energy consumption ($EC_{PJ,y}$ in GWh/year), and no emission reductions are assumed to occur.

$$EC_{BL} = EC_{HY} \text{ until } DATE_{BaselineRetrofit}$$

$$EC_{BL} = EC_{PJ,y} \text{ on/after } DATE_{BaselineRetrofit}$$

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

The remaining technical life time of the electric heater is determined according to the “Tool to determine the remaining life time of the equipment” Version 01, EB 50 Annex 15. The remaining technical life time of the electric heater is estimated as 16 years.

Baseline Emissions

Baseline emissions have been calculated using the actual data of consumption and flow of Nitrogen for the year 2008, 2009 and 2010.

$$BE = SE_1 \times NF_{PA}$$

BE = Total Baseline emissions (tCO₂e) per annum.

SE₁ = Specific Emission Factor for Heating Nitrogen in baseline (tCO₂e/Nm³)

NF_{PA} = Nitrogen Flow in Project activity(Nm³) per annum.

$$SE_1 = E_{BL} / NF_{BA}$$

E_{GB} = Emissions from Electricity Consumption in Baseline Activity (tCO₂e) in the year 2008, 2009 and 2010.

NF_{BA} = Nitrogen Flow in the baseline scenario (kWh) in the year 2008, 2009 and 2010.

Emission for Electricity Consumption

$$EC_{BL} = EG_{BA} \times EF_{grid,CM,y}$$

EC_{BL} = Emissions from Electricity Consumption in Baseline Activity (tCO₂e) in the year 2008, 2009 and 2010.

EG_{BA} = Electricity consumption by Electric Heater in the baseline scenario (kWh) in the year 2008, 2009 and 2010.

EF_{grid,CM,y} = CO₂ Emission Factor in year y; t CO₂e/MWh

As per AMS I D version 17 paragraph 12 the Emission Factor has to be calculated in a transparent and conservative manner as follows:



A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the ‘Tool to calculate the Emission Factor for an electricity system’.

OR

The weighted average emissions (in tCO₂e/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.

Calculations must be based on data from an official source (where available) and made publicly available.

Accordingly, the option (a) of the paragraph 12, version 17, AMS I D has been chosen. The emission coefficient (measured in tCO₂e/MWh) calculated in a transparent and conservative manner as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the “Tool to calculate the emission factor for an electricity system (version 02.2.1)” (hereafter referred to as “Tool”).

This is being determined in line with paragraph 12 (a) of AMS-I.D version 17.

B.5. Demonstration of additionality

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As per paragraph 3 of “Guidelines for demonstrating additionality of microscale project activities (EB 68, annex 26),

“Energy efficiency project activities that aim to achieve energy savings at a scale of no more than 20 gigawatt hours per year are additional if any one of the conditions below is satisfied:

- (a) The geographic location of the project activity is in an LDC/SIDS or special underdeveloped zone of the host country identified by the government in accordance with the paragraph 2 (a) (i)
- (b) The project activity is an energy efficiency activity with both conditions (i) and (ii) below satisfied:
 - (i) Each of the independent subsystems/measures in the project activity achieves an estimated annual energy savings equal to or smaller than 600 megawatt hours;
 - (ii) End users of the subsystems or measures are households/communities/SMEs.”

The project activity is located in Zambia which is an LDC and the energy savings from the project activity per annum is 2.14 GWh which is less than the threshold limit of 20 GWh per annum. Hence the project activity is additional.

B.6. Emission reductions

B.6.1. Explanation of methodological choices

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Baseline Emissions

Baseline emissions have been calculated using the actual data of consumption and flow of Nitrogen for the year 2008, 2009 and 2010.

$$BE = SE_1 \times NF_{PA}$$

BE = Total Baseline emissions (tCO₂e) per annum.

SE₁ = Specific Emission Factor for Heating Nitrogen in baseline (tCO₂e/Nm³)

NF_{PA} = Nitrogen Flow in Project activity(Nm³) per annum.



$$SE_1 = E_{GB} / NF_{BA}$$

E_{GB} = Emissions from Electricity Consumption in Baseline Activity (tCO₂e) in the year 2008, 2009 and 2010.

