



# VALIDATION REPORT V&M DO BRASIL S.A.

## VALIDATION OF THE “USE OF CHARCOAL FROM RENEWABLE BIOMASS ORIGINATED FROM FOREST PLANTATIONS FOR THE PRODUCTION OF PRIMARY IRON IN VALLOREC & MANNESMANN DO BRASIL”

REPORT No. BRAZIL -VAL/BR1119369/2012

REVISION No. 04.0

BUREAU VERITAS CERTIFICATION

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## VALIDATION REPORT

Date of first issue: 30/07/2012	Organizational unit: Bureau Veritas Certification Holding SAS
Client: V&M do Brasil S.A.	Client ref.: Alexandre Valadares Mello

## Summary:

Bureau Veritas Certification has made the validation of the "USE OF CHARCOAL FROM RENEWABLE BIOMASS ORIGINATED FROM FOREST PLANTATIONS FOR THE PRODUCTION OF PRIMARY IRON IN VALLOREC & MANNESMANN DO BRASIL", owned by V&M do Brasil S.A. located in Olinto Meireles Avenue, 65 -Barreiro, municipality of Belo Horizonte, Minas Gerais, Brazil on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study, monitoring plan and other relevant documents, and consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final validation report and opinion. The overall validation, from Contract Review to Validation Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

The first output of the validation process is a list of Clarification Requests, Corrective Actions Requests, and Forward Actions Requests (CLs, CARs and FARs), presented in Appendix A. Taking into account this output, the project proponent revised its project design document.

In summary, it is Bureau Veritas Certification's opinion that the project correctly applies the baseline and monitoring methodology AM0082 "Use of charcoal from planted renewable biomass in the iron ore reduction process through the establishment of a new iron ore reduction system" (version 01) and meets all relevant UNFCCC requirements for the CDM and the relevant host country criteria. Bureau Veritas Certification thus requests the registration of the project as a CDM project activity.

The changes from version 03 to version 04 of this Validation Report is to reflect the receipt of the Letter of Approval of the Interministerial Commission on Global Climate Change, which is the Designated National Authority in Brazil, issued on December 10<sup>th</sup>, 2012. Also, it incorporates the explanation and additional information provided upon the Request for Review.

Report No.: BRAZIL-val/BR1119369/2012	Subject Group: CDM
Project title: USE OF CHARCOAL FROM RENEWABLE BIOMASS ORIGINATED FROM FOREST PLANTATIONS FOR THE PRODUCTION OF PRIMARY IRON IN VALLOREC & MANNESMANN DO BRASIL	
Work carried out by: Cláudia Freitas – Team leader Felipe Barbirato – Team member José Alves de Souza Filho – Technical Specialist	
Internal Technical Review carried out by: Marco Prauchner Paulo Henrique de Abreu - Technical Specialist	
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Work approved by:

Matthieu Martini

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**Abbreviations**

AMS	Silviculture Association of the State of Minas Gerais
BMS	BVQI Management System
BVC	Bureau Veritas Certification
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CH <sub>4</sub>	Methane
CIMGC	Interministerial Commission of Global Climate Change (Brazilian DNA from the Portuguese Comissão Interministerial de Mudança Global do Clima)
CL	Clarification Request
CO <sub>2</sub>	Carbon Dioxide
CPU	Charcoal Production Unit
COPAM	State Council for Environmental Policy (Minas Gerais state)
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
IEF	State Forestry Authority (Minas Gerais state)
GHG	Green House Gas(es)
I	Interview
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organisation for Standardization
LI	Installation License
LO	Operating License
MoV	Means of Validation
MP	Monitoring Plan
NGO	Non Government Organization
PDD	Project Design Document
UNFCCC	United Nations Framework Convention for Climate Change
VMB	V&M do Brasil S.A.
VMFL	V&M Florestal Ltda.
VVM	Validation and Verification Manual



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## 1 INTRODUCTION

V&M do Brasil S.A. has commissioned Bureau Veritas Certification to validate its CDM project "USE OF CHARCOAL FROM RENEWABLE BIOMASS ORIGINATED FROM FOREST PLANTATIONS FOR THE PRODUCTION OF PRIMARY IRON IN VALLOREC & MANNESMANN DO BRASIL" (hereafter called "the Project") at Olinto Meireles Avenue, 65 - Barreiro, municipality of Belo Horizonte, Minas Gerais, Brazil.

This report summarizes the findings of the validation of the Project, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

### 1.1 Objective

The validation serves as project design verification and is a requirement of all projects. The validation is an independent third party assessment of the project design. In particular, the project's baseline, the monitoring plan (MP), and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design, as documented, is sound and reasonable, and meets the stated requirements and identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.

### 1.2 Scope

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations.

The validation is not meant to provide any consulting towards the Client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

### 1.3 Validation team

The validation team consists of the following personnel:

FUNCTION	NAME	CODE HOLDER*	TASK PERFORMED
Lead Verifier	Cláudia Freitas	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input type="checkbox"/> RI
Verifier	Felipe Barbirato	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input type="checkbox"/> RI



<b>Technical Specialist</b>	José Alves de Souza Filho	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input type="checkbox"/> RI
<b>Financial Specialist</b>	Not applicable	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> DR <input type="checkbox"/> SV <input type="checkbox"/> RI
<b>Internal Technical Reviewer (ITR)</b>	Marco Prauchner	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> DR <input type="checkbox"/> SV <input checked="" type="checkbox"/> RI
<b>Specialist supporting ITR</b>	Paulo Abreu	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> DR <input type="checkbox"/> SV <input type="checkbox"/> RI

\*DR = Document Review; SV = Site Visit; RI = Report issuance

## 2 METHODOLOGY

The overall validation, from Contract Review to Validation Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

In order to ensure transparency, a validation protocol was customized for the project, according to the version 01.2 of the Clean Development Mechanism Validation and Verification Manual, issued by the Executive Board at its 55<sup>th</sup> meeting on 30/07/2010. The protocol shows, in a transparent manner, criteria (requirements), means of validation and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organizes, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The completed validation protocol is enclosed in Appendix A to this report.

### 2.1 Review of Documents

The Project Design Document (PDD) submitted by V&M do Brasil S.A. and additional background documents related to the project design and baseline, i.e. country law, Guidelines for Completing the Project Design Document (CDM-PDD), Approved methodology, Kyoto Protocol, Clarifications on Validation Requirements to be Checked by a Designated Operational Entity were reviewed.

To address Bureau Veritas Certification corrective action and clarification requests, V&M do Brasil S.A. revised the PDD and resubmitted it on 14 June 2012, as version 2 (Ref /2/)

The validation findings presented in this report relate to the project as described in the PDD version 4 (14/06/2013) (Ref /2.2/), after Internal



Technical Review (ITR) conducted according to BVC's internal procedures.

## 2.2 Follow-up Interviews

Between 14/05/2012 and 18/05/2012, Bureau Veritas Certification conducted an onsite visit and interviews with project stakeholders to confirm selected information and to resolve issues identified during the document review stage.

Representatives of V&M do Brasil S.A., V&M Florestal Ltda. (V&M do Brasil S.A subsidiary company) and Plantar Carbon were interviewed (see References). The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
- V&M do Brasil S.A.  - V&M Florestal Ltda. (subsidiary of V&M do Brasil S.A. The company owns and operates dedicated forest plantations which provide the inputs (i.e. woody biomass) for the production of renewable charcoal to be used in the blast furnace of V&M do Brasil S.A.)	<ul style="list-style-type: none"> <li>➤ Project background information and CDM consideration.</li> <li>➤ Project technology, operation and maintenance.</li> <li>➤ Project approval and implementation status.</li> <li>➤ Project management and monitoring plan.</li> <li>➤ Stakeholder consultation process.</li> <li>➤ Common practice in the area.</li> <li>➤ Government policies related to the project activity.</li> </ul>
- Plantar Carbon (the CDM Consultant)	<ul style="list-style-type: none"> <li>➤ Applicability of selected methodology.</li> <li>➤ Baseline determination.</li> <li>➤ Emission reductions calculation.</li> <li>➤ Emission reduction monitoring plan.</li> </ul>

## 2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation is to raise the requests for corrective actions and clarification and any other outstanding issues that needed to be clarified for Bureau Veritas Certification positive conclusion on the project design.

Corrective Action Requests (CAR) is issued, where:

- (a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- (b) The CDM requirements have not been met;
- (c) There is a risk that emission reductions cannot be monitored or calculated.

A Clarification Request (CL) is raised, if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.





A Forward Action Request (FAR) may also be raised during validation, to identify issues related to project implementation that require review during the first verification of the project activity.

To guarantee the transparency of the validation process, the issues raised, the responses provided by the project participants, the means of validation of such responses and references to any resulting changes in the PDD or supporting annexes are documented in the Validation Protocol in Appendix A.

## **2.4 Internal Technical Review**

The validation report underwent a Internal Technical Review (ITR) before requesting registration of the project activity.

The validation findings presented in this report relate to the project as described in the PDD version 4 (14/06/2013) (Ref /2.2/), after Independent Technical Review (ITR) conducted according to BVC's internal procedures.

The ITR is an independent process performed to examine thoroughly that the process of validation has been carried out in conformance with the requirements of the validation scheme as well as internal Bureau Veritas Certification procedures.

The Lead Verifier provides a copy of the validation report to the reviewer, including any necessary validation documentation. The reviewer reviews the submitted documentation for conformance with the validation scheme. This will be a comprehensive review of all documentation generated during the validation process.

When performing an Internal Technical Review, the reviewer ensures that:

The validation activity has been performed by the team by exercising utmost diligence and complete adherence to the CDM rules and requirements.

The review encompasses all aspects related to the project which includes project design, baseline, additionality, monitoring plans and emission reduction calculations, internal quality assurance systems of the project participant as well as the project activity, review of the stakeholder comments and responses, closure of CARs, CLs and FARs during the validation exercise, review of sample documents.

The reviewer compiles clarification questions for the Lead Verifier and Validation Team and discusses these matters with Lead Verifier. This is



presented in Table 3 in Appendix A to this Validation Report ("Table 3: Summary of findings after ITR"). The change in PDD versions (from version 2 to version 3) was due to the clarification and corrective action requests raised and discussed at ITR stage.

After the agreement of the responses on the 'Clarification Request' from the Lead Verifier as well as the PP(s) the finalized validation report is accepted for further processing such as uploading on the UNFCCC webpage.

### **3 VALIDATION CONCLUSIONS**

In the following sections, the conclusions of the validation are stated.

The findings from the desk review of the original project design documents and the findings from interviews during the follow up visit are described in the Validation Protocol in Appendix A.

The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in Appendix A, Table 2 ("Resolution of Corrective Action and Clarification Requests") and Table 3 ("Summary of findings after ITR"). The validation of the Project resulted in 14 Corrective Action Requests (CARs) and 21 Clarification Requests (CLs). The validation process has identified 01 Forward Action Request (FAR), regarding Operating License renovation for V&M Florestal Ltda. activities during the crediting period.

The validation findings presented in this report relate to the project as described in the PDD version 4 (14/06/2013) (Ref /2.2/), after Internal Technical Review (ITR) conducted according to BVC's internal procedures.

The CARs and CLs were closed based on adequate responses from the Project Participant(s) which meet the applicable requirements. They have been reassessed before their formal acceptance and closure.

The number between brackets at the end of each section correspond to the VVM paragraph and/or methodology requirement.

#### **3.1 Approval (49-50)**

A letter of approval has been received from the Brazilian DNA - Designated National Authority, issued on November 9<sup>th</sup>, 2012 (/13/).



Bureau Veritas Certification received this letter from the project participant V&M do Brasil S.A. and does not doubt its authenticity.

According to the Letter of Approval of DNA:

- The Federative Republic of Brazil ratified the United Nations Framework Convention on Climate Change on February 28, 1994 and the Kyoto Protocol on August 23, 2002.
- The Federative Republic of Brazil participates voluntarily in the CDM.
- The "Carbonization Project - Mitigation of Methane Emissions in the Charcoal Production of V&M Florestal, Minas Gerais, Brazil" will assist the Federative Republic of Brazil in achieving sustainable development.

Bureau Veritas Certification considers that the letter is in accordance with paragraphs 45 - 48 of the VVM.

### **3.2 Participation (54)**

The participation for each project participant has been approved by a Party of the Kyoto Protocol. Please, refer to section 3.1 of this Validation Report.

The DOE has not identified any information or evidence which would indicate that the proposed project activity receives any public or ODA funding. Therefore, the DOE concluded that the proposed project activity has not received any public or ODA funding (i.e. it is entirely funded by the project entity, V&M do Brasil S.A.).

### **3.3 Project design document (57)**

The validation team hereby confirms that the PDD version 4 (Ref/2.2/) complies with the latest forms of the guidance document for completion of PDD, version 7 (Ref/40/).

### **3.4 Changes in the Project Activity**

During the site visit, no physical changes pertaining to the project design was observed as compared to details mentioned in the webhosted PDD.

The differences between the final version PDD and the webhosted PDD are consequences of CARs or CLs raised during the validation process. For a detailed assessment refer to Appendix A (Validation Protocol), Table 2 and Table 3.

### **3.5 Project description (64)**

The proposed project activity consists in the use of renewable charcoal - which is entirely produced from woody biomass sourced from dedicated forest plantations - as



the reducing agent in the iron ore reduction process. The use of renewable charcoal in the iron production process results in the replacement of fossil fuel (coal coke). The source of renewable biomass to be used in the production of the reducing agent, in the context of this project activity, will be through the supply of wood from forest areas managed by V&M Florestal (VMFL), which is a subsidiary from V&M do Brasil S.A.

The production of iron and steel requires the use of a substance that provides both thermal energy and reducing power to convert iron ore into primary iron (called “pig iron”). This process is known as the iron ore reduction and is mostly and commonly done with the use of coal coke, produced from coal of fossil origin. The global steel production depends on coal since charcoal represents less than 1% of the primary iron reduction in the world (almost 70% of the steel produced today uses coal as reducing agent). Based on the report entitled “World Steel in Figures”; World Steel Association, 2011 (Ref/11/) with the exception of: a) some countries that still have a small supply of different reducing agents; and b) the participation of “scrap” (nearly 35% of the steel produced worldwide is based on scrap); the world production of iron and steel is based on coal coke as a reducing agent. The basic technology used in this process is the blast furnace.

The Integrated Barreiro Plant, in Belo Horizonte, Minas Gerais, occupies an area of approximately three million square meters and has a capacity to produce approximately 650 thousand tons of pipes per year, it is one of the most modern and well-equipped metallurgical complexes in the world.

To implement this project activity, V&M do Brasil S.A. has decided to establish a sustainable and *new iron ore reduction system*, undertaking new investments in two levels:

- (i) establishment of new dedicated plantations to enable the sustainable production of renewable charcoal; and
- (ii) substantial refurbishment of the equipments of its iron ore reduction plant, including both blast furnaces and their peripherals in order to use charcoal at the top of the furnace as well as injection system of charcoal fines. The items subject to refurbishment were:

- Replacement of the blast furnace top;
- Total replacement of refractories;
- Installing of copper and steel boxes in the medium and upper stack;
- Implementation of new supervisory system and minor additional investments;
- New ring with blower kits and 12 tuyères;
- New casing in Bosh, Stack and Top;
- Installing of copper staves with new cooling system;
- Repairing of auxiliary equipment and peripherals.

As mentioned above, the iron ore reduction technology applied in the project activity is based on blast furnaces. Renewable charcoal produced in the project’s dedicated



plantations coupled with iron ore, are fed into the blast furnace and undergo the reduction process, resulting in primary iron.

The blast furnace consists of a counter-current reactor in which the iron ore and the reducing agents are charged and the preheated air is blown to remove oxygen from iron oxide. The oxygen in the furnace reacts with the carbon from the reducing agent, generating heat and reducing gases. The oxygen from the hot air blown into the bottom of the furnace ascends to the top and the raw materials then descend to the bottom of the furnace where they are transformed into liquid slag and liquid iron. Thus, reducing gases and heat are generated through the use of carbon. The iron oxides are reduced and result in liquid metallic iron, or primary iron, called hot metal. The liquid form of primary iron, hot metal, is used in steel manufacturing, and the molded solid form is the commonly referred to as "pig iron".

The proposed project activity uses two blast furnaces (AF1 and AF2) which allow the technological possibility of using either charcoal or coal coke as a reducing agent, either separately or any combination of them. The charcoal enters the production process both at the top of the blast furnace and by injection of pulverized charcoal (charcoal fines).

Charcoal fines are generated by the handling and the transportation of charcoal to the location where it will be used (Barreiro's plant). The injection of charcoal fines in the blast furnaces allows for the optimization of the use of carbon. This technology allows an increase in the blast furnace efficiency with gains in process control. It also means less need for area for forest plantation to supply the pig iron plant with charcoal.

The operational lifetime of the blast furnaces can be considered indefinite, as long as periodic refurbishments are carried out in order to replace some items, e.g. worn out refractories. Every ten years a major refurbishment shall occur in order to keep the blast furnace operation and extend its lifetime. Four years after a major refurbishment occurs, other minor repairs are required every two years.

The Project will result in annual emission reductions of 5,534,259 tCO<sub>2</sub>e during the seven years of its first renewable crediting period.

The validation did not reveal any information indicating that the Project can be seen as a diversion of official development assistance (ODA) funding towards the host country.

The processes undertaken by the validation team to validate the accuracy and completeness of the project description include conducting a physical site inspection and reviewing project related documentation.

The DOE hereby confirms that the project description in PDD version 4 (Ref/2.2/) is accurate and complete in all respects.



### 3.6 Baseline and monitoring methodology

#### 3.6.1 General requirement (76-77)

The steps taken to assess the relevant information contained in the PDD against each applicability condition are described below.

The Project uses the approved baseline and monitoring methodology AM0082 version 01 – “Use of charcoal from planted renewable biomass in the iron ore reduction process through the establishment of a new iron ore reduction system” (Ref/42/).