NF_{BA} = Nitrogen Flow in the baseline scenario (kWh) in the year 2008, 2009 and 2010.

Emission for Electricity Consumption

$$EC_{BL} = EG_{BA} \times EF_{grid,CM,y}$$

$EC_{BL} = EC_{HY}$ = Emissions from Electricity Consumption in Baseline Activity (tCO₂e) in the year 2008, 2009 and 2010.

EG_{BA} = Electricity consumption by Electric Heater in the baseline scenario (kWh) in the year 2008, 2009 and 2010.

$EF_{grid,CM,y}$ = CO₂ Emission Factor in year y; t CO₂e/MWh

As per AMS I D version 17 paragraph 12 the Emission Factor has to be calculated in a transparent and conservative manner as follows:

A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the ‘Tool to calculate the Emission Factor for an electricity system’.

OR

The weighted average emissions (in tCO₂e/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.

Calculations must be based on data from an official source (where available) and made publicly available.

Accordingly, the option (a) of the paragraph 12, version 17, AMS I D has been chosen. The emission coefficient (measured in tCO₂e/MWh) calculated in a transparent and conservative manner as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the “Tool to calculate the emission factor for an electricity system (version 02.2.1)” (hereafter referred to as “Tool”).

In the project activity, the option a has been used which prescribes use of ‘Tool to calculate the emission factor for an electricity system’, Version 02.2.1

Step 1. Identify the relevant electricity systems

The SAPP covers nine operating member countries which include Botswana, Democratic Republic of Congo (DRC), Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe. These member countries feature powerful transmission lines allowing for substantial electricity trades between the countries, their national power companies as well as between Independent Power Producers. Given this setup, the Project Electricity System is defined as the region covered by the nine member countries.

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.

Option II: Both grid power plants and off-grid power plants are included in the calculation.

The project participant may choose whether to include off-grid emissions. However for the project activity off-grid emissions was not chosen for calculating emission factor. Hence option I was chosen.

Step 3. Select an operating margin (OM) method

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods: (a) Simple OM, (b), Simple adjusted OM, (c) Dispatch Data Analysis, or (d) Average OM.

The two variants “Simple adjusted operating margin” and “Dispatch data analysis operating margin” cannot currently be applied due to lack of necessary data.

The simple OM method (Option a) can only be used if low-cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production. It is found that the share for the low-cost / must-run sources net generation constitutes to about 22.28% of the total generation. Hence simple OM can be used.

For the simple OM, the ex-ante option has been selected for the Project. Thus, the emission factor will be determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. A 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation is used.

Step 4. Calculate the operating margin emission factor according to the selected method (OM)

The Operating Margin is calculated considering of the generation weighted average of Operating Margin date for the SAPP grid as published by UNEP in a report titled “**Calculation of the Emission Factor of the Electricity System of the Southern African Power Pool**” during the years 2008, 2009 and 2010. The weighted average value for the SAPP Grid is 1.0339tCO₂/MWh.

Step 5. Calculate the build margin emission factor

The build margin is considered for the year 2010 for the SAPP grid has a value of 0.9652 tCO₂/MWh. The data for the build margin emission factor is taken from UNEP report titled “**Calculation of the Emission Factor of the Electricity System of the Southern African Power Pool**” for the year 2010.

Step 6. Calculate the combined margin emission factor

The combined margin emission factor is calculated as follows:

Input values and data sources for the calculation of EF_{CO_2} ($EF_{grid,CM,y}$)

Parameter	Description	Unit	Source
$EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM}$			“Tool to calculate the emission factor for an electricity system” version 02.2.1, equation 14
$EF_{grid,CM,y} = EF_{CO_2,grid,y}$	Combined margin CO ₂ emission factor in year y. This equals to EF_{CO_2}	tCO ₂ /MWh	Calculated
$EF_{grid,OM,y}$	Simple operating margin CO ₂ emission factor in year y.	tCO ₂ /MWh	Calculated



$EF_{grid,BM,y}$	Build margin CO ₂ emission factor in year y	tCO ₂ /MWh	Calculated
w_{OM}	Weightage of operating margin emission factor	0.5	“Tool to calculate the emission factor for an electricity system” version 02.2.1
w_{BM}	Weightage of build margin emission factor	0.5	“Tool to calculate the emission factor for an electricity system” version 02.2.1

As per “Tool to calculate the emission factor for an electricity system” version 02.2.1,

“The following default values should be used for w_{OM} and w_{BM} :

For other project activities for the first crediting period: $w_{OM} = 0.5$ and $w_{BM} = 0.5$ (As per UNEPA report Hence the values used are $w_{OM} = 0.5$ and $w_{BM} = 0.5$

$EF_{grid,CM,y} = EF_{CO_2,grid,y} = \text{Weighted Average OM \& BM} = 0.9996 \text{ tCO}_2\text{e/MWh.}$

B.6.2. Data and parameters fixed ex ante

Data / Parameter	EG_{BA}
Unit	kWh
Description	The quantity of electricity consumption by the electric heater
Source of data	The electricity consumption by electric heater is measured by means of energy meter installed at the site.
Value(s) applied	2141747
Choice of data or Measurement methods and procedures	The electricity consumption for the electric heater is continuously measured by means of an energy meter. The average electricity consumption for the years 2008,2009 and 2010 has been considered.
Purpose of data	The quantity of the electricity consumed by electric heater in baseline scenario is essential for estimation of baseline and net emission reductions by the project activity.
Additional comment	



Data / Parameter	$EF_{grid,OM,y}$
Unit	tCO ₂ / MWh
Description	The Operating Margin emission factor of South African Power Pool (SAPP)
Source of data	UEPA report titled “ Calculation of the Emission Factor of the Electricity System of the Southern African Power Pool ”
Value(s) applied	1.0339
Choice of data or Measurement methods and procedures	Default values as given in UEPA report
Purpose of data	The operating margin emission factor is used for calculating emission factor of the grid
Additional comment	

Data / Parameter	$EF_{grid,BM,y}$
Unit	tCO ₂ / MWh
Description	The Build Margin emission factor of South African Power Pool (SAPP)
Source of data	UEPA report titled “ Calculation of the Emission Factor of the Electricity System of the Southern African Power Pool ”
Value(s) applied	0.9652
Choice of data or Measurement methods and procedures	Default values as given in UEPA report
Purpose of data	The build margin emission factor is used for calculating emission factor of the grid
Additional comment	

Data / Parameter	$EF_{CO_2,Grid,y}$
Unit	tCO ₂ / MWh
Description	Emission factor of South African Power Pool (SAPP)
Source of data	UEPA report titled “ Calculation of the Emission Factor of the Electricity System of the Southern African Power Pool ”
Value(s) applied	0.9996
Choice of data or Measurement methods and procedures	Default values as given in UEPA report
Purpose of data	Emission factor of the grid is used in the estimation of total emission reductions of the project activity.
Additional comment	

Data / Parameter	NF _{PA}
Unit	Nm ³
Description	Nitrogen Flow in Project activity (Nm ³) per annum.
Source of data	Plant data
Value(s) applied	28800000
Choice of data or Measurement methods and procedures	For measuring the flow rate of nitrogen a Flow indicator controller (FIC) continuously regulates and indicates its flow on the digital control system. A continuous mode of measurement is followed for measurement of flow rate.
Purpose of data	Used for calculation of specific emission factor in baseline scenario.
Additional comment	

B.6.3. Ex-ante calculation of emission reductions

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Baseline Emissions

Baseline emissions have been calculated using the actual data of consumption and flow of Nitrogen for the year 2008, 2009 and 2010.

$$BE = SE_1 \times NF_{PA}$$

BE = Total Baseline emissions (tCO₂e) per annum.