The applicability of the selected methodology is justified and assessed as follows (based on Section I in the referred methodology):

- (1) *This methodology is applicable to project activities that seek to reduce emissions in the production of iron and steel by using renewable reducing agents such as charcoal produced from dedicated biomass plantations instead of fossil fuel based reducing agents.*
  - The validation team has confirmed through physical site inspection that this applicability condition is met by the project activity. The blast furnace and the dedicated farms and carbonization units (where the renewable charcoal is produced by V&M Florestal) were subject to the site visit. (ref/3/) (ref/6/) (ref/6.1/) (ref/7/) (ref/8)
- (2) *The project activity generates emission reductions from partial or complete use of renewable reducing agents from dedicated plantations instead of fossil fuel based reducing agents in the iron ore reduction process;*
  - The project activity relies entirely on the use of renewable charcoal sourced from dedicated forest plantations which are under the control of the PP (through its subsidiary company V&M Florestal Ltda.). (ref/3/) (ref/5/) (ref/6/) (ref/7/) (ref/8)
- (3) *Blast furnace technology is used in the iron ore reduction process;*
  - This was also confirmed through physical site inspection. (ref/6/) (ref/6.1/) (ref/7/) (ref/8) (ref/8.1)
- (4) *The methodology is applicable to project activities that aim at the establishment of new iron ore reduction systems, which are characterized by a new investment. The types of new investment that characterize the establishment of a new iron ore reduction system under this methodology are listed below and, hence, the methodology is only applicable to project activities that encompass within the same project boundary at least one of the following investment types 3, 4 or 5, those have*





*to be combined with the investment Types 1 and/or 2 below. The eligible types of new investments for projects under this methodology are:*

*Type 1: Production of reducing agents to be used in the production of iron and steel by investing in dedicated plantations by the project entity;*

*Type 2: Establishment of specific long-term binding contracts for the supply of reducing agents to be used in the production of iron and steel, i.e., renewable charcoal from dedicated biomass plantations corresponding to a new investment in the dedicated plantation; this eligibility requirement can be fulfilled whether the long term contractor being listed as a project participant or not;*

*Type 3: Refurbishment/replacement of blast furnace;*

*Type 4: Establishment/acquisition of blast furnace;*

*Type 5: Adaptation of existing blast furnace to the use of charcoal.*

- The project proponent conducted the following investment types to establish a new iron ore reduction system:
    - Type 1: Production of reducing agents from dedicated plantations by the project entity; and
    - Type 3: Refurbishment / replacement of blast furnace;
- Based on references (ref/3/) (ref/5/) (ref/6/) (ref/6.1/) (ref/7/) (ref/8)

*(5) As dedicated plantations are in the project boundary, all the corresponding land has to be geographically identified and delineated using maps or GIS or similar system identified;*

- The PDD version 4 (Ref/2.2/) ("Table 1") contains the unique location of each of the fourteen (14) farms/carbonization units included in the project boundary. The dedicated plantations are located in the following farms: Itapoã, Meleiro, Olhos D'Ádua, Diamante, Santa Cruz, Aldeia, Galheiros, Campo Alegre, Patagônia, Chapadinha, Sussuarana, Vargem Bonita, Brejo and Brejão. This was confirmed through physical site inspection and also based on the validation of the CDM project activity "Carbonization Project - Mitigation of Methane Emissions in the Charcoal Production of V&M Florestal, Minas Gerais, Brazil". This project activity (as mentioned, currently in validation) takes place in the integrated iron ore reduction system boundary (including the farms and carbonization units where the renewable charcoal is produced, in order to supply the two blast furnaces operated by V&M do Brasil S.A with thermo-reducing agent. The maps of the farms are included in the PDD Annex 5 and confirmed by the validation team.
- (6) The renewable reducing agent shall be sourced from dedicated plantations in the host country, which are under the control of project participants. In case the renewable plantation is sourced from long-term contractors, the project participants will have to have control on it, whether the contractor is also a project participant or not.*



- The charcoal is entirely sourced from dedicated plantations under the control of the project participants, through its subsidiary company V&M Florestal Ltda. This was confirmed through physical site inspection and also based on the validation of the CDM project activity “Carbonization Project - Mitigation of Methane Emissions in the Charcoal Production of V&M Florestal, Minas Gerais, Brazil”. This project activity (as mentioned, currently in validation) takes place in the carbonization units owned by V&M Florestal Ltda. and V&M do Brasil S.A. The maps of the farms are included in the PDD and confirmed by the validation team. (ref/3/)
- (7) *The dedicated plantation as required by this methodology shall be located only in tropical conditions;*
- The dedicated plantations are located in the state of Minas Gerais, within the tropical zone in Brazil. (ref/3/)
- (8) *Evidence (e.g., official land use maps, satellite images/aerial photographs, cadastral information, official land use records) demonstrating the location of plantations in the project boundary are established in areas that fall in one or more of the following categories:*
- (i) *Grasslands;*
  - (ii) *Forest plantation after its last rotation;*
  - (iii) *Degraded areas*
- The following category applies: (ii) Forest plantation after its last rotation. The validation team has checked the evidences (maps) provided and also confirms the location through site visits. The maps were crosschecked against official permits. (ref/3/)
- (9) *The land degradation can be demonstrated using the “Tool for the identification of degraded or degrading lands for consideration in implementing CDM A/R project activities”;*
- Not applicable, as above.
- (10) *In case the plantation is implemented on land previously hosting a forest plantation after its last rotation, it shall be demonstrated that this land would not be replanted in the absence of the project activity. In order to demonstrate that a forest plantation is in its last rotation, the project proponent shall refer to the plantation management practices which are common practice in the region for the considered species.*
- Please refer to CAR 05. The project participants have provided the maps and evidences (Ref/3/), which demonstrate that the land is categorized as “forest plantation in its last rotation” and that the applicability condition of the methodology is met. The forest plantations, which are the source of the biomass wood which is utilized to produce the renewable charcoal consumed in the





proposed project activity, were established based on the investment decision to replace the fossil fuel reducing agent in the blast furnace. In the baseline scenario, the reducing agent would be coal coke.

(11) *In case the dedicated plantation is covered under a registered A/R CDM project activity, the dedicated plantation shall not be included in the project boundary as per paragraph 38 EB 25. The demonstration that the biomass originates from renewable source is not required in such a situation. In case only a part of the dedicated plantation is covered under a registered A/R project activity this condition is applicable only to this part of the plantations;*

- Not applicable. The dedicated plantations are not covered under a registered A/R CDM project activity.

(12) *The renewable biomass and the charcoal used in the new iron ore reduction system implemented by the project activity shall not be acquired from the market, since leakage in this case cannot be estimated. The acquisition of renewable biomass supplies through long term contracts with a third party is not considered an acquisition from the market, and the corresponding land has to be identified and included in the project boundary (unless it is covered under a registered A/R project activity);*

- The project activity, in its new iron ore reduction system, relies entirely on charcoal from renewable sources, originated from dedicated plantations within the new iron ore reduction system, of which the supply is guaranteed by V&M Florestal (VMFL), company of the group and project participant entity. This supply will be monitored throughout the lifetime of the project activity. The validation team also confirmed through interviews and document review that V&M Florestal does not sell charcoal in the market and that its production aims to supply the company V&M do Brasil S.A. (ref/3/) (ref/5/) (ref/6/) (ref/7/) (ref/8)

(13) *In compliance with the paragraph 38 of the twenty-fifth meeting of the Board decision, for cases that demonstrate the supply of reducing agent from biomass projects registered as the A/R CDM project activities, upstream emissions from biomass production need not be accounted if they are accounted under the respective A/R CDM projects;*

- Not applicable.

(14) *If the renewable biomass is sourced from a plantation registered as an A/R CDM project activity, the first verification of this A/R CDM project activity should take place before the first harvesting of the wood takes place. The DOE shall verify that the plantation registered as an A/R CDM project activity from which the renewable biomass is sourced has generated cumulated net tCERs or ICERs at the time of verification of the CDM project activity under this methodology (i.e., the change of reluctant in an iron ore reduction system.) If this condition is not met the*



*corresponding biomass shall not be eligible for the generation of CERs in the context of this methodology;*

- Not applicable.

*(15) The land area of dedicated biomass plantations shall be established either through direct planting and/or seedling. In case the dedicated plantation is covered under a registered A/R CDM project activity, this condition is not applicable. In case only a part of the dedicated plantation is covered under a registered A/R CDM project activity, this condition is not applicable only to this part of the plantations;*

- The land area of the project's dedicated plantations is established through direct planting. (ref/4/)

*(16) Flood irrigation is not expected to take place on the plantation sites. In case the dedicated plantation is covered under a registered A/R CDM project activity, this condition is not applicable. In case only a part of the dedicated plantation is covered under a registered A/R CDM project activity, this condition is not applicable only to this part of the plantations;*

- Flooding irrigation is not practiced by the project entity. Instead, following the forestry management plan (Ref/4/), the project entity adopts local irrigation only during planting activities and during the dry season's periods. (ref/4/)

*(17) For at least ten years before the implementation of the project activity, no forest stocks were on the land where the dedicated plantations will be established; this condition does not apply to forest stocks in the form of productive forest plantations;*

- Please refer to CAR 05 and CL 05. Following the assessment of the responses, the validation team confirms that the PDD version 4 (Ref/2.2/) section B.2 was revised in order to include additional information. The validation team has verified the supporting evidences (for all the 14 farms) submitted (Ref/3/). The condition in the methodology, that at "least ten years before the implementation of the project activity, no forest stocks were on the land where the dedicated plantations is established" is complied with.

*(18) In case blast furnace gas is recovered and used outside of the project boundary for electricity and/or heat generation in the baseline situation, the project activity shall provide similar and/or equivalent energy outputs as the ones identified in the baseline scenario aiming to avoid impacts outside the project boundary due to the project implementation;*

- The project entity already monitors the activities of heat/electricity recovery and use within the limits of this project activity through the monitoring of the CDM activity #0143 registered by the Executive Board on 22 January 2006. Also, please refer to CL 18.



(19) *In cases the project scenario involves partial consumption of the mineral coke in the projects new iron ore reduction system this methodology is only applicable if the production of the mineral coke is undertaken within the host country (ies). Thus, the methodology is not applicable to project activities that rely on the use of imported mineral coke in the project scenario;*

- This project activity depends entirely on renewable charcoal produced within national borders and under the control of the project participant, through the management of dedicated plantations. (ref/3/) (ref/5/)

(20) *This methodology is not applicable to cases in which the most plausible baseline scenario is the non renewable charcoal iron ore reduction system or is an iron ore reduction system partially using non renewable charcoal. In order to ensure a conservative assessment of this applicability condition, the use of non-renewable charcoal shall be assessed in the baseline scenario identification procedure, as per the procedures presented in the corresponding section of this methodology;*

- The iron ore reduction system based on non-renewable charcoal is not a plausible baseline scenario for this project activity. The country's legislation restricts the use of non-renewable reducing agents. Thus, the operation of the iron mill based on non-renewable charcoal as the most plausible baseline scenario would be illegal. The most plausible baseline scenario for this project activity is the use of coal coke as a reducing agent for the primary iron production. This is presented in details in the section B.6.3 in this Validation Report.

(21) *This methodology is only applicable if the most plausible baseline scenario identified is the production of iron and/or steel based on an iron ore reduction system that relies completely or partially on the use of fossil fuel based;*

- The baseline scenario identified relies entirely on the use of fossil fuel reducing agent (i.e. coal coke). This is presented in details in the section B.6.3 in this Validation Report.

Some elements of the methodology AM0082 version 1 derive from the following approved methodologies/latest tools:

- AM0042 - Grid-connected electricity generation using biomass from newly developed dedicated plantation, version 2.1.
- ACM0003 - Emissions reduction through partial substitution of fossil fuels with alternative fuels or less carbon intensive fuels in cement or quicklime manufacture, version 7.4.0;
- AM0041 - Mitigation of Methane Emissions in the Wood Carbonization Activity for Charcoal Production, version 1;



- AR - AM005 - Afforestation and Reforestation project activities implemented for industrial and commercial uses, version 4;
- Combined tool to identify the baseline scenario and demonstrate additionality, version 04.0.0;
- Tool to calculate baseline, project and/or leakage emissions from electricity consumption, version 01;
- Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion, version 02;
- Tool for the identification of degraded or degrading lands for consideration in the implementation of CDM A/R project activities, version 01;
- Tool for the estimation of non-CO<sub>2</sub> GHG emissions from burning of biomass attributable to an CDM A/R project activity, version 1 (new tool called "Estimation of non-CO<sub>2</sub> GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity", version 04.0.0);
- Estimation of direct nitrous oxide emission from nitrogen fertilization, version 01.

The DOE hereby confirms that, as a result of the implementation of the proposed CDM project activity, there are no greenhouse gas emissions occurring within the proposed CDM project activity boundary, which are expected to contribute more than 1% of the overall expected average annual emissions reductions, which are not addressed by the applied methodology. The methodology's applicability's conditions were confirmed by the DOE to the proposed project activity.

### 3.6.2 Project boundary (80)

The spatial extent of the project boundary is clearly defined in line with AM0082 version 01 (Ref/42/). The project boundary takes into account the integrated nature of the iron ore reduction system in the estimation of GHG emissions, as well as in the determination of the baseline scenario and assessment of additionality. The project boundary includes emissions associated with the production of reducing agents (upstream emissions) and emissions associated with use of the reducing agents in the iron ore reduction facility (process emissions).

The spatial extent of the project boundary is consistent with the iron ore reduction system. It encompasses the geographical area of raw material supply (i.e. primary carbon source that is further converted into reducing agents, in the case of the project activity, planted biomass), the units that convert raw material into reducing agents (i.e. carbonization units that convert wood into charcoal), the transportation of the raw materials and of the reducing agents (i.e., charcoal) to the iron ore reduction facility, and the iron ore reduction facility (blast furnace). Please refer to Figure 04 in the PDD version 4 (Ref/2.2/).

This project activity only claims GHG emission reductions associated with the use of renewable charcoal produced within boundaries of the iron ore reduction system instead of the use of fossil fuel based reducing agents, i.e. coal coke. The detailed maps of the lands of the 14 farms that make up the limits of this project activity are available in



Annex 5 of the PDD version 4 (Ref/2.2/) and was assessed and confirmed by the validation team. The treatment of the project boundaries within this project activity is explained below, in accordance with each of its components:

*Emissions in the establishment of the dedicated plantations:*

The dedicated plantations within the boundaries of this project activity are located in the state of Minas Gerais (precise location is contained in Figures 05 and 06 in the PDD version 4). The eucalyptus forests in the region of the project activity usually last for a period of 21 years, with the first harvest occurring after 7 years, followed by two successive periods of 7-year rotations through coppicing. The DOE has confirmed this based on studies published by EMBRAPA (2003) (Ref/12/) and AMS - Silviculture Association for the state, 2003 (Ref/15/).

The first planting activity in the establishment of dedicated plantations to the new iron ore reduction system was at the farm Fazenda Itapoã on 01/10/2000 (Ref/5/). The spatial boundaries of the project's dedicated plantations are identified by land use maps, GPS coordinates based on cartographic-based geo-referenced information on the project area. All information on the area and limits of the project plantations is recorded in a forest inventory system that is represented on maps available in Annex 5 in the PDD version 4 (Ref/2.2/). The documentation was made available to the DOE and will be used for the purpose of monitoring and verification. The CO<sub>2</sub> emissions resulting from fossil fuel combustion in the establishment of dedicated forests and the N<sub>2</sub>O of the use of fertilizer are accounted and will be monitored.

*Emissions in the carbonization process*

This project activity relies on the same procedures of the approved methodology AM0041 "Mitigation of Methane Emissions in the Wood Carbonization Activity for Charcoal Production" version 1 (Ref/43/) with respect to CH<sub>4</sub> emissions in the carbonization process. Accordingly, CH<sub>4</sub> emissions will be monitored in the project and the result will be included in the estimation of project emissions and emission reductions.

The carbonization units currently built are monitored and the related documents and procedures established are also covered under another project activity currently under validation ("Carbonization Project - Mitigation of Methane Emissions in the Charcoal Production of V&M Florestal, Minas Gerais, Brazil").

The areas dedicated to the plantations and carbonization units are located in the 14 following farms: Itapoã, Meleiro, Olhos d'Água, Diamante, Santa Cruz, Aldeia, Galheiros, Campo Alegre, Patagonia, Chapadinha, Sussuarana, Vargem Bonita, Brejo, Brejão. Please refer to Figures 05 and 06 in the PDD version 4.

*Emissions in the iron ore reduction process:*

CO<sub>2</sub> emissions in the iron ore reduction process are considered and will be monitored accordingly.





The Plant Location is: V&M do BRASIL S.A. Av. Olinto Meireles 65 – Barreiro – BH/MG

The validation team did not identify any emission sources that will be affected by the implementation of the proposed project activity and which are expected to contribute more than 1% of the overall expected average annual emissions reductions, and are not addressed by the selected approved methodology.

Based on the above assessment, the DOE hereby confirms that the identified boundary and the selected sources and gases are justified for the project activity.

### 3.6.3 Baseline identification (87-88)

The steps taken to assess the requirement given in paragraph 81 and 82 of the VVM are described below.

In line with the methodology AM0082 version 1 (Ref/42/), the proposed project activity applies the latest "Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality", version 04.0.0 (Ref/58/) and also refers to specific issues related to the methodology itself and the new iron ore reduction system.

#### ***Step 1 – Identification of alternative scenarios***

The following alternative scenarios were identified for the use of reducing agents in the project entity's production of primary iron in the absence of the proposed project activity. The applicable geographical area for this project activity is the host country and "Fuel and feedstock switch" is the suitable measure:

- Alternative Scenario 1 - Iron ore reduction system based on the use of coal coke<sup>1</sup>;
- Alternative Scenario 2 - Iron ore reduction system based on the use of renewable charcoal, originated from new forest plantations (project scenario);
- Alternative Scenario 3 - Iron ore reduction system based on the use of non-renewable charcoal (originated from non-renewable sources);
- Alternative Scenario 4 - Iron ore reduction system based on the use of a mix of reducing agents;
  - In accordance with the guidelines of the methodology on how to address the mix of reducing agents as an alternative to the baseline, the flowchart provided by the methodology for this case has been applied. There are no regulations in the state of Minas Gerais that restrict the use of mix of reducing agents in the

<sup>1</sup> Coal coke is a reducing agent used in the iron and steel production worldwide. Usually, it is added on the top and also injected from the bottom of the blast furnace (LACROIX. PH. *et al. High blast furnaces productivity operations with low coke rates in the European Union*. La Revue de Métallurgie, March., 2001.).



reducing. The flowchart of the methodology to assess the *Alternative Scenario 4* is applied.

- Alternative Scenario 5 - Iron ore reduction system based on the use of renewable charcoal from planted biomass originated from existing plantations.

### ***Step 1a: Compliance with actual laws and regulations***

#### *Legislation regarding the use of coal coke (Alternative Scenario 1)*

In an attempt to restrain imports and to stimulate quantitatively and qualitatively the development of the national production of coal coke, the Brazilian coal coke industry has been given priority as an industrial development tool (CNP Resolution n.18/ 11 November 1980) (Ref/16/). The resolution provided the basis for the regulation of the national supply of coal coke, which allowed for imports of coal only allowed to complement the Brazilian production. Brazilian producers had to declare their expected production for the following year and only then the quota of coal to be imported was defined.

In the 1990's, the National Department of Mines and Energy, through the Decree 99.244 (Ref/17/) was designated to supervise and control imports, production and transportation of coal coke. As a result of new democratic and free trade governmental policies, the quantitative controls on companies' imports, as well as the prohibition for imports (in force since 1975) were eliminated in March 1990.

In June 1990, through the Ordinance MEFP n.365 (Ref/18/), the government settled its general guidance for industrial and international trade policies, aiming to boost internal competitiveness and industrial modernization. The DOE confirms that there are no legal restrictions regarding the use of coal coke in the iron ore reduction process. There are also no regulatory restrictions that prevent the implantation of coke ovens in Brazil. Pollutant emissions to the atmosphere are regulated by CONAMA's Resolution 382, of 26 December 2006 (Ref/19/). In addition, the DOE has not identified any other regulations for the industrial process involved.

#### *Legislation related to the use of charcoal (renewable and non-renewable) and of a mix of reducing agents (Alternative Scenarios 2, 3, 4 and 5)*

Since the 1930's, different regulatory mechanisms have affected the production of renewable and non-renewable charcoal in Brazil. The Brazilian Forestry Code, issued in 1934 (Decree 23.973/34) (Ref/20/) and reedited in 1965 (Law nr. 4771/65) (Ref/21/), was an important instrument to regulate the forestry activities, establishing a minimum percentage for the preservation of native forests, and introducing the concept of permanent preservation areas and legal reserves. Article 21 required that mills,



transportation companies, and other units based on wood or other forestry raw materials, have their own plantations established over a five to ten year period to achieve the requisite plantation-based wood supplies. The transportation of, acceptance and storage of wood, firewood or charcoal originated from native forests, as well as the production of charcoal using first quality native wood without proper licenses have all been qualified as criminal offenses, contravention passive of imprisonment and fines.