SE₁ = Specific Emission Factor for Heating Nitrogen in baseline (tCO₂e/Nm³)

NF_{PA} = Nitrogen Flow in Project activity(Nm³) per annum.

$$SE_1 = EC_{BL} / NF_{BA}$$

E_{GB} = Emissions from Electricity Consumption in Baseline Activity (tCO₂e) in the year 2008, 2009 and 2010.

NF_{BA} = Nitrogen Flow in the baseline scenario (kWh) in the year 2008, 2009 and 2010.

Emission for Electricity Consumption

$$EC_{BL} = EG_{BA} \times EF_{grid,CM,y}$$

EC_{BL} = Emissions from Electricity Consumption in Baseline Activity (tCO₂e) in the year 2008, 2009 and 2010.

EG_{BA} = Electricity consumption by Electric Heater in the baseline scenario (kWh) in the year 2008, 2009 and 2010.

EF_{grid,CM,y} = CO₂ Emission Factor in year y; t CO₂e/MWh

Leakage Emissions

In accordance with methodology AMS II.D, Paragraph No. 11 leakage is to be considered only if the energy generating equipment is transferred from another activity.

This is not applicable here so LE_y = 0

Hence,

$$ER_y = BE_y - PE_y - LE_y = 2676 \text{ tCO}_2\text{e}$$

B.6.4. Summary of ex-ante estimates of emission reductions

Year	Baseline emissions (tCO ₂ e)	Project emissions (tCO ₂ e)	Leakage (tCO ₂ e)	Emission reductions (tCO ₂ e)
2013	2676	0	0	2676
2014	2676	0	0	2676
2015	2676	0	0	2676
2016	2676	0	0	2676
2017	2676	0	0	2676
2018	2676	0	0	2676
2019	2676	0	0	2676
2020	2676	0	0	2676
2021	2676	0	0	2676
2022	2676	0	0	2676
Total	26760	0	0	26760
Total number of crediting years	10			
Annual average over the crediting period	2676	0	0	2676

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data / Parameter	$m_{\text{nitrogen, project}}$
Unit	Nm ³ /hr
Description	Flow rate of nitrogen used in the project scenario.
Source of data	Plant data
Value(s) applied	20000
Measurement methods and procedures	A flow indicator control system controls the flow of nitrogen at the inlet and outlet where the flow rate is displayed on a continuous basis by Digital Control System.
Monitoring frequency	The flow rate of the nitrogen is monitored on a hourly basis
QA/QC procedures	
Purpose of data	Amount of nitrogen heated is essential for the calculating heat transferred from steam to nitrogen in project scenario.
Additional comment	

B.7.2. Sampling plan

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Not applicable

B.7.3. Other elements of monitoring plan

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The project activity is operated and managed by the project proponent as per the procedures defined in the Quality Management system and hence will follow internal QA/QC procedures. A monitoring plan has been prepared and the emergency preparedness plan will become an integral part of the project Management Programmes and would be constituent of operational and management structure of this Quality Management System (QMS).

A separate project management team is in place for supervising the functioning of normal project activities. This is coordinated by Project Executor and Head (General Manager) mainly responsible for checking the consistency with monitored parameters. The well maintained diversified procedure for collection of data and its analysis at various levels for subsequent corrective actions as when required in line indicates effectiveness of implemented quality management system.

- The project team has been entrusted with the responsibility of storing, recording the data related to the project activity. The project team is also responsible in calculating actual emission reduction in the most transparent and relevant manner.
- Inspection and record of daily checklist of critical parameters of project activity is maintained. The maintenance staff's accesses the condition of all the equipments relating to the project activity and takes a suitable action if required.
- Installed meters are calibrated according to the calibration schedule programmed at the start of the operation and recalibrated annually before the due date.
- All the monitoring data is stored /will be recorded and kept under safe custody of the Project Executor and Head for a period of crediting period (10 years fixed crediting period) + 2 years.
- The Instrumentation and the control system for the project activity are designed with adequate instruments to control and monitor the various operating parameters for safe and efficient operations. All the instruments are of reputed make and are calibrated at regular intervals.

Training Protocol:

Training will be imparted subsequent to the installation of steam heater for the Shift In charge, Manager and General Manager. Internal audits will be performed every 6 months by the audit team comprising of the Manager (Utilities) and the Shift In-charge. The audit will be performed with respect to the following points:

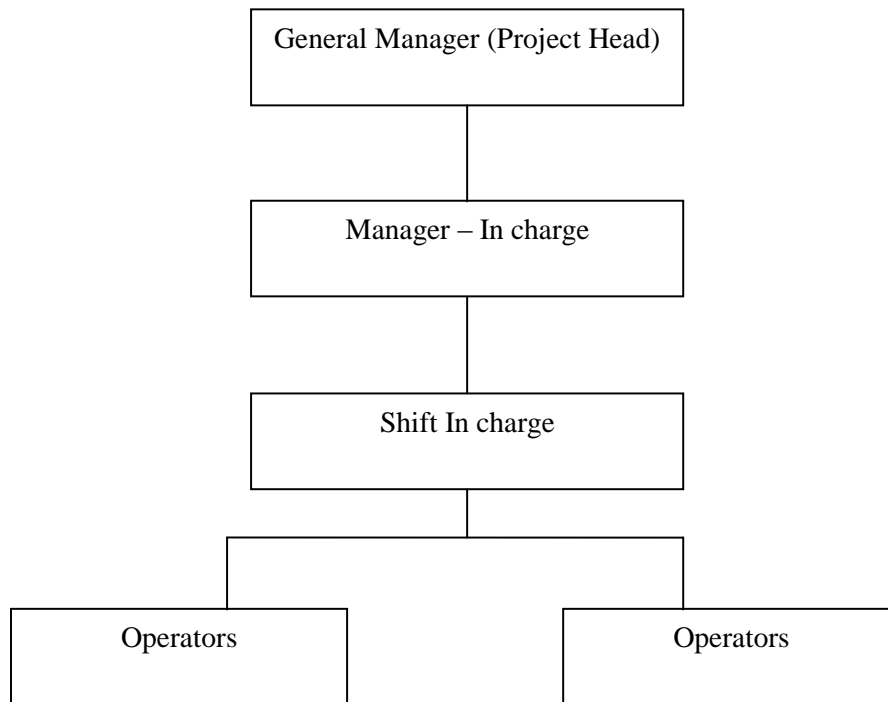
- Are the monitoring of the parameters done in line with the CDM PDD.
- Is the recording done properly?
- Are the equipments calibrated and maintained as per the schedule.
- Are any corrective actions to be taken?

Whenever a new employee is involved in the CDM team the Manager (In charge) will provide the training with regard to the CDM procedures.

Any change with in the project boundary such as change in equipments will be recorded and change in emission reduction due to such alterations will be studied and recorded.



PROJECT TEAM

**SECTION C. Duration and crediting period****C.1. Duration of project activity****C.1.1. Start date of project activity**

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12/08/2011

C.1.2. Expected operational lifetime of project activity

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20 years 00 Months

C.2. Crediting period of project activity**C.2.1. Type of crediting period**

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Fixed Crediting period

C.2.2. Start date of crediting period

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01/04/2013

C.2.3. Length of crediting period

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10 years 0 Months

SECTION D. Environmental impacts**D.1. Analysis of environmental impacts**

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The implemented project activity does not result in any significant adverse environmental impacts. The project activity is considered to be environmentally friendly as it reduces the electricity consumption for the electric heater used for heating nitrogen installed in baseline scenario where project activity uses waste steam for heating nitrogen. The project activity thus reduces the greenhouse gas emissions associated with the equivalent amount of electricity consumption by electric heater.

SECTION E. Local stakeholder consultation**E.1. Solicitation of comments from local stakeholders**

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The local stakeholder consultation meeting for the project activity was conducted at KCM Nchanga Convention Centre, Zambia on 6th July 2012.