In 1989, the Decree 97.628/89, under the Brazilian Forestry Code (Ref/22/), required all companies that consume forest raw materials in large-scale to be responsible for the creation of the required plantation sources to supply their production activities. However, the 1988's Federal Constitution (Ref/23/) had established a new role for the Federation, States and Municipalities in the preservation and maintenance of forests, fauna and flora. It allowed States to simultaneously legislate on environmental issues. In 1991, Minas Gerais became the first Brazilian State to have its own forestry regulation, with the creation of the State Forestry Law (Law nr. 10.561) (Ref/24/), which was later replaced by Law nr. 14.309 of 2002 (Ref/25/), which obliges all companies that consume or commercialize forest products to use a minimum of 90% of wood coming from planted forests. This regulation provides the legal basis for the possibility of using a mix of renewable and non-renewable charcoal, since a maximum of 10% for native forests consumption has been allowed, provided a fee is paid.

In the past, several illegal schemes of commercialization of products deriving from illegal logging and falsification of licenses for charcoal production and transportation have been reported. Technical and human resources for more thorough inspections have not been sufficient to cover the national territory. The effects of such a lack of inspection and state control, together with the abundant availability of native forest resources and its greater economic attractiveness compared to any alternative that requires new investments, e.g. renewable charcoal or coal coke, have led to market failures in the sustainable production of renewable charcoal-based iron.

However, inspection operations have significantly increased both in terms of frequency and strictness. In the state of Minas Gerais, this trend culminated at the end of 2007, early 2008, when the executive branch has proposed new legislation, gradually banning the use of non-renewable sources of charcoal for the iron ore reduction process. In 2009, the State Governor approved Law nr. 18.365 (Ref-/26/), which regulates the use of native wood sources by companies in Minas Gerais. It presents a schedule for gradual reduction of consumption of native wood and establishes its use to a maximum of 5% from 2018 on. New companies have to prove they start their activities relying 95% on planted forests. The law also considers the electronic monitoring of forest goods, such as wood and charcoal, tracking the transporting trucks via electronic chips.

Therefore, based on the legal framework applicable to the use of reducing agents in the iron ore reduction process in Brazil and on the scenarios initially identified in Step 1, it can be concluded that:

- (i) There are no legal restrictions to the use of coal coke in the iron ore reduction process (*Alternative Scenario 1*);
- (ii) There is no legal restriction in terms of the maximum amounts of renewable charcoal that can be used in the process (*Alternative Scenario 2 and 5*);





- (iii) It is illegal to base the production of iron totally on non-renewable charcoal (*Alternative Scenario 3*). Consequently, it would be unrealistic and not feasible to assume that project entities would plan new and long-term investments to establish a new iron ore reduction system, in light of the severe restrictions in terms of the maximum amounts of non-renewable charcoal, coupled with all risks derived from the illegal and unsustainable practices involving the use of non-renewable charcoal;
- (iv) There are no legal restrictions to the use of a mix of reducing agents for the integrated sector mills. For the same reasons stated in the previous topic, a scenario based on the large scale use of non-renewable charcoal would be illegal even in a mixture with renewable charcoal.

**Outcome of Step 1a:** the plausible alternative scenarios to the project activity are Scenarios 1, 2, 4 and 5.

### **Step 1a: Assessment of supply and demand of reducing agents**

#### Sector Level:

The Brazilian iron and steel industry can be divided into two groups with very different characteristics. The first group comprises the integrated iron and steel mills, which operate the three basic phases of steel production process: the reduction of iron ore, where the resulting primary iron in liquid state (hot metal) is directed to refining, and to the final processing of steel<sup>2</sup>, such as the lamination, with an installed capacity of 41.5 million tons/year. It meets 95% of the country's steel demand (about 24 million tons in 2008) and export the surplus production (9.2 million tons in 2008) to different markets around the world (SILVA, 2010) (Ref/27).

The second group comprises the non-integrated (or independent) primary iron producers, which have as common feature the use of charcoal in blast furnaces for the iron ore reduction and the final product is the pig iron (primary iron in solid state). This segment targets especially the external market (63.6%) and it has an installed capacity of 14 million tons/year.

According to a study done by Cedeplar - Centre for Regional Development and Planning of the Federal University of Minas Gerais (SILVA, 2010) (Ref/27/), the national iron and steel industrial park currently consists of 13 private companies, controlled by eight business groups that operate 27 plants (12 integrated mills and 15 semi-integrated ones), scattered in ten Brazilian states, and about 80 independent producers throughout Brazil: 63 in the state of Minas Gerais, 15 in the Carajás region (states of Pará and Maranhão), 4 in the state of Espírito Santo, and 2 in the region of Corumbá in the state of Mato Grosso do Sul. V&M do Brasil S.A. is part of the group of integrated iron and steel mills.

Since the availability of reducing agents has a large impact on the assessment of the baseline scenario, the PDD (Ref/2.2/) has presented a detailed analysis on how the

<sup>2</sup> IABr – Instituto Aço Brasil, [Steel](http://www.acobrasil.org.br/site/portugues/aco/processo-introducao.asp). Accessed in June 2012. <http://www.acobrasil.org.br/site/portugues/aco/processo-introducao.asp>



dynamics of supply and demand for coal coke and/or charcoal from renewable plantations affect the definition of realistic alternative scenarios. As presented in Figures 8 and 9 in the PDD version 4 (Ref/2.2/), there is a historical, current and expected plantation deficit in Brazil, which is widely recognized by local, state and federal governments, universities, research institutes, NGOs' and private sector entities.

Although specific numbers may vary, depending on the research focus, vintage of the data, and wood end-uses, most researches report a common conclusion, pointing to severe shortages in the supply of plantation wood (renewable wood) in Brazil, widely referred to as the "forestry blackout". The most frequent causes are: lack of adequate debt funding, inadequate long-term policy, high interest rates, complex environmental policy and forestry legislation (AMS, 2009) (Ref/28/) and VALVERDE, 2011) (Ref/29/). In most cases, these issues make the establishment of plantations unattractive and increase the pressure on native vegetation, which is a common conclusion reached in the published literature. The causes of these and other potential barriers will be discussed in Step 2.

In order to identify possible supply and demand unbalances, a comparative analysis has been conducted for (i) the total share of reducing agents consumed (effective demand) in the production of primary iron and, (ii) the amount of plantations established for such an end-use seven years before (available supply).

According to a study report published by the National Social and Economic Development Bank (BNDES), the charcoal industry is currently the most affected sector by the ever increasing demand for wood sources and the lack of new plantations that would be sufficient to meet this demand (BNDES, 2002) (Ref/30/). This trend is further corroborated by a survey done by the Brazilian Institute for Geography and Statistics (IBGE, 2003) (Ref/31/).

At the international level, the economic growth of countries like China and India is creating a considerable demand for iron and steel products, and it is expected that this growth continues for a long time due to the development needs and macroeconomic targets (e.g. GDP growth/year) of such countries. As a consequence, the iron and steel production in Brazil and in other parts of the world was driven to an unprecedented level of growth. The Brazilian iron and steel industry widely uses coal coke since the 1940s (BARBOSA, 2006) (Ref/32/). Recently, companies that produce coal coke based iron have significantly grown in importance and are considered relevant market players at the global level. There is a historical and current trend of the Brazilian coal coke based iron and steel production, which points to a significant expansion of coal coke based iron ore reduction facilities.

Unlike the renewable charcoal, the coal reserves are available in different countries, with recoverable reserves in more than 70 countries and, at current production levels, with an estimated duration of at least 118 years (World Coal Association, 2012) (Ref/33/). In addition, the logistics of a global *commodity* such as coal provides a substantial basis for internal and external economies of scale (Krugman and Obstfeld, 2003<sup>3</sup>), which cannot be affirmed about the charcoal industry.

<sup>3</sup> KRUGMAN P. & OBSTFELD M., [International Economics: Theory and Policy](http://wps.aw.com/aw_krgmnobstf_interecon_7/), New York: Harper-Collins (6<sup>th</sup> Edition), 2002. [http://wps.aw.com/aw\\_krgmnobstf\\_interecon\\_7/](http://wps.aw.com/aw_krgmnobstf_interecon_7/)



In conclusion, the analysis of the supply and demand dynamics of dedicated plantations of renewable charcoal points to a significant supply shortage of renewable charcoal as an iron ore reducing agent. On the contrary, coal, a widely distributed global commodity, is identified as the usual and most common reducing agent used nationally and internationally in the iron and steel industry due to its substantial availability and external economies of scale.

#### Project Level:

V&M do Brasil and its subsidiaries (V&M Florestal and V&M Mineração) are the Brazilian units of the group Vallourec & Mannesmann Tubes. V&M Tubes is a holding of French capital, 100% controlled by Vallourec, which possesses dozens of industrial plants and businesses in four continents. In 1969, Mannesman Agroflorestal was created, which later became V&M Florestal. The aim of its establishment was to produce charcoal from planted eucalyptus forests in order to ensure V&M do Brasil's self-sufficiency in its primary iron production. Its creation was parallel to the creation of a national policy to encourage the production of planted forests (historically known as Fiset), which started in the late 1960s.

This policy's purpose was to meet part of the demand of the forest-based industries and assist in the import substitution policy regarding the import of coal. However, in the late 1980's, due to the international crisis that strongly affected the Brazilian economy, the Brazilian government ended the incentive program to reduce government spending. At the same time in the 1990, there was the opening of the Brazilian economy, easing again the import process and reducing access to quality credit for investments in the forestry business. Therefore, in the 1990s, there was a dramatic reduction in new investments in the forestry area in Brazil. As we have previously presented, the nature of iron ore reduction systems that use renewable charcoal is very different from that of systems that use coal coke, since the latter has immediate stock availability, while in the case of renewable charcoal, investment in supply must be made at least 7 years from the point of production and a considerable amount of resources and energy must be allocated in the forestry activities related to the production of charcoal. It is definitely a long term investment, with considerable amounts of risks (as it will be discussed in the barrier analysis sections below).

After France signed the Kyoto Protocol in April 1998<sup>4</sup>, Vallourec's group of managers identified that the Clean Development Mechanism could assist the head office to comply with the possible commitments to reduce emissions through project activities using charcoal in its iron ore production in Brazil. During a board meeting in 2000, it was shown that the coal route presented more advantages, but they opted for the establishment of new forest plantations for the supply of charcoal since this route could be supported by "carbon credits". Thus, from 2001 onwards, a new cycle of investment was triggered for the establishment of a sustainable iron ore reduction system, based on dedicated eucalyptus forest plantations.

<sup>4</sup> The [ratification of the Protocol by France](http://www.mct.gov.br/upd_blob/0210/210584.pdf) to the approval occurs on 31 May 2002 (source: [http://www.mct.gov.br/upd\\_blob/0210/210584.pdf](http://www.mct.gov.br/upd_blob/0210/210584.pdf) )



In quantitative terms, when historical data between domestic supply and demand of charcoal sources are analyzed, the analysis shows that the forest stocks established until 2001, already in 2002 could not meet the Barreiro plant's production demand, reaching just over 50% of the iron and steel production demand. Please refer to Figure 11 in the PDD version 4 (Ref/2.2/). Looking at the average of the analyzed period, only about 35% of the total demand could be met with the group's own stocks. This number reaches the value of only 6% in 2013 (expected start date of this project activity's crediting period).

Therefore, despite the fact that V&M Florestal Ltda had thousands of hectares of planted forests in 2001 across several municipalities in the State of Minas Gerais, the data presented demonstrates that these stocks were at the end of their rotation and they would not be able to ensure an adequate supply of renewable wood to the iron and steel mills unless significant additional new investments were made.

### Conclusion

The analyses conducted in the sub-steps above have lead the validation team to the following conclusions:

- Based on state and national legislation, it is not possible or realistic to use non-renewable charcoal produced from native forests to completely supply iron production at an industrial scale (although the use of a share of non-renewable charcoal is legally possible; up to 10% of total reducing agent used in the production);
- The analysis of the supply and demand dynamics of the reducing agents (both at sector and project levels) related to the alternative scenarios identified points to a severe supply shortage of renewable charcoal, making it clear that there is no structured market for renewable charcoal and no existing plantation stocks that third parties could sell directly to the project entity on a long-term and sustainable basis. On the other hand, the coal coke market benefits from significantly lower transaction costs benefits and external economies, since it is a global commodity.
- The deficit of renewable charcoal provides a significant constraint to the types of new investments to be analyzed within the combined baseline and additionality assessment. Given the absence of the required plantations, the only realistic alternative scenario which encompasses the use of renewable charcoal is the establishment of new dedicated plantations.

**Outcome of Step 1b:** The plausible alternative scenarios for the project activity are Scenarios 1, 2, and 4.

**Conclusion of Step 1:** In line with AM0082 version 1, the remaining realistic alternative scenarios, Scenario 1, Scenario 2 and Scenario 4 will be evaluated in the subsequent steps, in order to allow for the identification of the most likely baseline scenario.

### **Step 2 – Barrier Analysis**



The barrier analysis contained in the PDD version 4 considers the three remaining alternatives described in **Step 1** above: use of coal coke in the iron ore reduction system (Alternative Scenario 1), iron ore reduction system based on renewable charcoal from planted biomass sources based on new plantations (Alternative Scenario 2) and an iron ore reduction system based on a mix of reducing agents (Alternative Scenario 4). The barrier analysis takes into consideration the "Guidelines for objective demonstration and assessment of barriers", Annex 13 of the EB 50 (Ref/45/).

***Step 2a: Identify barriers that would prevent the implementation of alternative scenarios***

The identified barriers include:

- a) Barriers/incentives to investment and financing;
- b) Sectoral and policy barriers;
- c) Technical and/or regulatory barriers, e.g. different environmental licensing requirements for different reducing agents.

***Outcome of Sub-step 2a:*** The barriers that may prevent the occurrence of one or more alternative scenarios are listed above.

***Step 2b: Eliminate alternative scenarios which are prevented by the identified barriers***

***2b.1. Assessment of the identified barriers to establish a coal coke iron ore reduction system (Alternative Scenario 1):***

- a) Barriers/incentives to investment and financing:
  - The coal coke-based iron and steel industry in Brazil has benefited from the Brazilian industrial modernization programme that occurred in the 1990s. According to an article published in a respected Brazilian newspapers, the new investments in the sector are expected to reach US\$39.8 billion by 2016, increasing the installed capacity in Brazil from 42 million tons to 77 million tons of crude steel (Newspaper: O ESTADO DE SP, 2010<sup>5</sup>).
  - There is no coal coke supply in the Brazilian domestic market. Major steel companies of the integrated sector build their own coke ovens to process coal, which is mostly imported<sup>6</sup>. Another alternative is to import

<sup>5</sup> [O ESTADO DE SP. IABr prevê investimentos de US\\$39,8 bi até 2016. 04 February 2010.](#)

<sup>6</sup> The coke manufacturing process is a chemical process in which coal releases gases contained in its structure when subjected to high temperatures, in the absence of oxygen, forming a solid residue, powerful and infusible called coke (DEMEC/UFMG, accessed in June 2012).  
<http://www.demec.ufmg.br/disciplinas/ema003/solidos/coque/processo.htm>





the coal coke. The DOE has assessed the argument presented in the PDD that there are no barriers to investment and financing in the installation of a coke oven, since it is possible to build efficient and competitive coke ovens that do not require a huge amount of investment (SCHERER, 1995<sup>7</sup>), and confirms that it is reasonable and adequately represents the situation in the sector in the host country.

b) Sectoral and policy barriers:

- In the early 1990s, the Brazilian economy went through a process of trade liberalization, following the democratization process that culminated in the presidential elections of 1989, ending an era of trade protectionism and nationalism. A more liberal development policy was adopted. Import taxes were reduced, encouraging imports of coal coke. A comprehensive privatization policy was also implemented. A specific privatization program for the iron and steel industry was put into practice and by the second half of the 1990s, all major public iron and steel companies had been privatized and, in parallel, the tax incentives for forest plantations aimed at supplying renewable charcoal were eliminated. "With the privatization, many companies related to the charcoal production were shut down and the process shifted to imported coal"<sup>8</sup>.
- According to the Ministry of Mines and Energy (MME), an important incentive policy financed by the National Social and Economic Development Bank (BNDES) is to finance new researches and investments in order to achieve self-sufficiency in coal and coal coke by 2010 (USP, 2004<sup>9</sup>). The Federal Government intends to develop an infrastructure in the domestic market to explore and produce 13 million tons of coal per year. In this way, the country would become less dependent on imports by the iron and steel industry (USP, 2004<sup>10</sup>).

c) Regulatory barriers and/or technical barriers:

- There are no significant regulatory issues regarding the use of coal coke as a reducing agent, in addition to those reported with respect to foreign trade and imports.

<sup>7</sup> SCHERER, S. W. G. and MAIA, R. J. *Mini Usinas Integradas a Base de Mini Alto Fornos*. 27-29 November 1995. [ABM, Belo Horizonte. Seminar.](#)

<sup>8</sup> MINISTER for Technology and Science, 2004, page 195. <http://www.mct.gov.br/index.php/content/view/310580.html>

<sup>9</sup> USP – Universidade de São Paulo - Hemeroteca do Instituto de Eletrotécnica e Energia. [Brasil poderá ser auto-suficiente em carvão](#). Gazeta Mercantil, 2004. <http://infoener.iee.usp.br/infoener/hemeroteca/imagens/78561.htm>

<sup>10</sup> According to IBS (2006), 72% of Brazilian primary iron is produced with the use of coal coke.



- There are no technical barriers to the use of coal coke in blast furnace design of the project entity.
- The implementation of a coke oven near the plant is a viable solution to ensure self-sufficiency in the supply of thermo-reducing agent. There is no sufficient or adequate supply of coal coke in the Brazilian domestic market and the most economic solution is the installation of a coke oven for self-supply. There is available technology in the market to implement a viable coke oven using the technology called "*non-recovery*" or "*heat recovery*". The "*non recovery*" or "*heat recovery*" technology exists at all scales, from small installations of approximately 40,000 tons of coke/year to large plants with a production capacity of 2 million tons of coke/year (PFEIFER, 2008<sup>11</sup>). The "*non recovery*" or "*heat recovery*" technology burns all the coal's volatile matter while it is inside the coke ovens, instead of releasing toxic gases into the atmosphere<sup>12</sup>, meaning low environmental impact. It also recovers the heat from the hot gases for power generation<sup>13</sup>.
- To conclude, there are no regulatory or environmental barriers related to the installation of "*non recovery*" or "*heat recovery*" coke ovens. Its fumes and gases are completely burned before being released into the atmosphere or could be used for energy generation.

*2b.2 Assessment of the identified barriers to establish a renewable charcoal iron ore reduction system based on new plantations (Alternative Scenario 2):*

a) Barriers/incentives to investment and financing:

In line with Guideline 1 of EB 50, Annex 13 (Ref/45/), the validation team has assessed the following information provided in the PDD version 4, regarding the nature, the organization, and the ownership of the company, as well as concerning its previous experience with similar projects:

Vallourec & Mannesmann Tubos do Brasil (V&M do Brasil S.A.) was established in 2000 through the acquisition by the French group Vallourec of a company of German capital, Mannesmann SA. V&M do Brasil is a wholly-owned subsidiary of the 100%-French group Vallourec.

The DOE confirms, based on information publically available (<http://www.vmtubes.com.br/>) that the description in the PDD version 4 is accurate.

The barriers discussed in the PDD, and presented below, refer mainly to the forestry component of the iron ore reduction system based on the use of renewable charcoal.

<sup>11</sup> PFEIFER, Henrique Carlos. *Coque e os Mini Alto-Fornos*. ABM, São Luiz do Maranhão, 2008. Symposium.

<sup>12</sup> Emissions of air pollutants are regulated by CONAMA Resolution 382 of 26 December 2006.