Mr. Wilson Miti welcomed the Guests and introduced the KCM CDM Consultant CoreCarbonX team comprising of Mr. Niroj Mohanty and Mr. Sandeep Kota

Presentation was done by Mr. Niroj Mohanty, Managing Director, CoreCarbonX. A Scientific mechanism of Global Warming and Climate Change was given, as well as elaboration of the Clean Development Mechanism concept. The presentation also brought to the fore the history and objectives of the United Nations Framework Convention on Climate Change and the Kyoto protocol. The three mechanisms for carbon trading under the UNFCCC were also explained. The objective and the importance of the Local Stakeholder Consultation meeting was explained to the participants. The CDM projects involving the installation of energy efficient Smelter at Nchanga, the replacement of electric heater with steam heater and the commissioning of the conveyor system for the transportation of the raw materials and slag was also explained to the participants. The participants were also made aware of the socio-economic and environmental benefits from the projects.

Mr. Gift Kalumbu, Nkana ward counsellor was unanimously elected as the chairman for the meeting. The chairman in his speech highlighted the community's concern about the environmental safety and need for surrounding industries to include environmental protection measures in their operations. He also mentioned about the community's concern about scenta (refers to visible 'smoke' emissions of SO₂ from the surrounding plants) emissions from the industries. The chairman also expressed his gratitude for the initiatives taken up by KCM for mitigating the impact of climate change.

Mr. Frank Siatwinda, on behalf of Kitwe District Commissioner also attended the meeting. He expressed the government's happiness at KCM's initiative to undertake measures that will add towards safeguarding the environment in view of current issues of global warming and climate change. He also expressed gratitude that KCM is engaging stakeholders in its quest for environmental equity. He also added that KCM is taking the future of the earth as a matter for proactive intervention and it is good that the company is creating working relationships in these undertakings. It should act as a call to take responsibility and implement environmentally friendly technologies. The government called on the private sector (KCM) to help the Forest Department with vehicles and other equipment. He suggested that KCM can engage other mines companies in these kind of dialogues and can invite them for any future stakeholder meeting. This will create an opportunities for other players to learn from the interaction and they will start acting in the same direction.

Mr. Edward Zulu proposed the vote of thanks.



E.2. Summary of comments received

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The following queries were raised by the stakeholders present in the meeting

Q1: Mr. Ezekiel Nyondo (Sustainability Expert, Graduate): Why is Africa only having 2% of CDM funding and making the effort when Annex 1 countries are busy emitting, why is Africa's access to carbon fund limited?

A: Mr. Niroj Mohanty: Initial stage of CDM from 2005 to 2010 had developing countries like China, India, Brazil and South Africa commanding a majority market share. Having developed capacity since the beginning, these major players had played major players in the CDM market and were able to sell their credits to European Union which is a major buyer. India and China had the bulk of their electricity generation from coal thereby creating a more potent baseline to undertake CDM. However, the market is now opening up for African countries that will fall in the LDC category post 2012, as the European Union Emission Trading Scheme (EUETS) will be putting restrictions on CDM projects from developing countries such as China, India and Brazil, CDM projects from these countries will fall to qualify under EUETS. This will benefit CDM projects from African LDC countries.

The chairman took the floor and made mention that Zambia has one CDM project registered on energy efficient cookstoves and the fact that Zambia still has nine spots for free registration at UNFCCC. This is opportunity for organizations such as KCM to undertake CDM projects.

Q2: Mrs. Musumali (Board Trustee, Green Enviro-Watch): Why have the developed countries like USA and Japan are pulling out of the Carbon Market.

A: Chairman: It is practically not possible to exert political control on these situations where countries decide to pull out from the carbon market.

Mr. Nyondo: The EUETS are pulling out of their obligations although they haven't achieved emission reduction targets, it will be like a targ-of-war between the powerful countries with money and those without

Chairman: The powerful countries are the owners of the technology and so it is a challenge for us to be innovative and come-up with our own technologies and also to explore our own resources.