<sup>13</sup> CST-Arcelor Brasil – *Mecanismo de Desenvolvimento Limpo – Projeto Heat Recovery*. Accessed in August, 2011. [http://www.cst.com.br/meio\\_ambiente\\_comunidade/mecanismo\\_desenvolvimento\\_limpo/mecanismo\\_desenvolvimento\\_limpo.asp](http://www.cst.com.br/meio_ambiente_comunidade/mecanismo_desenvolvimento_limpo/mecanismo_desenvolvimento_limpo.asp)



- In order to produce renewable charcoal it is necessary to establish sustainable sources of fuel wood. The most common way to achieve this scenario is through the establishment of dedicated forest plantations, which require large amounts of initial investment with extremely long payback periods. Although the productivity of eucalyptus plantations in Brazil is among the highest productivities in the world, the first harvesting period for most economic uses, including charcoal, cannot occur before the seventh year. The first revenues are only obtained after 7 years, which makes the structuring of financing schemes for the project extremely complex.
- In order to cope with the intrinsic characteristics of the renewable charcoal sector, loans must have a grace period of at least 7 years (first harvesting period), and a minimum duration of about 10 years, which is not common in the Brazilian financial market. These types of loans are not offered by Brazilian private banks, and, as a result, this fact increases the demands for governmental funding, which must meet priorities competing for the limited available resources.
- Even among the Brazilian public banks, the availability of appropriate funding for the project activity is very limited. From 2000 to 2010 only \$ 113.9 million was made available for the entire reforestation sector in the state of Minas Gerais (BDMG, 2010<sup>14</sup>).

As it can be seen in Figures 12 and 13 in the PDD (version 4), the approximate average value for loan disbursements by Minas Gerais Development Bank (BDMG), through its fund “Pro-forests” between 2000 and 2010, has reached roughly R\$ 10.3 millions/year. In 2007 for example, no loan was made available through this fund.

The National Social and Economic Development Bank (BNDES), the largest long-term lender in Brazil was unable to meet the sector's demands for funding<sup>15</sup>. The funds available for forest plantations do not apply to the project activity, since it is intended exclusively for small businesses (e.g. BNDES Pronaf - just for rural producers, and BNDES Propflora) or are intended for the pulp and paper industry. The program Propflora was created to finance the establishment of forest plantations. Nonetheless, the limit is R\$150.000, negligible amount considering the investment demands of large plantations, such as the as the ones involved in the proposed project activity.

Likewise, the plantation's location in the state of Minas Gerais also makes it ineligible for other sources of official resources, such as funds for the less privileged regions of Brazil, which also suffer from a lack of sufficient resources (e.g. regional funds for the North, Midwest and Northeast regions). Consequently, the project entity has restricted access to long-term financing for project's dedicated plantations, which have proved extremely scarce and expensive in Brazil.

<sup>14</sup> BDMG – Development Bank for Minas Gerais State

<sup>15</sup> PNF – National Program for Forests, [Funding and Credit](http://www.mma.gov.br/sitio/index.php?ido=conteudo.monta&idEstrutura=5&idMenu=1442) (<http://www.mma.gov.br/sitio/index.php?ido=conteudo.monta&idEstrutura=5&idMenu=1442>) and [the funding table](http://www.reflorestar.com.br/financiamento.shtml) (<http://www.reflorestar.com.br/financiamento.shtml>), accessed in July 2011.





As discussed in the PDD, the expected CDM project activity's registration would encourage other industries that require wood to use renewable charcoal from dedicated plantations in the iron (ore) production. In fact, other Brazilian companies have already considered CDM's incentive as means of enabling sustainable plantations. In recent years, major steel and iron producers, such as Acesita S/A and Belgo Mineira (both part of the ArcelorMittal Group) initiated the development of similar project activities, in response to CDM's incentive. The two companies had previously converted part of their manufacturing operations based in plantations into fossil fuel-based operations, such as the coal coke based iron production. Similarly, in the independent pig iron sector, Plantar has developed a CDM project activity, in order to provide sources of sustainable charcoal.

b) Sectoral and policy barriers:

The development of forest plantations began in 1967, as a result of a reforestation program subsidized by the Federal Government implemented through Law 5106 of 02<sup>nd</sup> September 1966 (Ref/34/). In response to the growing demand from wood dependent industries and in order to limit deforestation practices, a program of fiscal incentives (later known as "FISSET") was implemented to encourage the establishment of plantations. The program lasted up to 1988 and the state of Minas Gerais was responsible for more than 70% of the plantation projects under this program.

The planted area has increased in response to this program and the total area of plantations in Brazil, which was practically inexistent prior to the program's implementation, increased to 6.5 million hectares in 1992 (REIS, 1994<sup>16</sup>). With the end of the program in 1988, the establishment of plantations decreased sharply, while the harvest of existing plantations continued in considerable pace. The plantations' downward trend was clearly observed in the state of Minas Gerais (the project region), which has historically dominated the reforestation sector in Brazil (SEAPA, 2009<sup>17</sup>), especially in terms of plantations for charcoal supply. Minas Gerais state consumes approximately 60% of the charcoal produced in the Brazil. The iron ore deposits are common in the state and the need for a thermo-reducing agent (carbon) were responsible for the rapid reduction/deforestation of native forests in the region. The end of the program "FISSET" led to a decline in area for plantations in Minas Gerais and this was followed by a reduction of the total forest cover in the state, since the harvesting levels remained high, with very low levels of replanting. In 1992, the state of Minas Gerais had 2.6 million hectares of planted forests. In 2003 and 2004, the stock of

<sup>16</sup> REIS, M. G. F. et al. *Sequestro e armazenamento de carbono em florestas nativas e plantadas dos Estados de Minas Gerais e Espírito Santo*. In: EMISSÃO x SEQUESTRO DE CO<sub>2</sub> - Uma nova oportunidade de negócios para o Brasil. Rio de Janeiro, 1994. Anais. Rio de Janeiro: Companhia Vale do Rio Doce, 1994. Seminar.

<sup>17</sup> SEAPA – Secretaria de Estado de Agricultura, Pecuária e Abastecimento de Minas Gerais. *SuperAgro esclarece dúvidas sobre plantios de florestas*. 2009.



planted forests in Minas Gerais was 1.16 and 1.15 million hectares, respectively, of which 75% was allocated to supply charcoal (AMS, 2005<sup>18</sup>).

Recognizing the threatening deficit of plantations in Brazil, the Federal Government launched the National Forest Programme (PNF) in 2000. The program's goal was to expand the planted forests through multiple initiatives, such as increase in funding, removal of regulatory bottlenecks and strengthening the governmental institutional capacity. However, according to the State's Forestry Authority (IEF) and an article published by the Federal University of Lavras (SCOLFORO, 2006<sup>19</sup>), the stock of wood plantations for fuel had decreased even further, reaching approximately 1.17 millions hectares in the State of Minas Gerais.

In 2004, the PNF program was relaunched by the Federal Government. However, as pointed out by the trends shown in Step 1b, and due to the barriers discussed herewith, the recent measures are not sufficient to address the current and projected deficits of renewable charcoal dedicated plantations. Therefore, despite governmental efforts, there is a lack of appropriate policies that can create incentives to tackle the critical shortage of planted areas to provide raw inputs (e.g. renewable charcoal) to several industries (e.g. steel industry). In 2009, there was approximately 1.22 million hectares of planted eucalyptus forests<sup>20</sup> in Minas Gerais state.

c) Regulatory barriers:

- Compared to the option of using coal coke, the main institutional (or regulatory) barrier identified in relation to the use of renewable charcoal originated from planted forests is related to the land use environmental licensing. Although an extended period of time is necessary for the environmental licensing of both coal coke and charcoal based mills, as the coal coke system is based on imported coal, its licensing is less time consuming<sup>21</sup> than in the case of renewable charcoal from planted forests that require an additional licensing process. The validation team has confirmed that based on the current procedures in the project's region.

Other regulatory restrictions that affect the use of renewable charcoal include:

- Land acquisition, including measures for its geo-referencing, which require a significant amount of time, according to the National Institute of Colonization and Agrarian Reform (INCRA);

<sup>18</sup> AMS – ASSOCIAÇÃO MINEIRA DE SILVICULTURA. [Perspectivas e tendências do abastecimento de madeira para a indústria de base florestal no Brasil – Uma contribuição à construção e acompanhamento dos cenários futuros](http://www.silviminas.com.br/Publicacao/Arquivos/publicacao_131.pdf). Minas Gerais. 2005. [http://www.silviminas.com.br/Publicacao/Arquivos/publicacao\\_131.pdf](http://www.silviminas.com.br/Publicacao/Arquivos/publicacao_131.pdf)

<sup>19</sup> SCOLFORO, José R. and CARVALHO, Luis M. T. *Mapeamento e Inventário da Flora Nativa e dos Reflorestamentos de Minas Gerais*. Editora UFLA, p. 225. Minas Gerais, 2006.

<sup>21</sup> The environmental impacts of the mining activities do not take place within the national borders. Therefore, an environmental license is not required.



- The establishment of legal reserve and permanent preservation areas, requiring the producers of planted forests to acquire extra portions of land that cannot be economically exploited (usually 30% more than the area required for planting: 20% for legal reserves in the project region + 10% on average for permanent preservation areas);
- Other steps and actions involved and required in the overall licensing process include: Environmental impact assessment (EIA/RIMA); Recovery of degraded areas and other environmental obligations; Public hearings to obtain the Environmental License; Evaluation of the Environmental License by the State Council for Environmental Policy (COPAM);
- After receiving the (preliminary) Environmental License, there are the environmental conditionalities for the Operating License, which must be followed;
- Development of an Environmental Control Plan (PCA);
- Environmental License renewal every 4 to 6 years (depending on the size of the rural area and its location).

In summary, the regulatory requirements presented above lead to significant barriers when comparing the use of charcoal with the use of coal coke. The latter does not need to face strict regulations regarding the land use to start with and in the specific case of the proposed project activity, all the mentioned regulatory barriers need to be considered for each of the 14 farms included in the project activity (i.e. each farm follows its own licensing process).

*2b.3 Assessment of the identified barriers to an iron ore reduction system based on the use of a mix of reducing agents (Alternative Scenario 4):*

a) Barriers/incentives to investment and financing:

- For the share of renewable charcoal, see analysis presented in item “2b.2 (a) Barriers/Incentives to investment and financing” above.
- For the share of non-renewable charcoal, it is legally impossible to obtain government incentives, public or private financing, as well as to obtain support from the scientific community or from NGOs for industrial activities based on the unsustainable use of native forests. Thus, this is an important step to clarify why the use of non-renewable charcoal is not likely to be an appropriate baseline scenario for a 21-year-long iron ore reduction project activity, even within the limit of 5%.
- For the share of coal coke, no major barriers regarding investment and financing have been identified (see the analysis presented in “2b.1 (a) Barriers/Incentives to investment and financing”).



b) Sectoral barriers:

- In Brazil, the total area with forests covers 56.7% (477.98 million hectares) of the total land area. However, the dedicated planted forests represent only 0.7% of the country's total forested area (5.98 million hectares), and the remaining 99.3% refers to native vegetation (472 million hectares) (Brazilian Society for Silviculture, 2008; [www.sbs.org.br](http://www.sbs.org.br)). Historically, natural forests have supplied the country's demand for wood, which resulted in the large-scale degradation/deforestation of several of the country's original biomes, including the Atlantic Rainforest, the Cerrado ("Brazilian savannah") and a significant portion of the Amazon Rainforest<sup>22</sup>. As presented in Brazil's Second National Communication to the UNFCCC<sup>23</sup>, 49% of the consumed charcoal still comes from non-renewable wood sources. It is not uncommon in Brazil that illegal logging (for various purposes, including charcoal production) occurs even in indigenous reserves. According to official data, 80% of the Amazon exploitation occurs under illegal conditions<sup>24</sup>. The illegal practice causes not only the depletion of the natural forests but also environmental and biodiversity degradation due to the production of non-renewable charcoal, which also and frequently leads to some of the most extreme and precarious labor conditions in Brazil. The Brazilian legislation prohibits the use of slave labour, but it can still be found mainly in the countryside, especially in agricultural, logging and non-renewable charcoal production activities. Some Brazilian companies have been accused of using forced labour, by paying little or no wages to workers especially in the northern area of the country (VOREACOS, 2006<sup>25</sup>) to produce non-renewable charcoal from illegal biomass sources (Newspapers BRASIL ECONOMICO, 2011<sup>26</sup>). Therefore, the circumstances regarding the production of charcoal in Brazil also indicate that it is not reasonable to assume non-renewable charcoal as a plausible alternative for reducing agent in the iron ore reduction process.
- According to the methodology's *Guidance on how to address the mix of reducing agents as an alternative scenario*, demonstrating that the use of a mix of reducing agents scenario is not realistic "shall be based on the availability of renewable wood at a reasonable price in the region". The assessment provided in **Sub-step 1b** above, with all its references, identified points to a severe supply shortage of renewable charcoal, making clear that

<sup>22</sup> Several studies, including one conducted by IBAMA in 2005 (Diagnose of the iron and steel sector in Para and Maranhão States – Technical report, 2005), indicate that the illegal logging that takes place in the Amazon rainforest is an important source of charcoal supply for pig iron production activities.

<sup>23</sup> [Brazil's Second National Communication to the United Nations Framework Convention on Climate Change](http://www.mct.gov.br/index.php/content/view/full/310922), 2010, Volume II, page 340. [http://www.mct.gov.br/index.php/content/view/full/310922.html](http://www.mct.gov.br/index.php/content/view/full/310922)

<sup>24</sup> IBAMA's website, accessed in July, 2011.

<sup>25</sup> VOREACOS, D. e Smith, M. [Automakers Pledge Joint Effort With Suppliers to Fight Slavery](http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aqs8kA0Qrpzw&refer=news). 11 December 2006. <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aqs8kA0Qrpzw&refer=news>

<sup>26</sup> BRASIL ECONOMICO. [Estudo acusa siderúrgicas de utilizar carvão vegetal ilegal](http://www.brasileconomico.com.br/noticias/nprint/103347.html). 22 and 23 June 2011. <http://www.brasileconomico.com.br/noticias/nprint/103347.html>



there is no structured spot market for the purchase of renewable charcoal and no existing plantation stocks that third parties could sell directly to the project entity on a long-term and sustainable basis. Also according to the methodology, “the availability of wood during the lifetime of the steel mill shall also be one of the main determinants for the definition of the mix”. In this case, the shortage of renewable wood to supply the demand of the industry is to be considered in this CDM-PDD the focal point of the assessment of the use of a mix of reducing agents, defining if the use of a mix of reducing agents is a realistic scenario.

c) Regulatory and/or technical barriers:

To produce non-renewable charcoal, it is necessary to have access to non-renewable sources of wood by intervening in the natural forests stocks. According to the State Forestry Authority of Minas Gerais (IEF), it is possible to intervene in native forests for different uses. The limit for exploitation is of 8st/ha in Atlantic Forests and 18 st/ha to other types of forests<sup>27</sup>. In a conservative scenario, in order to reduce a ton of hot metal, it is necessary to convert around 8 wooden steres into non-renewable charcoal. In order for a primary iron mill to reach the production level of the project activity, the necessary intervention in the natural vegetation would be almost 10 times larger than the *total* amount of land required for high-yielding eucalyptus plantations.

Apart from that, in order to legally intervene in a native forest, there is a long and complex process which the interested party must undergo. There are 14 institutional steps to be followed, which can be found in the IEF's manual. After the approval of all documents and pursuit of all the procedures, the applicant is granted the APEF document (Authorization for Forestry Exploitation) and only then is able to proceed with the intervention in native forests.

The great number of procedures and the complexity of the process make the access to the non-renewable wood sources from the legal exploitation of native forests something quite unattractive. Considering that a blast furnace demands a constant and regular amount of input, it is possible to conclude that the reliance on non-renewable charcoal supplies to establish a new iron ore reduction system is not a legal, practical or viable alternative.

- As for the use of coal coke coupled with renewable charcoal, in addition to the shortage of renewable wood in the market outlined in **Sub-step 1b** above, the use of larger shares of coal coke with renewable charcoal is technically not a good option. As an example, in a mix of 80% of charcoal and 20% of coal coke, the charcoal alkalis react with the coal coke diminishing its mechanical resistance and enlarging its reactivity. Any alkalis in the blast furnace affect the refractories creating crusts and also reacting with the cargo jeopardizing the gases flow and the smooth

<sup>27</sup> Ordinance 191 of 16 September 2005, IEF - State's Forestry Authority (Insituto Estadual de Floresta). See Art.3, <http://www.siam.mg.gov.br/sla/download.pdf?idNorma=11212>.



descend of the cargo. Other example is that the use of coal coke also implies the need of a desulphurization installation. Other different characteristics that have significant influence in the blast furnace performance are found between charcoal and coal coke, such as sulphur content, percentage of ashes, mechanical resistance (MINASAMBIENTE<sup>28</sup>, 2000). The table below shows the main characteristics of each reducing agent.

Property	Item	Unit	Value	
			Charcoal	Coal coke
Chemical	Fixed carbon	%	70~75	86~89
	Volatile matter	%	20~25	1~3
	Ashes	%	2~3	10~12
	Sulphur	%	0.03~0.10	0.45~0.70
	Composition of ashes			
	SiO <sub>2</sub>	%	5~10	50~55
	CaO	%	37~56	4~5
	MgO	%	5~7	4~5
	Al <sub>2</sub> O <sub>3</sub>	%	2~12	25~30
	Fe <sub>2</sub> O <sub>3</sub>	%	6~13	5~7
	P <sub>2</sub> O <sub>5</sub>	%	8~12	0.40~0.80
	K <sub>2</sub> O	%	15~25	2~4
	Na <sub>2</sub> O	%	2~3	1~3
Physical	Resistance to	kg/cm <sup>2</sup>	10~80	130~160

<sup>28</sup> MINASAMBIENTE. CETEC – CTDN – DESA – EE UFMG – FEAM – FIEMG – GTZ – SEBRAE (Cooperação Técnica Brasil-Alemanha). *Pesquisa Tecnológica para Controle Ambiental em Unidades Independentes de Produção de Ferro gusa de Minas Gerais. Ensino e Desenvolvimento tecnológico para Controle Ambiental na Indústria*. Subprojeto 4: Ferro-Gusa/ Volume III – Alternativas Tecnológicas. Belo Horizonte, 2000. See information on Minas Ambiente Project in <http://www.ufmg.br/boletim/bol1350/sexta.shtml> and reference to this 2000 work in <http://www.abes-dn.org.br/publicacoes/engenharia/resaonline/v7n34/v7n34n03.pdf>.





	compression			
	Granulometric range	mm	9~101.6	25~75
	Density	t/m <sup>3</sup>	0.250	0.550
Metallurgical	Reactivity (at 950°C)	%	60	15
	Resistance after reaction	%	-	60
	Density	(%)	100	30

(DEMEC, 2004)<sup>29</sup>

- The establishment of a mini coal coke making facility adjacent to the pig iron mill (in order to guarantee its self-sufficiency in reducing agent supply) and also the construction of coal coke silos in the plant are presented in **Sub-step 2b, item 2b.1 (c)** above).

As presented above, the validation team has considered and confirmed that:

- the technology applicable to the project activity is the blast furnace and three possible alternatives of reducing agents are considered: coal coke, renewable charcoal and non-renewable charcoal (including a mix among reducing agents types);
- the liberalization of the Brazilian market has facilitated the import of coal coke and the large amounts of investments to modernize and expand the Brazilian coal coke industrial park have increased the attractiveness of the use of coal coke in the iron ore reduction process in relation to long-term investments in dedicated plantations for the supply of renewable charcoal;
- the end of fiscal incentives to forests plantations and other major barriers assessed in **Sub-step 1b**, such as lack of adequate debt funding, inadequate long-term policy, complex environmental policy and forestry legislation, have resulted in the historical, current and expected shortage of dedicated plantations to supply the production of primary iron within the context of the project entity;
- the assessment of supply and demand of the Sector and Project levels, carried out in **Sub-step 1b** above, clearly demonstrates that using a mix of reducing agents that partially rely on renewable charcoal would face the same barriers as the alternative based entirely on renewable charcoal;

<sup>29</sup> DEMEC – DEPARTAMENTO DE ENGENHARIA MECÂNICA/ UFMG. [Uso alternativo de coque em alto-forno a carvão vegetal. http://www.demec.ufmg.br/disciplinas/ema003/solidos/coque/altern.htm](http://www.demec.ufmg.br/disciplinas/ema003/solidos/coque/altern.htm)



- in addition to the absence of renewable plantations, there are technical restrictions to the mixed use of coal coke and renewable charcoal in the thermo-reduction process which takes place in the blast furnace. There are technical restrictions (and changes required in equipments) when one reducing agent is chosen, and not the other (and *vice-versa*).
- the use of non-renewable charcoal is closely linked to environmental and illegal labor practices. Major companies are restraining negotiations with this type of raw material suppliers that perform illegal logging and labor practices in order not to damage or affect the companies reputation in the sector;
- the access to legal non-renewable sources is bureaucratic and slow, limited to small amounts of wood, and it is virtually impossible to comply with all the requirements for the legal use of nonrenewable sources at the scale capable of meeting the project activity's envisaged capacity;
- among the three options of reducing agents considered (coal coke, non-renewable charcoal and renewable charcoal), renewable charcoal option is the one which faces the greatest investment barriers due to its long-term nature and specially due to the lack of proper financing through the private sector, which is likely to prevent the implementation of the project activity even if it were more attractive than the use of coal coke in the short term.

The analysis leads to the conclusion that there are no barriers which would prevent the implementation of a new coal coke based iron ore reduction system (*Alternative Scenario 1*).

On the other hand, the establishment of a new renewable charcoal based iron ore reduction system (*Alternative Scenario 2*) would demand new long term investments for the establishment of dedicated plantations in order to guarantee the company's supply, which would otherwise face a lack of dedicated and sustainable wood plantations for the production of renewable charcoal. Given such deficit, the reliance on fossil fuel based reducing agents (i.e. coal coke) emerges as the only realistic alternative. Moreover, the use of a mix of renewable charcoal and non-renewable reducing agents, that is non-renewable charcoal and coal coke (*Alternative Scenario 4*) would mean incurring most of the barriers identified for *Alternative Scenario 2*, since dedicated plantations for renewable charcoal would have to be implemented anyway, and the risks and legal preventions to the mix with non-renewable and technical difficulties to the mix with coal coke are substantive and often prohibitive. In conclusion, *Alternative Scenario 4* is not a realistic alternative to the project activity.

Therefore, the most likely alternative for the project entity in the absence of the CDM project activity is the establishment of a coal coke based iron ore reduction system (*Alternative Scenario 1*).

**Outcome of Sub-step 2b:** the alternative scenario to the project activity that is not prevented by any barrier is *Scenario 1*. Therefore, *Alternative Scenario 1*, coal coke based iron ore reduction system, is the baseline scenario.





### **Step 3 - Investment Analysis**

According to the "Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality", version 04.0.0 (Ref/58/), the investment analysis is not applicable to this proposed project activity once the **Step 2** above has resulted in only one realistic alternative scenario, the coal coke based iron ore reduction system (Alternative Scenario 1).

The chronic supply shortage of renewable charcoal and the limitations of a price mechanism in curbing such deficits also seem to point to the existence of major market failures in the use of renewable charcoal as a reducing agent in the steel industry. Despite substantial increases in the prices of primary iron in the last 10 years (please refer to Figure 16 in the PDD version 4), the *deficit* in dedicated forest plantations for its production based on renewable charcoal has persisted unchanged. The idea that historical changes in the prices of primary iron, in strictly financial sense, could make the use of renewable charcoal from dedicated plantations more attractive, did not result in any proportional increase of its use as a reducing agent. Instead, the *deficit* in terms of the use of renewable charcoal as a reducing agent has remained as high as in previous years. The inelastic relationship between the price of primary iron ore in the market and the establishment of forest plantations and the use of renewable charcoal as a reducing agent corroborates the high risks of using the model based on renewable charcoal. The validation team has concluded that there is no direct relationship between availability of dedicated plantations and consumption of primary iron, making the limitations of the price mechanism explicit in this case.

Furthermore, there are no structured markets for renewable charcoal in Brazil, which does not occur with coal coke. Coal coke based iron production benefits from several external economies of scale, such as the standardization of a global commodity and the existence of an extensive logistics network.

### **Step 4 – Common practice analysis**

As explained in **Sub-step 2b** above, V&M do Brasil is part of the group of integrated iron and steel mills<sup>30</sup>. As presented in Figure 18 in the PDD version 4, the majority of the companies listed use coal coke as a reducing agent<sup>31</sup>. As it can be seen from the planning of the major companies in the Brazilian integrated sector, their production is mainly based on coal coke as a thermo-reducing agent, thus making it clear that the investment decision is made by defining only one reducing agent and not by a mix of reducing agents, reinforcing the elimination of this scenario (*Alternative Scenario 4*) as the baseline scenario.

The capacity of the iron and steel production in Brazil is expected to double by 2012 (reaching more than 77 million tons/year) and according to projections made by the

<sup>30</sup> Refer to **Step 1b**, *Sector Level* for an explanation of the Brazilian iron and steel sector, divided mainly into integrated and non-integrated (or independent) companies.

<sup>31</sup> Source: [IABr website and the cited companies websites](http://www.iabr.org.br/site/portugues/instituto/associadas.asp).  
<http://www.iabr.org.br/site/portugues/instituto/associadas.asp>



Brazilian National Steel Institute, 95% of this expansion using exclusively coal coke as thermo-reducing agent. On the other hand, it is certain that the participation of charcoal from planted forests in the national steel production will remain small and the shortage of forests plantations can be expected to continue in the coming years.

Following provisions of the “Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality”, version 04.0.0 (Ref/45/), a credibility check was prepared and is also presented in the PDD.

***Step 4a: The proposed CDM project activity applies measure(s) that are listed in the definitions section***

The entire host country Brazil is considered the applicable geographical area for this project activity and “Fuel and feedstock switch” is the suitable measure, in line with the Tool. The technology applied in the proposed project activity is the use of 100% of renewable charcoal as a reducing agent in the reducing process in the blast furnace.

**Sub-step 4a(1):** The primary iron range was calculated based on the rated capacity of the project activity, that is 650,000 tons of primary iron/year. Ten other facilities that provide the same output (primary iron) were considered and a calculation from these companies steel rated capacity was made in order to achieve their primary iron rated capacity. The conversion factor applied was 940kg pig iron per tonne of liquid steel<sup>32</sup>, resulting in an applicable range between 325,000 and 975,000 tons of primary iron/year for the assessment of similar project activities.

**Sub-step 4a(2):** The companies that deliver the same output (primary iron) in the project activity’s geographical area were identified within the integrated sector<sup>33</sup> and listed in Figure 19 in the PDD (for the purpose of selection criteria applied, “0” means “No”; “1” means “Yes”). Project activities registered or undergoing validation in CDM were excluded from the analysis, as well as companies outside the range established in **Sub-step 4a(1)**.

**Sub-step 4a(3):**  $N_{diff}$  refers to the companies identified in **Sub-step 4a(2)** that apply technologies different from the technology applied in the project activity, i.e. technology using coal coke as a reducing agent in the primary iron production.

**Sub-step 4a(4):** Factor F was calculated representing the share of companies applying a technology similar to the one used in the project activity, i.e. technology using 100% of renewable charcoal as a reducing agent in the primary iron production. The results confirm that the proposed project activity is not common practice in Brazil.

<sup>32</sup> 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 4: Metal Industry Emissions, page 4.25.

<sup>33</sup> According to IABr – Instituto Aço Brasil, [www.acobrasil.org.br](http://www.acobrasil.org.br).



Companies <sup>2</sup>	Steel rated capacity (tonnes/year)	Tonne pig iron/tonne steel	Fits the range? <sup>3</sup>	Fits the range and has a CDM project activity undergoing validation? <sup>3</sup>	Fits the range, does not have a CDM project activity and apply technology different to the proposed project activity? <sup>3</sup>
Aperam	900,000	846,000	1	0	1
ArcelorMittal - Juiz de Fora	1,000,000	940,000	1	1	0
ArcelorMittal Tubarão	7,500,000	7,050,000	0	0	0
CSN - Comanhia Siderúrgica Nacional	5,600,000	5,264,000	0	0	0
Gerdau Barão de Cocais/Divinópolis	950,000	893,000	1	0	1
Gerdau Group	8,690,000	8,168,600	0	0	0
Sinobras Siderúrgica Norte Brasil	315,000	296,100	0	0	0
Thyssenkrupp CSA	5,000,000	4,700,000	0	0	0
Usiminas	9,000,000	8,460,000	0	0	0
Villares Metals	250,000	235,000	0	0	0
Votorantim Siderurgia	1,750,000	1,645,000	0	0	0

<sup>1</sup> IPCC 2006<sup>2</sup> Instituto Aço Brasil - IABr<sup>3</sup> Where 0 = No and 1 = Yes

Nall = 2

Ndiff = 2

F = 1 – (Ndiff/Nall)

F = 1 – (2/2) = 1 - 1 = 0

The factor “F” is not greater than 0.2 (F = 0) and Nall – Ddiff is not greater than 2 (Nall – Ndiff = 0), therefore, in line with the “Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality”, version 04.0.0 (Ref/45/), the project activity is not common practice in the host country.

**Outcome of Step 4:** As demonstrated above, the project activity is not “common practice”. Therefore, the proposed project activity is additional.

The DOE has assessed the date used to identify the baseline scenario based on the following guidelines/standards: VVM v1.2 (paragraphs 117 & 118) (ref/41/); EB 50 (Annex 13) (ref/45/); Combined Tool for Baseline and Additionality (ref/58/). It concluded that, although the evidences used to substantiate the baseline scenario are after the project start date, there is no requirement in any of the guidelines/standards mentioned



above regarding the applicability of these sources at the time of investment decision. There is such requirement in the Guidelines on the Assessment of investment analysis (ref/61/), regarding input values used in any investment analysis conducted. However, investment analysis is not applied in the PDD.

The DOE has also assessed that there is no CAP for the parameter “Hot metal production” in the methodology. According to the methodology, the parameter “Hot metal production in project scenario in year y” is based on “expected hot metal production of the new iron ore reduction system”. In summary, the DOE assessed and concluded that the barriers were valid at the time of investment decision date. There was no change in circumstances or regulatory environment regarding the steel industry and charcoal production sector in the last decade. Furthermore, the baseline scenario according to the methodology is paragraph 48(b) of Modalities and procedures for a clean development mechanism (Decision 3/CMP.1) (“48(b): Emissions from a technology that represents an economically attractive course of action, taking into account barriers to investment”).

Based on the above assessment, the DOE hereby confirms that:

- (a) All the assumptions and data used by the project participants are listed in the PDD, including their references and sources;
- (b) All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD;
- (c) Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable;
- (d) Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD;
- (e) The approved baseline methodology has been correctly applied to identify the most reasonable baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed CDM project activity.

### 3.6.4 Algorithms and/or formulae used to determine emission reductions (92-93)

The steps taken to assess the requirement outlined in paragraph 89 the VVM are described below.

The project applies the methodology AM0082 version 1 (Ref/42/) to demonstrate the emission reductions in the project relative to the baseline. In accordance with the proposed methodology, the following sections present the formulae that were used to estimate the new iron ore reduction system baseline emissions, project emissions, leakage and emission reductions.

#### **A) Baseline emissions:**

$$BE_y = RAE_{BL, y} + IRE_{BL, y} \quad (1)$$

Where:

- $BE_y$  = Total baseline emissions in the iron ore reduction system in year  $y$  (tCO<sub>2</sub>e)
- $RAE_{BL,y}$  = Baseline upstream emissions in the reducing agent supply in year  $y$  (tCO<sub>2</sub>e)
- $IRE_{BL,y}$  = Baseline process emissions in the industrial facility in year  $y$  (tCO<sub>2</sub>e)

**A.1) Baseline upstream emissions:**

The baseline upstream emissions are attributable to the primary carbon extraction, reducing agent production and transportation in the national boundaries within the new iron ore reduction system. The assessment of baseline upstream emissions is carried out as per the equations below.

$$RAE_{BL,y} = PCE_{BL,y} + RAP_{BL, RA,y} + RAT_{Vehicle, BL,y} \quad (2)$$

Where:

- $RAE_{BL,y}$  = *Baseline* upstream emissions associated with the supplies of the reducing agent (tCO<sub>2</sub>e)
- $PCE_{BL,y}$  = Emissions from the *Primary carbon extraction* in the *baseline* scenario during year  $y$  (tCO<sub>2</sub>e)
- $RAP_{BL, RA,y}$  = GHG emissions from the production of reducing agents within the boundary under the baseline scenario during year  $y$ ; (tCO<sub>2</sub>e /yr)
- $RAT_{Vehicle, BL,y}$  = CO<sub>2</sub> emissions in fossil fuel combustion in the transport of reducing agent(s) to iron ore reduction facility during year  $y$  in the baseline scenario; (tCO<sub>2</sub>e /yr)

As the baseline scenario encompasses only the use of coal coke as reducing agent in the new iron ore reduction system, no emissions associated to the establishment of plantation shall be considered in the upstream baseline emission calculations.

Although the baseline scenario involves the complete use of coal coke as reducing agent in the new iron ore reduction system, for conservativeness purposes, the primary carbon sources extraction GHG emissions attributable to the coal mining related activities are not taken into account. However, emissions from the coal transportation from the seaport to the mill and the emissions of its processing into coal coke are considered due to the fact that they occur within national boundaries.

**1 - Coal coke reducing agent in the baseline scenario**

$$PCE_{BL,y} = CM_{BL,y}$$

Where:

$PCE_{BL,y}$  = Emissions from the *Primary carbon extraction* in the *baseline* scenario during year  $y$  (tCO<sub>2</sub>e)

$CM_{BL,y}$  = GHG emissions associated with coal mining activities in the baseline scenario during year  $y$  (tCO<sub>2</sub>)

### a) Coal mining emissions

$$CM_{BL,y} = (CM_{BL,machine,y} + CM_{BL,fugitive,y}) \cdot RA_{BL,i} \cdot P_{PJ,y} + CM_{BL,Vehicle,y} \quad (3)$$

Where:

$CM_{BL,y}$  = GHG emissions due to the coal mining activities in the baseline scenario during year  $y$  (tCO<sub>2</sub>)

$CM_{BL,machine,y}$  = GHG emissions due to the coal mining machinery in the baseline scenario during year  $y$  (tCO<sub>2</sub>/t Coal)

$CM_{BL,fugitive,y}$  = Fugitive methane emissions from the coal mines and coal cleaning, use of ammonium nitrate and mine reclamation activities in the baseline scenario during year  $y$  (tCO<sub>2</sub>/t Coal)

$CM_{BL,Vehicle,y}$  = CO<sub>2</sub> emissions from fossil fuel combustion in the vehicles used to transport coal to the coal coke production units within the project boundary (tCO<sub>2</sub>/yr)

$RA_{BL,i}$  = Quantity of coal coke necessary to produce one tonne of hot metal; (t Coal coke /t of hot metal)

$P_{PJ,y}$  = Hot metal production in year  $y$  (expected hot metal production of the new iron ore reduction system) (tonnes of hot metal)

### a) Emissions from the operation of mining machinery and fugitive methane emissions from coal mines, coal cleaning, ammonium nitrate usage and mine reclamation

Even though there is coal mining in Brazil due to its chemical outputs and operational status, almost 100% of the coal used in the coal coke production in the Brazilian iron and steel industry is imported from several countries.

According to the Mineral Summary 2010<sup>34</sup> from the National Department of Mineral Production (DNPM), in terms of quantity, Brazil imports its mineral coal from countries

<sup>34</sup> DNPM – NATIONAL DEPARTMENT FOR MINERAL PRODUCTION [Mineral Summary 2010](http://www.dnpm.gov.br/conteudo.asp?IDSecao=68&IDPagina=1820). Accessed in June 2012. See: <http://www.dnpm.gov.br/conteudo.asp?IDSecao=68&IDPagina=1820>



like Australia (33%), United States of America (36%), China (5%), Canada (8%) and Colombia (7%), among others. Therefore, when calculating emissions sources outlined in the above formula it was identified that the project entity primary carbon extraction (coal extraction) in the upstream baseline emissions mainly occurs outside the project entity's national boundaries.

In this sense, GHG emissions due to the coal mining machinery ( $CM_{BL, machine, y}$ ) and fugitive methane emissions from the coal mines and coal cleaning, ammonium nitrate use and mine reclamation activities ( $CM_{BL, fugitive, y}$ ) in the *baseline* scenario are conservatively considered as zero in the PDD version 4.

### **b) Coal transport to the coal coke production sites**

Despite coal origin, only the routes within the country's borders have been considered increasing conservativeness of the upstream baseline emission calculations. The origin of the coal is considered to be the Itaguaí Seaport (Sepetiba seaport), in Rio de Janeiro, where coal is shipped from through rail. The **Option 2** (Project emissions from transport based on distance traveled by vehicles) was adopted in line with Annex I of the AM0082 version 1.

#### **Option 2: Baseline emissions from transport based on distance traveled by vehicles**

$$CM_{BL, Vehicle, y} = N_{v, BL, y} \cdot AVD_{j, y} \cdot EF_{v, km, CO_2, y} \quad (4)$$

Where:

- $CM_{BL, Vehicle, y}$  = CO<sub>2</sub> emissions from fossil fuel combustion in the vehicles used to transport coal to the coal coke production units within the project boundary (tCO<sub>2</sub>/yr)
- $N_{v, BL, y}$  = Number of round trips (to and from) per type *v* of vehicle had during the year *y*
- $AVD_{j, y}$  = Average round trip distance (to and from) between the reducing agent type *v* production site (*s*) and the site of the project activity during the year *y* (km)
- $EF_{v, km, CO_2, y}$  = CO<sub>2</sub> emission factor for the type *v* of vehicle during the year *y* (tCO<sub>2</sub>/km)

It was considered the number of 240 wagons per train. The emission factor for diesel (2.622312kgCO<sub>2</sub>/l) is sourced from the Brazilian Program GHG Protocol and 2006 IPCC Guidelines for National GHG Inventories, Volume 2, Chapter 1, Table 1.4, calculated as: 0,000043TJ/kg \* density 0,84kg/l = 0.00003612TJ/l.

And 0,00003612TJ/l \* 72600 kgCO<sub>2</sub>/TJ = 2,622312kgCO<sub>2</sub>/l .

The total of 433,333 tons of coal<sup>35</sup>. The volume of a wagon, according to Vale<sup>36</sup> is 25.7 cubic meters and the weight capacity of the coal – with a density of 0.550 ton/m<sup>3</sup><sup>37</sup> - is 14.135 t of coal per wagon.

The fuel consumption for train is 2.91 L/1000TKU<sup>38</sup> (Liter per 1,000 ton of cargo per useful kilometer). Sourced from (National Agency for Ground Transportation) – Railway Concessions Follow-up Annual Report 2009. (Ref/36/)

Coal transport by Rail (within national boundary)		Results	Calculations
$AVD_{j,y}$	(Km/y)	474	Distance from Itaguaí (seaport) to Belo Horizonte (pig iron mill)
$N_{v,BL,y}$	(round trips)	138.85	$(650,000 \text{ t pig iron} * 0.5435^{39} \text{ t coal coke/t pig iron}) / (240 \text{ wagons} * 14.135 \text{ t per wagon}) / 0.75 \text{ t coal coke/t coal}$
$EF_{v,km,CO_2,y}$	(tCO <sub>2</sub> /Km)	0.02589	$2.91 \text{ L/1000TKU} * (240 \text{ wagons} * 14.135 \text{ t per wagon}) * (2.622312 \text{ kg CO}_2/\text{l} / 1000)$
$CM_{BL,Vehicle,y}$	(tCO <sub>2</sub> /y)	1,704	$138.85 * 474 * 0.02589$

$$CM_{BL,Vehicle,y} = 1,704 \text{ tCO}_2/\text{y}$$

By substituting the parameters of **Equation 3** for the numbers above and adopting a conservative approach the following results are presented to account under the upstream emissions of the *Primary carbon sources extraction*:

$$CM_{BL,y} = (0 + 0) * 0.5435 * 650,000 + 1,704$$

Primary Carbon extraction  
(Upstream Baseline Scenario)

<sup>35</sup> This value is based on the amount needed to produce 300,000 tons of coal coke under a gravimetric yield of 75% (SAMPAIO, 2001) to supply its production of 650,000 tons of primary iron annually.  $650,000 * 0.5 = 325,000$  tons of coke. That is, 325,000 tons of coque/ 0.75 = **433,333 tons of coal**.