Mr. Niroj Mohanty: Brazil, India and China are growing at 5-10% during the last few years. Thus, global emission contribution from these countries have changed drastically during the past 15 years. This has created uncertainty in the carbon market. Many of the developed countries wants stringent emission reduction committment from developing countries. However, developing countries argues that they are population is still under poverty and their economy and carbon emission need to grow for meeting the demand of its populations. However, India, China, South Korea , South Africa and Mexico have now started their own emission reductions domestic actions which shows their committment towards global Greenhouse gses emission reductions.

Q3: Mr. Hendrix Mungalu: How does/will CDM benefit the common man on the streets, already, the Conceyor belt projects will result into loss of business by transport contractors and employment (Drivers), what is the CDM benefit then?

Mr. Niroj Mohanty: On the negative front, termination of jobs will arise, from switch to better efficiency and emission reductions undertakings, on the positive front these undertakings will give efficiency to the economy and will create a balance which result into attaining efficient economies.



Mr. Wilson Miti: Efforts aimed at emission reductions take consideration that the future is at stake. Mr. Miti further stated that sustainable development demands that we meet the needs of the present without compromising the capacity of the future generations to meet their own needs, this leaves a choice between putting food on the table now or safeguarding the future of the earth.

Q4: Mr. Nyondo: Has the carbon footprint been done by KCM?

A: Mr. Niroj Mohanty / Mr. Wilson Miti: The process is in the initial stages. Plans have already been instituted to manage the company's carbon assets of the smelter facilities using the ISO14064 tool. More projects are expected to be brought on-board year on year basis

Mrs. Glendar Mwandama (Manager Environment, Corporate): Revealed to the public that KCM has drafted strategy for energy efficiency improvements, environmental protection, and water management.

E.3. Report on consideration of comments received

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The stakeholders were provided clarifications on the issues raised by them to their satisfaction. None of the concerns expressed by the stakeholders required an action to be taken by the PP during the project operation and at any other stage.

SECTION F. Approval and authorization

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Letter of approval from the party for the Project activity will be provided to the DOE at the time of request for registration of the given project activity.

**Appendix 1: Contact information of project participants**

Organization	Konkola Copper Mines PLC
Street/P.O. Box	Private Bag KCM © 2000
Building	Stand M/1408, Fern Avenue
City	
State/Region	Chingola, Zambia
Postcode	
Country	
Telephone	
Fax	
E-mail	
Website	
Contact person	
Title	
Salutation	Mr
Last name	Dhulipala
Middle name	
First name	Prabhu
Department	
Mobile	
Direct fax	
Direct tel.	
Personal e-mail	dhulipala.prabhu@kcm.co.zm

Appendix 2: Affirmation regarding public funding

Public funding from Annex I countries and diversion of ODA is not involved in this project.

Appendix 3: Applicability of selected methodology

Please refer section B.2

Appendix 4: Further background information on ex ante calculation of emission reductions

Please refer Section B.6.1

Name of the responsible entity in determining the exante emission reduction calculation:

Core CarbonX Solutions Private Limited

6-3-903/A/4/1, Vani Nilayam
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Landline: +91-40-23413071, +91-9908387772, +91-9963047666

Email: info@corecarbonx.com,

www.corecarbonx.com

Core CarbonX Solutions Pvt Ltd is not a project participant.

Appendix 5: Further background information on monitoring plan

Please refer Section B.7.3

Appendix 6: Summary of post registration changes

Not Applicable.

History of the document

Version	Date	Nature of revision
04.1	11 April 2012	Editorial revision to change history box by adding EB meeting and annex numbers in the Date column.
04.0	EB 66 13 March 2012	Revision required to ensure consistency with the “Guidelines for completing the project design document form for small-scale CDM project activities” (EB 66, Annex 9).
03	EB 28, Annex 34 15 December 2006	<ul style="list-style-type: none"> The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.
02	EB 20, Annex 14 08 July 2005	<ul style="list-style-type: none"> The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
01	EB 07, Annex 05 21 January 2003	Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Registration		