<sup>36</sup> Vale's website 2007.

<sup>37</sup> Source: DEMEC – DEPARTAMENTO DE ENGENHARIA MECÂNICA/ UFMG. [Processos de coqueificação](http://www.demec.ufmg.br/disciplinas/ema003/solidos/coque/carvao.htm). (Mechanical Engineering Department (DEMEC), Minas Gerais Federal University UFMG), <http://www.demec.ufmg.br/disciplinas/ema003/solidos/coque/carvao.htm>

<sup>39</sup> Calculated as  $0,174 \text{ t pulverized charcoal/ t hot metal} * 0,75 \text{ t coal coke/ t coal} + 0,413 \text{ t coal coke/ t hot metal} = 0.5435 \text{ t coal coke/ t hot metal}$ .

$$CM_{BL,y} = PCE_{BL,y} = 1,704 \text{ (tCO}_2\text{/y)}$$

### a) Coal coke production

As presented above the upstream baseline scenario only includes emissions attributable to the reducing agent production and transportation within the iron ore reduction system, inside national boundaries. In this sense, the following equations are used to calculate emissions.

$$RAP_{BL, RA, y} = RAP_{BL, \text{coal coke}, y} \quad (5)$$

Where:

$RAP_{BL, RA, y}$  = GHG emissions from the production of reducing agents within the boundary under the baseline scenario during year  $y$ ; (tCO<sub>2</sub>/yr)

$RAP_{BL, \text{coal coke}, y}$  = GHG emissions within the project boundary due to production of coal = coke used in the iron ore reduction facility in the baseline scenario during year  $y$ ; (tCO<sub>2</sub>/yr)

$$RAP_{BL, \text{coal coke}, y} = P_{PJ, y} \bullet EF_{CO2e, \text{coal coke}, y} \bullet RA_{BL, i} \quad (6)$$

Where:

$RAP_{BL, \text{coal coke}, y}$  = GHG emissions within the project boundary due to production of coal = coke used in the iron ore reduction facility in the baseline scenario during year  $y$ ; (tCO<sub>2</sub>/yr)

$P_{PJ, y}$  = Hot metal production in year  $y$  (expected hot metal production of the new iron ore reduction system). (tonnes of hot metal)

$EF_{CO2e, \text{coal coke}, y}$  = Emission factor to produce one tonne of coal coke in the iron ore reduction system baseline scenario; (tCO<sub>2</sub>e/ t of Coal coke)

$RA_{BL, i}$  = Quantity of coal coke necessary to produce one tonne of hot metal; (t Coal coke /t of hot metal)

To calculate the emission factor to produce one tonne of coal coke in the iron ore reduction system baseline scenario it is used:

- Total CO<sub>2</sub>e coal coke oven gas (Kg/t of coal) = 402.6<sup>40</sup>

<sup>40</sup> Default emission factors provided by AM0082 version 1 in Annex I, Table 3

- Gravimetric yield of coal coke = 0.75<sup>41</sup>

Therefore:

$$EF_{CO_2e, coal\ coke, y} = 402.6 / 0.75 / 1,000$$

$$EF_{CO_2e, coal\ coke, y} = \mathbf{0.537}$$

Applying the baseline parameters in the formula:

$$RAP_{BL, coal\ coke, y} = 650,000 * 0.537 * 0.358$$

Production of coal coke (Baseline Scenario)	
$RAP_{BL, coal\ coke, y}$	$= RAP_{BL, RA, y} = 124,913$ tCO <sub>2</sub> /y

## 2 – Baseline emissions in the transportation of reducing agent

In accounting the CO<sub>2</sub> emissions within the project boundary due to fossil fuel combustion from vehicles used to transport reducing agent(s) to iron ore reduction facility ( $RAT_{Vehicle, BL, y}$ ) a conservative approach is applied assuming that the coal coke production sites are located close to the iron ore reduction facility and the cargo rail station. In this sense, those emissions are neglected under the baseline scenario calculations.

Transportation of reducing agent (Baseline Scenario)	
$RAT_{Vehicle, BL, y}$	$= 0$

Nevertheless, applying the numbers identified above the following results corresponds to the *total reducing agents components emissions in the upstream baseline*, **Equation 2**.

<sup>41</sup> SAMPAIO, 2001.

$$RAE_{BL,y} = 1,704 + 124,913 + 0$$

Baseline Upstream Emissions
-----------------------------

$RAE_{BL,y} = 126,617 \text{ tCO}_2$
--------------------------------------

### Baseline process emissions

This project activity will use 100% of charcoal in its pig iron production and the baseline scenario for the proposed project activity is the use of coal coke as a reducing agent in the iron ore reduction system.

According to SAMPAIO 2001 (Ref/13/) it takes 0.413 tonnes of coal coke with 87% of carbon added through the top of the blast furnace and 0.174 tonnes of pulverized coal with 81% of carbon injected in the blast furnace at bottom level to produce one tonne of primary iron. However, according to AM0082 version 1, the cap value of 0.358 tonnes of coal coke per tonne of primary iron is applied to the calculations as the reducing agent added through the top of the blast furnace.

The Integrated Pollution Prevention and Control – IPPC 2001 study “Best Available Techniques Reference Document on the Production of Iron and Steel” (IPPC, 2001<sup>42</sup>) mentions the consumption of pulverized coal injection technology establishing it at a level of approximately 180kg/t pig iron. The study also states in its Chapter 6 item 6.5 “Emerging techniques and Future Developments” that, “*at a coal injection rate of 180 kg/t pig iron, (...) approximately 30% less coke is consumed*”. Similar data is also available in the study “High Blast Furnaces Productivity Operations with Low Coke Rates in the European Union” (LACROIX, 2001) (Ref/14/)

Therefore, the project entity following the methodology guidance, adopted a cap of 0.358 tons of coke per ton of hot metal. Additionally, an injection of 174 kg of pulverized coal coke was considered.

#### a) Calculation of the baseline process emissions

The formula below is used to calculate the project entity baseline process emissions

<sup>42</sup> IPPC – Integrated Pollution Prevention and Control. *Best available techniques reference document on the production of iron and steel*. 2001.

$$IRE_{BL, y} = (P_{PJ, y} \bullet EF_{Ind, BL}) - (P_{PJ, y} \bullet Cc_{HM, BL, y} \bullet \frac{44}{12}) \quad (7)$$

Where:

- $IRE_{BL, y}$  = *Baseline process emissions* within the iron ore reduction facility (tCO<sub>2</sub>e)
- $P_{PJ, y}$  = Hot metal production in year *y* (expected hot metal production of the new iron ore reduction system); tonnes of hot metal
- $EF_{Ind, BL}$  = *Baseline emission factor* to produce one tonne of hot metal (tCO<sub>2</sub>e/ t of hot metal)
- $Cc_{HM, BL, y}$  = Carbon content per t of hot metal produced in year *y* (tC/ t of hot metal)
- $\left(\frac{44}{12}\right)$  = Conversion factor from carbon to CO<sub>2</sub>e; (dimensionless)

### **b) Calculation of emission factor for baseline process emissions**

The following formula is used to calculate the baseline process emission factor

$$EF_{Ind, BL} = \sum_i \frac{(\%C_{BL, i} \bullet RA_{BL, i})}{100} \bullet \frac{44}{12} \quad (8)$$

Where:

- $EF_{Ind, BL}$  = *Baseline emission factor* to produce one tonne of hot metal (tCO<sub>2</sub>e/ t of hot metal)<sup>43</sup>
- $\%C_{BL, i}$  = Carbon content in percent of reducing agent *i* (e.g. coal coke, charcoal, etc.) used in the baseline scenario. It is equal to zero for renewable charcoal.
- $RA_{BL, i}$  = Reducing agent type *i* (e.g. coal coke, charcoal, etc.) required to produce one tonne of hot metal (tonne of reducing agent/ tonne of hot metal)

<sup>43</sup> If no national/local emission factor is publicly available, an IPCC default value can be used.



$\left(\frac{44}{12}\right)$  = Conversion factor from carbon to CO<sub>2</sub>e (dimensionless)

$i$  = Type of reducing agent  $i$  (e.g. coal coke, charcoal, etc.)

Coal coke added to blast furnace top:

$$EF_{\text{Ind, BL, } i} = \frac{87.00 \cdot 0.358}{100} \cdot \frac{44}{12}$$

$$EF_{\text{Ind, BL, } i} = \mathbf{1.1420}$$

Injection of pulverized coal at blast furnace bottom level:

$$EF_{\text{Ind, BL, } j} = \frac{81.00 \cdot 0.174}{100} \cdot \frac{44}{12}$$

$$EF_{\text{Ind, BL, } j} = \mathbf{0.5168}$$

Then:

$$EF_{\text{Ind, BL}} = 1.1420 + 0.5168$$

Process emission factor Baseline Scenario
$EF_{\text{Ind, BL}} = 1,6588 \text{ tCO}_2\text{e}$

***c) Calculation of carbon fixation factor under the baseline scenario***

Calculation of carbon fixation factor under the baseline scenario

$$Cc_{HM, BL, y} = \frac{\%C_{HM, PJ, y}}{100} \quad (9)$$

Where:

$Cc_{HM, BL, y}$  = Carbon content fixed in hot metal per t of hot metal produced in year y (t C/ t of hot metal)

$\%C_{HM, PJ, y}$  = Percentage of carbon in hot metal (%) in the project situation

The percentage of carbon in the hot metal in the project situation was considered as 0.

Carbon content fixed in hot metal Baseline Scenario
--

$Cc_{HM, BL, y} = 0 \text{ t}$
--------------------------------

Applying the results to **Equation 7**:

$$IRE_{BL, y} = (650,000 \cdot 1.6588) - (650,000 \cdot 0 \cdot \frac{44}{12})$$

$$IRE_{BL, y} = 1,078,220 - 0$$

<b>Baseline Process Emissions</b>
-----------------------------------

$IRE_{BL, y} = 1,078,220 \text{ tCO}_2\text{e}$
---

### Calculation of total baseline emissions

$$BE_y = RAE_{BL, y} + IRE_{BL, y}$$

Applying the above stated:

$BE_y = RAE_{BL, y} + IRE_{BL, y}$		
$BE_y$	126,617	1,078,220
$BE_y$	1,204,837	

Therefore, by substituting the numbers above in the formula and adopting a conservative approach, the following results are presented to account under the baseline emissions:

<b>Coal coke iron ore reduction system with pulverized coal injection Baseline Scenario</b>
$BE_y = 1,204,837 \text{ tCO}_2/\text{y}$

## **B) Project emissions:**

The following equations focus on the emissions associated with renewable charcoal iron ore reduction system boundary, adopting a complete use of renewable charcoal produced in self established dedicated plantation and combining its two interdependent components: upstream and process. The emissions associated with the upstream component encompass the emissions directly attributable to the renewable charcoal production (including the establishment of the forest dedicated plantation), while the emissions related to the consumption of the renewable charcoal in the iron ore reduction facility are aggregated under the process emissions component.

$$PE_y = RAE_{PJ, y} + IRE_{PJ, y} \quad (10)$$

Where:

$PE_y$  = Total project emissions in the new iron ore reduction system in year y (tCO<sub>2</sub>e)

$RAE_{PJ, y}$  = Project upstream emissions associated with the reducing agent production and transportation in year y in the project scenario (tCO<sub>2</sub>e)

$IRE_{PJ, y}$  = Project process emissions in the iron ore facility in year y (tCO<sub>2</sub>e)

## **Project upstream emissions**

The formula below is used to calculate the project upstream emissions.

$$RAE_{PJ,y} = PCE_{PJ,y} + RAP_{PJ, RA,y} + RAT_{Vehicle, PJ,y} \quad (11)$$

Where:

$RAE_{PJ,y}$	<i>Project</i> upstream emissions associated with the reducing agent = production and transportation in year y in the project scenario; (tCO <sub>2</sub> e)
$PCE_{PJ,y}$	<i>Primary carbon source extraction</i> emissions in the project scenario; (tCO <sub>2</sub> e)
$RAP_{PJ, RA,y}$	Emissions associated with production of reducing agents within the project boundary for use in the iron ore reduction facility in the project scenario during year y; (tCO <sub>2</sub> /yr)
$RAT_{Vehicle, PJ,y}$	CO <sub>2</sub> emissions due to fossil fuel combustion from vehicles used to transport reducing agent(s) to iron ore reduction facility within the project boundary during year y of the project scenario; (tCO <sub>2</sub> /yr)

Considering that the project scenario encompass only the use of renewable charcoal as reducing agent in the new iron ore reduction system, there are some GHG activities related to the forest establishment to supply the new iron ore reduction system in the project scenario such as:

- CO<sub>2</sub> emissions from combustion of fossil fuels within the project boundary;
- N<sub>2</sub>O emissions as a result of direct nitrogen application within the project boundary;
- CO<sub>2</sub> emissions within the project boundary due to fossil fuel combustion from vehicles used to transport biomass to carbonization units during year y of the project scenario;

The investment decision undertaken by the project proponent to establish V&M do Brasil's new iron ore reduction system involves also the establishment of dedicated planted forests. These dedicated planted forests fit in the category of forest plantation after its last rotation.

## 1 - Emissions in the establishment of plantations and production of biomass

For the lands under category of plantations after last rotation, apply the following formulas:

To calculate the emissions attributable to the establishment of the dedicated plantations in lands of plantations after last rotation, formulae from **Annex 2** of the approved methodology AM0082 version 1 are applied.

$$PCE_{PJ,y} = EP_{PJ,y}$$

Where:

$PCE_{PJ,y}$  Primary carbon source extraction emissions in the project scenario; (tCO<sub>2</sub>e)

$EP_{PJ,y}$  = GHG emissions of the establishment of plantations to produce biomass in the project scenario during year  $y$ ; (tCO<sub>2</sub>/t biomass)

$$EP_{PJ,y} = E_{FuelBurn,PJ,y} + PE_{BB,y} + N_2O_{direct-N_{fertilizer,PJ,y}} + EP_{Vehicle,PJ,y} \quad (12)$$

Where:

$EP_{PJ,y}$  = GHG emissions of the establishment of plantations to produce biomass in the project scenario during year  $y$ ; (tCO<sub>2</sub>/t biomass)

$E_{FuelBurn,PJ,y}$  = CO<sub>2</sub> emissions from combustion of fossil fuels within the project boundary in the project scenario; tonnes CO<sub>2</sub>-e yr<sup>-1</sup> in year  $y$

$PE_{BB,y}$  = Project emissions arising from field burning of biomass at the plantation site (tCO<sub>2</sub>e/yr)

$N_2O_{direct-N_{fertilizer,PJ,y}}$  = N<sub>2</sub>O emissions as a result of direct nitrogen application within the project boundary in the project scenario; (tonnes CO<sub>2</sub>-e yr<sup>-1</sup> in year  $y$ )

$EP_{Vehicle,PJ,y}$  CO<sub>2</sub> emissions within the project boundary due to fossil fuel combustion from vehicles used to transport biomass to carbonization unit during year  $y$  of the project scenario; (tCO<sub>2</sub>/yr)

#### a. Calculation of CO<sub>2</sub> emissions from burning fossil fuels

This calculation uses the “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion”, version 02.

$$E_{FuelBurn,PJ,y} = PE_{FC,j,y}$$

Where:

$E_{FuelBurn,PJ,y}$  = CO<sub>2</sub> emissions from combustion of fossil fuels within the project boundary in the project scenario; tonnes CO<sub>2</sub>-e yr<sup>-1</sup> in year  $y$

$PE_{FC,j,y}$  = CO<sub>2</sub> emissions from fossil fuel combustion in process  $j$  during the year  $y$  (tCO<sub>2</sub>/yr);

$$PE_{FC,j,y} = \sum_i FC_{i,j,y} * COEF_{i,y} \quad (13)$$

Where:

$PE_{FC,j,y}$  = CO<sub>2</sub> emissions from fossil fuel combustion in process  $j$  during the year  $y$  (tCO<sub>2</sub>/yr);

$FC_{i,j,y}$  = Quantity of fuel type  $i$  combusted in process  $j$  during the year  $y$  (litres/yr);

$COEF_{i,y}$  = Is the CO<sub>2</sub> emission coefficient of fuel type  $i$  in year  $y$  (tCO<sub>2</sub>/litres)

$i$  = Are the fuel types combusted in process  $j$  during the year  $y$

Considering to the availability of data of fossil fuel type  $i$ , this project activity uses **Option 2** from the “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion”, version 02.

$$COEF_{i,y} = NCV_{i,y} * EF_{CO2,i,y} \quad (14)$$

Where:

$COEF_{i,y}$  = CO<sub>2</sub> emission coefficient of fuel type  $i$  in year  $y$  (tCO<sub>2</sub>/ litres)

$NCV_{i,y}$  = Weighted average net calorific value of the fuel type  $i$  in year  $y$  (GJ/ litres)





$EF_{CO_2,i,y}$  = Weighted average CO<sub>2</sub> emission factor of fuel type  $i$  in year  $y$  (tCO<sub>2</sub>/ GJ)

$i$  = Fuel types combusted in process  $j$  during year  $y$

$$COEF_{i,y} = 0.03612^{44} \text{ GJ/l diesel} * 0.0748^{45} \text{ tCO}_2/\text{GJ diesel}$$

$$COEF_{i,y} = 0.0027018 \text{ tCO}_2/\text{l diesel}$$

To calculate the annual amount of fuel consumed, it was considered an average annual consumption of 1,457.15 liters<sup>46</sup> per hectare in 21 years (3 rotations) and a planting area of 59,624.43 ha. Thus, the average annual consumption considered is  $59,624.43 * 1,457.15 / 21 = 4,137,226$  liters.

$$FC_{i,j,y} = 4,137,226$$

Then,

$$PE_{FC,j,y} = 4,137,226 * 0.0027018 \text{ tCO}_2/\text{l}$$

$$PE_{FC,j,y} = 11,177 \text{ tCO}_2/\text{y}$$

#### ***b. CH<sub>4</sub> and N<sub>2</sub>O emissions from the field burning of biomass***

The project entity does not burn biomass for site preparation as a forestry management practice. Therefore, parameter  $PE_{BB,y}$  shall be considered zero where applicable.

$$PE_{BB,y} = 0$$

<sup>44</sup> GHG Protocol Brazilian Program, 2010 - <http://www.ghgprotocolbrasil.com.br>

<sup>45</sup> Source: 2006 IPCC Guidelines for National GHG Inventories, Volume 2, Chapter 1, Table 1.4

<sup>46</sup> Source: The Plantar Group. *Fuel consumption per hectare*.

### c. Calculation of nitrous oxide emissions from nitrogen fertilization practices

As per AM0082 version 1, this CDM-PDD uses the tool for “Estimation of direct nitrous oxide emission from nitrogen fertilization”, version 01 to estimate nitrous oxide emissions from fertilizers application within the project boundary.

As the project entity does not use organic fertilizer, the parameter  $F_{ON,i}$  shall be considered as zero.

$$N_2O_{direct - N_{fertilizer} PJ, y} = N_2O_{direct-N, t}$$

Where:

$N_2O_{direct - N_{fertilizer} PJ, y}$  =  $N_2O$  emissions as a result of direct nitrogen application within the project boundary in the project scenario; (tonnes  $CO_2$ -e  $yr^{-1}$  in year  $y$ )

$N_2O_{direct-N, t}$  = Direct  $N_2O$  emission as a result of nitrogen application within the project boundary; (t  $CO_2$ -e in year  $t$ )

$$N_2O_{direct-N, t} = (F_{SN, t} + F_{ON, t}) \cdot EF_1 \cdot MW_{N_2O} \cdot GWP_{N_2O} \quad (15)$$

$$F_{SN, t} = \sum_i^I M_{SFi, t} \cdot NC_{SFi} \cdot (1 - Frac_{GASF}) \quad (16)$$

Where:

$N_2O_{direct-N, t}$  = Direct  $N_2O$  emission as a result of nitrogen application within the project boundary; (t  $CO_2$ -e in year  $t$ )

$F_{SN, t}$  = Mass of synthetic fertilizer nitrogen applied adjusted for volatilization as  $NH_3$  and  $NO_x$ , t-N in year  $t$

$F_{ON, t}$  = Mass of organic fertilizer nitrogen applied adjusted for volatilization as  $NH_3$  and  $NO_x$ , t-N in year  $t$

$EF_1$  = Emission Factor for emissions from N inputs, tonne- $N_2O$ -N (t-N input) $^{-1}$   
(1% - IPCC default, 2006 Guidelines, Chapter 11, Table 11.1)

$MW_{N_2O}$	= Ratio of molecular weights of $N_2O$ and N (44/28), tonne- $N_2O$ (t-N) <sup>-1</sup>
$GWP_{N_2O}$	= Global Warming Potential for $N_2O$ , kg- $CO_2$ -e (kg- $N_2O$ ) <sup>-1</sup> (310 - IPCC default, valid for the first commitment period)
$M_{SF_i,t}$	= Mass of synthetic fertilizer type $i$ applied, tonne in year $t$
$NC_{SF_i}$	= Nitrogen content of synthetic fertilizer type $i$ applied, g-N (100 g fertilizer) <sup>-1</sup> (6% of NPK fertilizer)
$Frac_{GASF}$	= Fraction that volatilizes as $NH_3$ and $NO_x$ for synthetic fertilizers, dimensionless (IPCC default 0.10 - 2006 Guidelines, Chapter 11, Table 11.3)
$I$	= Number of synthetic fertilizer types

$$F_{SN,t} = 4,003 * 0.20 * (1 - 0.10)$$

$$F_{SN,t} = 721 \text{ t of N}$$

Then,

$$N_2O_{direct-N,t} = (721 + 0) * 0.01 * 44/28 * 310$$

$$N_2O_{direct-N,t} = 3,510 \text{ tCO}_2\text{e/y}$$

#### **d. Biomass transport to the carbonization sites**

The project participant should collect data on the origin and transportation of biomass under the project scenario. The project participants chose to calculate the GHG emissions associated with transportation of biomass based on distance travelled by vehicles (**Option 2**).

**Option 2:** Project emissions from transport based on distance traveled by vehicles

$$EP_{Vehicle, PJ, y} = N_{v, PJ, y} \bullet A_{VD_{i, PJ, y}} \bullet EF_{v, km, CO_2, PJ, y} \quad (17)$$

Where:

- $EP_{\text{Vehicle, PJ, y}}$  = CO<sub>2</sub> emissions within the project boundary due to fossil fuel combustion from vehicles used to transport biomass to carbonization unit during year  $y$  of the project scenario; (tCO<sub>2</sub>/yr)
- $N_{\text{v, PJ, y}}$  = Number of round trips (to and from) per type  $v$  of vehicle during year  $y$  in the project scenario
- $AVD_{\text{i, PJ, y}}$  = Average round trip distance (to and from) between the biomass  $v$  production site(s) and the site of the project plantation during year  $y$  (km)
- $EF_{\text{v, km, CO}_2, \text{PJ, y}}$  = CO<sub>2</sub> emission factor for the type  $v$  of vehicle during year  $y$  in the project scenario (tCO<sub>2</sub>/km)

The average distance adopted by VMB between the harvesting sites and the carbonization units in the Farms is 8km. This is the distance considered for the biomass transport calculations. The transportation of higher consumption per tonne of transported goods was conservatively considered in the calculations (cargo capacity 25 tonnes, circa 38m<sup>3</sup> of wood<sup>47</sup>) for the round trip of 16km. The mean annual amount of wood transported is 305 m<sup>3</sup>/ha<sup>48</sup> or 2,597,921 m<sup>3</sup>/y<sup>49</sup>; the fuel consumption 1.3441<sup>50</sup> L/km and the emission factor for diesel is 0.0027018 tCO<sub>2</sub>/l<sup>51</sup>.

Transport of biomass by Truck (project boundary)		Results	Calculations
$N_{\text{v, PJ, y}}$	(round trips)	68,366	2,597,921 m <sup>3</sup> /y / 38 m <sup>3</sup> /truck
$AVD_{\text{i, PJ, y}}$	(Km)	16	N/A
$EF_{\text{v, km, CO}_2, \text{PJ, y}}$	(tCO <sub>2</sub> /km)	0.00363	0.0027018 tCO <sub>2</sub> /l of diesel * 1.3441 l of diesel/Km

So,

<sup>47</sup> Source of data: Project entity records - Planning and Silviculture Department.

<sup>48</sup> Source of data: Project entity records - Planning and Silviculture Department.

<sup>49</sup> 59,624.43 ha \* 305 m<sup>3</sup>/ha / 7-year-cycle= **2,597,921 m<sup>3</sup>/y**

<sup>50</sup> Source of data: Project entity records - Planning and Silviculture Department.

<sup>51</sup> Sources: GHG Protocol Brazilian Program, 2010 and 2006 IPCC Guidelines for National GHG Inventories, Volume 2, Chapter 1, Table 1.4, calculated as: 0.00003612TJ/l\*74800kgCO<sub>2</sub>/TJ= **2.7018kgCO<sub>2</sub>/l**

$$EP_{Vehicle, PJ, y} = 68,366 * 16 * 0.00363$$

$$EP_{Vehicle, PJ, y} = 3,972 \text{ tCO}_2\text{e}$$

Applying all the results to **Equation 12**, the emissions in the establishment of plantations and production of biomass are:

$$EP_{PJ, y} = E_{FuelBurn, PJ, y} + 0 + N_2O_{direct-N_{fertilizer, PJ, y}} + EP_{Vehicle, PJ, y}$$

$$EP_{PJ, y} = 11,177 + 0 + 3,510 + 3,972$$

Establishment of plantations and production of biomass (Project Scenario)
$EP_{PJ, y} = PCE_{PJ, y} = 18,660 \text{ tCO}_2\text{/t of biomass}$

## 2 - Emissions in the production of charcoal, the renewable reducing agent

The following formulae is used as per the proposed new methodology to calculate GHG emissions within the project boundary due to production of reducing agents used in the iron ore reduction facility in the project scenario.

$$RAP_{PJ, RA, y} = RAP_{PJ, charcoal, y}$$

Where:

$RAP_{PJ, RA, y}$  Emissions associated with production of reducing agents within the project boundary for use in the iron ore reduction facility in the project scenario during year  $y$ ; (tCO<sub>2</sub>/yr)

$RAP_{PJ, charcoal, y}$  GHG emissions within the project boundary due to the production of charcoal used in the iron ore reduction facility in the project operation during year  $y$ ; (tCO<sub>2</sub>/yr).

As presented above, the project activity involves a complete use of renewable charcoal as the reducing agent within the iron ore reduction system. Hence, only the emissions related to these renewable reducing agents will be accounted as an applicable source of the emissions in the  $RAP_{PJ, RA, y}$  calculation.

The formulae below were considered in order to calculate the GHG emissions for the charcoal production.

$$RAP_{PJ, charcoal, y} = P_{PJ, y} \bullet EF_{CH_4, charcoal, y} \bullet F_{PJ, charcoal} \bullet GWP_{CH_4} \quad (18)$$

Where:

$RAP_{PJ, charcoal, y}$	= GHG emissions within the project boundary due to the production of charcoal used in the iron ore reduction facility in the project operation during year y; (tCO <sub>2</sub> /yr)
$P_{PJ, y}$	= Hot metal production in the project scenario in year y; (expected hot metal production of the new iron ore reduction system) (tonnes of hot metal)
$EF_{CH_4, charcoal, PJ, y}$	= Emission Factor to produce one tonne of renewable charcoal identified in the project supply chain; (tCH <sub>4</sub> / t of charcoal)
$F_{PJ, charcoal}$	= Quantity of charcoal necessary to produce one tonne of hot metal; (t charcoal/t of hot metal)
$GWP_{CH_4}$	= Global warming potential for CH <sub>4</sub> ; (tCO <sub>2</sub> e/tCH <sub>4</sub> )

The project activity uses **Option 1** (see Annex 2 of AM0082 version 1) “Methane emission factor as function of the gravimetric yield” (tonnage of charcoal per tonnage of biomass) to monitor the methane emission factor as per the gravimetric yield results obtained in charcoal production. The gravimetric yield in the carbonization process will be monitored by the project entity according to the provisions of the AM0041 “Mitigation of methane emissions in the Wood carbonization Activity for Charcoal Production”.

#### **Option 1:** Methane emission factor as function of the gravimetric yield

$$EF_{CH_4, charcoal, PJ, y} = f(Y_{PJ}) \quad (19)$$

Where:



$EF_{CH_4, \text{charcoal}, PJ, y}$  = Emission Factor to produce one tonne of renewable charcoal identified in the project supply chain; (tCH<sub>4</sub> / t of charcoal)

$Y_{PJ}$  = Carbonization gravimetric yield (t charcoal/ t wood on dry basis);

$$f(Y_{PJ}) = (A - B * Y_{PJ}) / 1.000$$

	A	B	$Y_{PJ}$
EF	282.4	676.4	0.35
EF	<b>0.0457</b>		

The regression line above, that establishes the methane emissions in charcoal production, was defined by a specific research for this project activity. The reports that present the definition and statistical validation of the line, according to AM0041, are presented in **Annex 6** of this document. For the purposes of this project activity the projected gravimetric yield is 35%.

A production of 650,000 tonnes of hot metal (pig iron) per year is foreseen for the project activity. Considering the methane emission factor in the charcoal production based on the projected gravimetric yield and an average charcoal consumption of 0.6 t/t of hot metal and applying these values to the formulae, we have:

$$RAP_{PJ, \text{charcoal}, y} = 650,000 * 0.0457 * 0.6 * 21$$

$$RAP_{PJ, \text{charcoal}, y} = \mathbf{373,955}$$

Emissions from Charcoal production (Project Scenario)
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$RAP_{PJ, \text{charcoal}, y} = RAP_{PJ, RA, y} = \mathbf{373,955 \text{ tCO}_2/y}$
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### 3 - Project emissions in the transportation of reducing agent

This CDM-PDD uses **Option 2** (Project emissions from transport based on distance traveled by vehicles) to calculate GHG emissions related to transportation of reducing agents.

## Option 2: Project emissions from transport based on distance traveled by vehicles

In the project scenario, the renewable charcoal suppliers are the V&M Florestal's Carbonization Units. V&M Florestal has 14 farms with dedicated plantations implemented to supply its charcoal needs and each planting area has its carbonization units.

It takes 600kg of renewable charcoal as a reducing agent to produce 1,000kg of primary iron. The average distance between the carbonization units and Belo Horizonte is 401km. The round trip is calculated, that is, 802km.

Therefore, in the project scenario, the renewable charcoal arrives from V&M Florestal's Carbonization Units located at a weighted average of 401km from the mill and trucks are the transportation (each truck transports approximately 20 tonnes of charcoal<sup>52</sup>). The annual amount of charcoal transported is 390,000 tonnes<sup>53</sup>, the fuel consumption 0.50L/km and the emission factor for diesel is 0.0027018 tCO<sub>2</sub>/l.

Transport of charcoal by Truck (project boundary)		Results	Calculations
$N_{v,PJ,y}$	(round trips)	19,949	390,000 t of charcoal/ 19.55 t capacity of each truck
$AVD_{i,PJ,y}$	(Km)	802	Round trip
$EF_{v,km,CO_2,PJ,y}$	(tCO <sub>2</sub> /km)	0.00135	0.0027018 tCO <sub>2</sub> /l of diesel * 0.5 of diesel/Km

As provided by the proposed new methodology, the following formula is undertaken to conservatively calculate the emissions derived from the renewable reducing agents transportation.

$$RAT_{Vehicle, PJ, y} = N_{v, PJ, y} \cdot AVD_{j, PJ, y} \cdot EF_{v, km, CO_2, PJ, y} \quad (20)$$

Where:

<sup>52</sup> Source of data: Project entity's records – Planning Department.

<sup>53</sup> Required amount to produce 650,000 tonnes of primary iron: 650,000 t of primary iron\* 0,6 tonnes of charcoal.

$RAT_{Vehicle, PJ, y}$	= CO <sub>2</sub> emissions within the project boundary due to fossil fuel combustion from vehicles to transport reducing agent to iron ore reduction facility at the project scenario; (tCO <sub>2</sub> /yr)
$N_{v, PJ, y}$	= Number of round trips (to and from) per type $v$ of vehicle had during the year $y$
$AVD_{j, PJ, y}$	= Average round trip distance (to and from) between the reducing agent type $v$ production site(s) and the site of the project activity during the year $y$ (km)
$EF_{v, km, CO_2, PJ, y}$	= CO <sub>2</sub> emission factor for the type $v$ of vehicle during the year $y$ (tCO <sub>2</sub> /km)

By substituting the numbers in the formula, the following results are presented:

$$RAT_{Vehicle, PJ, y} = 19,949 * 802 * 0.00135$$

Renewable Charcoal Route (Project activity Scenario)
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$RAT_{Vehicle, PJ, y} = 21,613 \text{ tCO}_2/\text{y}$
--

Finally, applying the numbers identified above to **Equation 10**, the following results correspond to the total upstream emissions in the project scenario.

$$RAE_{PJ, y} = 18,660 + 373,955 + 21,613$$

<b>Project Upstream Emissions</b>
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$RAE_{PJ, y} = 414,229 \text{ tCO}_2\text{e}$
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### Project process emissions

#### ***a) Calculation of the project process emissions***

The formula below is used to calculate the project scenario process emissions.

$$IRE_{PJ, y} = (P_{PJ, y} \bullet EF_{Ind, PJ, y}) - (P_{PJ, y} \bullet Cc_{HM, PJ, y} \bullet \frac{44}{12}) \quad (21)$$

Where:

$IRE_{PJ, y}$  = Project process emissions in the iron ore reduction facility in year  $y$  (tCO<sub>2</sub>e)

$\square$  = Hot metal production in year  $y$  (expected hot metal production of the new iron ore reduction system) (tonnes of hot metal)

$EF_{Ind, PJ, y}$  = Emission factor of one tonne of hot metal production under the project scenario (tCO<sub>2</sub>e/ t of hot metal)<sup>54</sup>

$Cc_{HM, PJ, y}$  = Carbon content per t of hot metal produced in the year  $y$  (tC / t of hot metal)

$\left(\frac{44}{12}\right)$  = Conversion factor from carbon to CO<sub>2</sub>e; (dimensionless)

#### **b) Calculation of project process emission factor**

$$EF_{Ind, PJ, y} = \sum_i \frac{(\%C_{PJ, i} \bullet RA_{PJ, i})}{100} \bullet \frac{44}{12} \quad (22)$$

Where:

$EF_{Ind, PJ, y}$  = Emission factor of one tonne of hot metal production under the project scenario (tCO<sub>2</sub>e/ t of hot metal)<sup>55</sup>

$\%C_{PJ, i, j, k, \dots}$  = Carbon content in percent of reducing agent  $i$  (e.g. coal coke, charcoal, etc.) used in the project scenario. It is equal to zero for renewable charcoal.

$RA_{PJ, i, j, k, \dots}$  = Reducing agent type  $i$  (e.g. coal coke, charcoal, etc.) required to produce one tonne of hot metal (tonne of reducing agent/ tonne of hot metal)

$\left(\frac{44}{12}\right)$  = Conversion factor from carbon to CO<sub>2</sub>e (dimensionless)

<sup>54</sup> If no national/local emission factor is publicly available, an IPCC default value can be used.

<sup>55</sup> If no national/local emission factor is publicly available, an IPCC default value can be used.

$i$  = Type of reducing agent  $i$  (e.g. coal coke, charcoal, etc.)

In the project activity case, as it totally relies on renewable charcoal, parameter  $\%C_{PJ,i}$  is equal to zero. Parameter  $RA_{PJ,i}$  is considered 0.6t.

So,

$$\%C_{PJ,i} = 0$$

$$RA_{PJ,i} = 0.6 \text{ t}$$

Therefore:

$$EF_{Ind, PJ, y} = \frac{0,00 \bullet 0.6 \bullet 0,00}{100} \bullet \frac{44}{12}$$

Emission factor hot metal (Project activity scenario)
--

$EF_{Ind, PJ, y} = 0$
-----------------------

**c) Calculation of carbon fixation factor  $Cc_{HM, PJ, y}$**

$$Cc_{HM, PJ, y} = \frac{\%C_{HM, PJ, y}}{100} \quad (23)$$

Where:

$Cc_{HM, PJ, y}$  = Carbon content fixed in hot metal per t of hot metal produced in year  $y$  (t C / t of hot metal)

$\%C_{HM, PJ, y}$  = Percentage of carbon in hot metal (%)

According to the provisions of the AM0082 version 1, to increase conservativeness in the calculations of the project emissions the hot metal carbon content shall be accounted as zero.

Carbon content in hot metal (Project activity scenario)
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$C_{c_{HM, PJ, y}} = 0$
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Applying the results to **Equation 23**:

$$IRE_{PJ, y} = (650,000 \cdot 0,00) - (650,000 \cdot 0,00 \cdot \frac{44}{12})$$

<b>Project Process emissions</b>
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$IRE_{PJ, y} = 0,00 \text{ tCO}_2\text{e}$
--

### Calculation of total project emissions

$$PE_y = RAE_{PJ, y} + IRE_{PJ, y}$$

Applying the above stated:

$PE_y = RAE_{PJ, y} + IRE_{PJ, y}$		
$PE_y$	414,229	0,00
$PE_y$	414,229	

Therefore, by substituting the numbers above in the formula and adopting a conservative approach the following results are presented:

<b>Renewable charcoal Route Project Scenario</b>
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$$PE_y = 414,229 \text{ tCO}_2/\text{y}$$

### **C) Leakage emissions**

The leakage emissions calculations conservatively followed the procedures to evaluate the change in upstream emissions associated with the establishment of the primary carbon extraction activity. In this sense, activities assessed are the ones that are measurable and attributable to the project activity and occur outside the new iron ore reduction system under the project scenario.

The assessment of leakage emissions under the AM0082 version 1 is carried out considering emissions associated with primary carbon extraction activities in the project scenario relative to the emissions of the baseline scenario. The following formula is used to calculate leakage emissions under this CDM-PDD:

$$LK_y = LK_{PJ, Activity\_Disp, y} - LK_{BL, Activity\_Disp, y} \quad (24)$$

Where:

$LK_y$  = Annual GHG emissions outside the project boundary; tonnes CO<sub>2</sub>-e yr<sup>-1</sup> in year y

$LK_{PJ, Activity\_Disp, y}$  = Annual project GHG emissions outside the project boundary resulting from displacement of economic activities; tonnes CO<sub>2</sub>-e yr<sup>-1</sup> in year y

$LK_{BL, Activity\_Disp, y}$  = Annual baseline GHG emissions outside the project boundary resulting from displacement of economic activities; tonnes CO<sub>2</sub>-e yr<sup>-1</sup> in year y

The baseline scenario, as it was presented in the section above, involves the complete use of coal coke as a reducing agent in the iron ore reduction facility. It is widely known that under the establishment and operation of a coal mine there are GHG intensive activities that are measurable and attributable to its operation and that may occur outside its boundary such as possible economic and household displacement activities in the establishment of the coal mine that would lead to increase in deforestation, among others. However, in order to adopt a conservative approach all those sources of leakage emissions associated with the primary carbon extraction identified in the baseline will be considered as zero as they occur outside the project proponent national boundaries.



As it was presented in the sub-sections above, the new investment decision undertaken by the project proponent involves also the establishment of dedicated planted forests. In this sense, the emissions measurable and attributable to the project that occur outside the project boundary are related to the establishment of those planted forests. The planting of dedicated forests within the project activity's boundaries are in the category of forest plantations after its last rotation. These areas were already owned by the business Group and were covered with productive forests before the establishment of the dedicated plantations; no activity displacement took place in these areas.

Thus, leakage emissions in this CDM-PDD associated to primary carbon extraction identified in this project activity will be considered zero. The table below shows the results identified in this leakage assessment of this proposed project activity.

Leakage Coal Coke Route (Baseline Scenario)	Leakage Renewable Charcoal Route (Project activity Scenario)
$LK_{BL,Activity\_Disp,y} = 0,00 \text{ tCO}_2/y$	$LK_{PJ,Activity\_Disp,y} = 0,00 \text{ tCO}_2/y$
<b>Leakage emissions</b>	
$LK_y = 0$	

Based on the above assessment, the DOE hereby confirms that:

- (a) All assumptions and data used by the project participants are listed in the PDD, including their references and sources;
- (b) All documentation used by project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD;
- (c) All values used in the PDD are considered reasonable in the context of the proposed CDM project activity;
- (d) The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions;
- (e) All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD.

### 3.7 Additionality of a project activity (97)

The steps taken and sources of information used, to cross-check the information contained in the PDD on this matter are described below. The PDD version 4 applies the latest "Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality", version 04.0.0 (Ref/58/).



### **3.7.1 Prior consideration of the clean development mechanism (104)**

The DOE has validated the project activity start date provided in the PDD by reviewing the project documentation (including contracts signed with third parties) and assessing the actions taken by the PP at the time of investment decision. The starting date is considered to be 18/09/2000, the date on which the contract for the general refurbishment of VMB's Blast Furnace 1 was signed (Ref /5/) (Ref/6/) (Ref/7/) (Ref/8/)

In line with Glossary of CDM terms version 6.0 (EB 66 Annex 63) (Ref/47/), the validation team confirms that this date (i.e. 18/09/2000) represents the first action where the implementation of the project activity started. The DOE checked the dates in which the plantation cycles were established in each farm (ref /5/) and has verified that the first planting activity in the establishment of dedicated plantations to the new iron ore reduction system was at the farm "Fazenda Itapoã" (Cadastro Talhão 0248 ITAPOÃ). In summary, the DOE has confirmed that the first planting under the new iron ore reduction for all the farms (the dates for each farm are mentioned in the e sub-section below) happened after the starting date of the project activity.

The project start date is prior to the date on which the PDD was made available for public consultation (17/04/2012). In line with the "Guidelines on the demonstration and assessment of prior consideration of the CDM" (EB 62, Annex 13) (Ref/46/), the validation team has verified the following evidences which confirm that the CDM was seriously considered in the decision to implement the project activity:

- 12/05/2000 - Minutes of the V&M do Brasil directors' board meeting in which the reducing agent type was decided (i.e. renewable charcoal) and the project activity was considered as a CDM project activity. The carbon credits were the decisive factor in the decision to implement the project activity; (Ref/9/)

- 02/06/2000: Consultancy contract with Eco Securities - Service agreement related to quantification and distribution of carbon credits derived from forestry and industrial activities of V&M do Brasil; (Ref/10/)

Therefore, in line with paragraph 6(a) of the "Guidelines on the demonstration and assessment of prior consideration of the CDM" (EB 62, Annex 13) (Ref/46/), the validation team confirms that the CDM was a decisive factor in the decision to implement the project activity.

#### **3.7.1.1 Historical information on project timeline**

In line with paragraph 6(b) and 7 of the "Guidelines on the demonstration and assessment of prior consideration of the CDM" (EB 62, Annex 13) (Ref/46/), the validation team has also assessed the following continuing and real actions taken by the PP (after CDM consideration) in order to secure the CDM status for the project activity in parallel with the project's implementation:



- 12/05/2000 - V&M do Brasil board meeting: the directors of V&M do Brasil decided to apply the CDM benefits; (ref /9/)
- 02/06/2000: Contract with Eco Securities - Service agreement to quantification and distribution of carbon credits derived from forestry and industrial activities of V&M do Brasil; (ref /10/)
- 18/09/2000: Contract for the general refurbishment of Blast Furnace 1 (Type of new investment 3) – considered the starting date of the project activity; (Ref/6/)
- 01/10/2000: 1<sup>st</sup> planting carried out for the project activity to establish the new iron ore reduction system - farm Fazenda Itapoã (municipality of Paraopeba, state of Minas Gerais) – Type of new investment 1; (ref /5/)
- 30/10/2000 – first planting under the new iron ore reduction system in Galheiros farm, stand 0427; (ref /5/)
- 01/11/2000 – first planting under the new iron ore reduction system in Santa Cruz farm, stand 0835; (ref /5/)
- 15/11/2000 - first planting under the new iron ore reduction system in Diamante farm, stand 0754; (ref /5/)
- 20/11/2000: Payments for the contracted services of general refurbishment of Blast Furnace 1; (ref/8.1/)
- 21/11/2000 – first planting under the new iron ore reduction system in Campo Alegre farm, stand 1370; (ref /5/)
- 11/07/2001 – Contract to assemble the Blast Furnace 1; (ref/7/)
- 12/09/2001 – Authorization for payment of contract “4038160” regarding the refurbishment of Blast Furnace 1; (ref/8/)
- 18/09/2001 – Confirmation of 10<sup>th</sup> (monthly) payment regarding the refurbishment of Blast Furnace 1; (ref/8.1/)
- 01/12/2001 – first planting under the new iron ore reduction system in Patagônia farm, stand 1917; (ref /5/)
- 06/11/2002 – first planting under the new iron ore reduction system in Aldeia farm, stand 0569; (ref /5/)
- 13/01/2003 (Eco Securities Ltd): date of the final version of the PDD sent for the first submission of the proposed new methodology NM0002<sup>56</sup> to the UNFCCC;
- 20/08/2003 (Eco Securities and INCaF): date of the final version of the PDD sent for the second submission of the proposed new methodology NM0029<sup>57</sup> to the UNFCCC;
- 01/09/2003 – first planting under the new iron ore reduction system in Chapadinha farm, stand 2257; (ref /5/)

<sup>56</sup> <http://cdm.unfccc.int/methodologies/PAMethodologies/pnm/byref/NM0002>

<sup>57</sup> <http://cdm.unfccc.int/methodologies/SSCAR/PAMethodologies/pnm/byref/NM0029>



- 21/12/2003 – first planting under the new iron ore reduction system in Meleiro farm, stand 1028; (ref /5/)
- 31/12/2003 – first planting under the new iron ore reduction system in Brejão farm, stand 3088; (ref /5/)
- 12/10/2004 – first planting under the new iron ore reduction system in Olhos D'Água farm, stand 0312; (ref /5/)
- 07/02/2005 – first planting under the new iron ore reduction system in Sussuarana farm, stand 2309; (ref /5/)
- 18/04/2005 (Eco Securities and INCaF): date of the final version of the PDD sent for the third submission of the proposed new methodology NM0104<sup>58</sup> to the UNFCCC;
- 20/01/2005: First payment for the consultancy with “Geoconsult” (Prof. Gylvan Meira Filho) - contract and series of payments for institutional and technical consultancy related to climate change and carbon credits projects within V&M do Brasil S.A. industrial processes; (ref /10.1/)
  - 20/01/2005 to 20/12/2005: payments # 01 to 13;
  - 30/03/2006: contractual amendment for the consultancy, valid until 09/12/2006;
  - 15/01/2007: contractual amendment for consultancy, valid until 09/12/2007;
  - 11/02/2008: contractual amendment for consultancy, valid until 09/12/2008;
- 07/04/2006 – Contract with Paul Wurth Refractory & Engineering for general refurbishment of Blast Furnace 2; (ref /6.1/)
- 14/03/2008 – first planting under the new iron ore reduction system in Brejo farm, stand 2882; (ref/5/)
- 01/04/2009: CDM Consultancy contract signed with Key Associados; (ref/10.2/)
- 04/03/2011: CDM Consultancy contract signed with Plantar Carbon Ltda. (ref/10.3/)

In summary, the validation team has taken into account the requirements contained in the “Guidelines on the demonstration and assessment of prior consideration of the CDM” (EB 62, Annex 13) (Ref/46/), paragraphs 6, 7 and 8, and confirms that:

- real and continuing actions were taken by the PP to secure the CDM status in parallel with project implementation;
- the evidences are based on real and authentic evidence (details above), all checked and confirmed by the validation team during the validation process, including onsite visit;
- there is no gap of two years or more between the documented evidences which indicate real and continuing actions taken by the PP to secure the CDM status.

<sup>58</sup> <http://cdm.unfccc.int/methodologies/PAmethodologies/pnm/byref/NM0104>



The validation team has assessed the implementation related actions and dates of the proposed project activity and concluded that the difficulty in finalizing the process of PDD preparation is closely linked to the slow process for methodology approval (i.e. AM0082 was only approved in July 2009 (<http://cdm.unfccc.int/methodologies/DB/ZDKO7TGQR2OHHKMMI1VL9L49LDPR94/view.html>)) regardless the efforts and attempts (e.g. three PDDs/new methodologies submissions between 2003 and 2005) taken by the PP to register a new methodology under the applicable process scope contained in the proposed project activity long before 2009. The difficulties involved in the concept and implementation (via PDD) of a methodology applicable to process involved in the project activity can be demonstrated by the fact that at least four different consulting companies were involved in the development of the new methodology. The process could finally move forward once Plantar Carbon was involved in the PDD preparation. Since then, the CDM project related actions have run smoothly. Plantar Carbon is directly involved in CDM project activities (including new methodology proposals) related with charcoal and/or pig iron production. Its experience with previous similar CDM project activities has made it possible for the PP to finally conclude its process for CDM application.

Based on the actions described above, the DOE hereby confirms that the proposed CDM project activity complies with the requirements of the “Guidelines on the demonstration and assessment of prior consideration of the CDM” (version 04), EB 62, Annex 13. (Ref/46/)

Upon the Request for Registration, the following issue was raised by either three members of the CDM EB or one party involved in the project activity:

***Request for Review 2:*** *The DOE shall further substantiate on how continuing and real actions were taken to secure CDM status for the project in parallel with its implementation during the period 20/01/2005 - 04/03/2011 considering that it is not clear what are the real actions and deliverables related to : a) payments # 01 to 13 and contractual amendments (30/03/2006-09/12/2008) with Geoconsult and b) CDM consultancy contract signed with Key Associados on 01/04/2009. Please refer to VVM v.01.2, Para 102 (b) and “Guidelines on the demonstration and assessment of prior consideration of the CDM” EB 62 Annex 13, paragraph 6(b).*

#### **DOE’s response:**

The DOE has validated that, for the proposed project activity, the sequence of events which confirm that continuing and real actions were taken by the PP in parallel with project implementation during the period of 20/01/2005 - 04/03/2011 in order to secure CDM status, as follows:



a) Geoconsult: Geoconsult is a consultancy company owned by Professor Gylvan Meira in Brazil. Professor Meira was contracted in 2005 as a CDM expert advisor to V&M to conduct its actions for e.g. following up the development and submission of a new industrial methodology by Plantar that was NM0278: "Use of Charcoal from Renewable Biomass Plantations as Reducing Agent in Pig Iron Mill in Brazil" submitted to the UNFCCC on 2<sup>nd</sup> July 2008, which came to be approved under number AM0082 "Use of charcoal from planted renewable biomass in the iron ore reduction process through the establishment of a new iron ore reduction system" on 16<sup>th</sup> July 2009. His role as a consultant was more of an intellectual kind, with intangible deliverables. One evidence of his work is a Minute of a Meeting held on 02<sup>nd</sup> February 2007 (Ref/10.1.3/) in which some strategies to address the industrial project were discussed.

The sequence of contract amendments listed refers to the renewal of Geoconsult advisory contract for the periods 2006, 2007 and 2008. In March 2007, a "Meeting Report for Methodology Assessment-Renewable Reducing Agents in Pig Iron Production" was made in a joint work with EcoSecurities and RSConsultants (Ref/10.1.2/). The presentation, which was delivered on 2-3 March 2007, was verified by the DOE. The name of Professor Gylvan Meira is listed in the presentation, which further confirms (together with the series of payments made by V&M to Geoconsult – these were also verified by the DOE) that the CDM consultant was involved in the ongoing work regarding the development of the methodology and forest management for renewable reducing agent production (through dedicated forest plantations and renewable charcoal production).

The name of Professor Gylvan Meira/Geoconsult is also evidenced in the document mentioned below (in response letter "b"), which was prepared by Key Associados in January 2010. Page 6 in the referred document (Ref/10.2.2/) mentions the involvement of Geoconsult in the development of the methodology. Key Associados and Geoconsult are totally independent consulting companies, which in the DOE's opinion, further confirm the ongoing work done by Geoconsult since the project's inception.

b) Key Associados: it is a consultancy company contracted in 2009 to assess the potentiality of V&M's carbon projects in terms of emission reductions, including the proposed industrial project activity (Ref/10.2/). An assessment on the company's potential projects was made on 25<sup>th</sup> January 2010 and the DOE has confirmed this through document review (Ref/10.2.2/).

In 2011 Plantar Carbon Ambiental was contracted as a consultant to lead the development and registration of the V&M Group's carbon project activities.

It is important to mention that the proposed methodology "NM0278: Use of Charcoal from Renewable Biomass Plantations as Reducing Agent in Pig Iron Mill in Brazil." (27<sup>th</sup> June 2008) was put under review and finally approved as AM0082: "Use of charcoal from planted renewable biomass in the iron ore reduction process through the





establishment of a new iron ore reduction system" on 16<sup>th</sup> July 2009. The DOE acknowledges that this piece of information (i.e. regarding NM0278) was missing in the project's implementation timeline presented in the Validation Report.

In summary, the CDM related actions during the period 20/01/2005 - 04/03/2011, are presented below:

Date	CDM related action/event	Reference documents
20/01/2005 – 09/12/2008	<p>Contracts, amendments and series of payments made by V&amp;M (PP) to "Geoconsult"/Prof. Gylvan Meira.</p> <p>The documents listed in the Validation Report Section 3.7.1.1 for the work conducted by "Geoconsult" were all verified by the DOE.</p> <p>The DOE considers that the payments made, together with the additional information herewith provided and the scope of the contracts, further confirm that "Geoconsult"/Prof. Gylvan Meira were involved in the methodology and project design since its inception.</p> <p>The DOE has performed a telephone interview on 12/06/2013 with Mauricio Meira, son and partner of Prof. Gylvan Meira in "Geoconsult" and confirms the direct involvement of the referred company in the design of the proposed project activity and respective methodology.</p>	Ref/10.1/





02/02/2007	“Minutes of meeting”, where strategies to address the industrial project were discussed. The DOE has verified the evidence and does not doubt its authenticity.	Ref/10.1.3/
02/03/2007	“Meeting Report for Methodology Assessment: Renewable Reducing Agents in Pig Iron Production” was made in a joint work with “Ecosecurities” and “RSConsultants”. The name of “Geoconsult”/Prof. Gylvan Meira is listed as one of the persons who prepared the presentation.	Ref/10.1.2/
01/04/2009	Contract signed with “Key Associados” for CDM related activities	Ref/10.2/
25/01/2010	<p>Assessment document on the company’s (i.e. PP) potential CDM projects and status of the methodology (finally approved at that time), prepared by “Key Associados”.</p> <p>The document was verified by the DOE and Page 6 of the referred document also mentions the involvement of Geoconsult in the development of the methodology. “Key Associados” and “Geoconsult” are totally independent consulting companies, which in the DOE’s opinion, further confirm the ongoing work</p>	Ref/10.2.2/



	done by "Geoconsult" since the project's inception and the long process which lead to methodology approval.	
04/03/2011	Consultancy contract signed with "Plantar" (objective: to lead the development and registration of the V&M Group's carbon project activities)	Ref/10.3/

Based on the above assessment, the DOE hereby confirms that it has validated that continuing and real actions were taken in parallel to project implementation in order to secure CDM status. There is no time gap of two years or more in the series of events/actions taken to secure the CDM status. The DOE confirms that the validation is done in line with "VVM v.1.2, paragraph 102 (b)" and "Guidelines on the demonstration and assessment of prior consideration of the CDM" EB 62 Annex 13, paragraphs 6(b) and 7. The DOE has assessed the mentioned evidences and confirm them to be reliable and authentic.

### 3.7.2 Identification of alternatives (107)

In accordance with the approved methodology AM0082 version 1, the PDD applies the latest version of the "Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality", version 04.0.0 (Ref/58/). Refer to the above section 3.6.3 in this Validation Report (Step 1) for the definition of alternatives to the proposed project activity.

The DOE considers the listed alternatives to be credible and complete.

### 3.7.3 Investment analysis (114)

According to the "Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality", version 04.0.0 (Re/58/), the investment analysis is not applicable to this proposed project activity once the Step 2 (Barrier analysis) has resulted in only one realistic alternative scenario, the coal coke based iron ore reduction system (Alternative Scenario 1). Refer to the above section 3.6.3 in this Validation Report (Step 3) for further details.



The validation team has accepted and concluded that the investment analysis is not applicable to the proposed project activity.

### 3.7.4 Barrier analysis (118)

In line with the approved methodology AM0082 version 1, the PDD applies the latest version of the "Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality", version 04.0.0 (Ref/58/).

The DOE hereby confirms that the barrier analysis performed in the PDD is credible and appropriate. Refer to the above section 3.6.3 in this Validation Report (Step 2) for further details.

In summary, the identified barriers include:

- a) Barriers/incentives to investment and financing;
- b) Sectoral and policy barriers;
- c) Technical and/or regulatory barriers, e.g. different environmental licensing requirements for different reducing agents.

The barriers prevent the implementation of the proposed project activity and the only scenario which is not prevented by any of the mentioned barriers is "alternative scenario 1", i.e. Iron ore reduction system based on the use of coal coke. Refer to section 3.6.3 in this Validation Report (step 2) for details regarding the barrier analysis conducted for the purpose of the baseline identification.

Upon the Request for Registration, the following issue was raised by either three members of the CDM EB or one party involved in the project activity:

***Request for Review 1:*** The DOE is requested to further substantiate on how the CDM alleviates the identified barriers to a level that the project is not prevented any more from occurring by the barriers and the financing of the project was assured only due to the benefit of the CDM. The DOE should note that barriers that can be mitigated by additional financial means can be quantified and represented as costs and should not be identified as a barrier for implementation of project while conducting the barrier analysis, but rather should be considered in the framework of investment analysis. Please refer to VVM v.01.2 paragraph 115(a); Combined tool to identify the baseline scenario and demonstrate additonality ver 04.0.0, paragraph 21-24 ; EB 50, Annex 13, para 5, 7 and 9.

**DOE's response:**

According to PDD (version 4), Section B.4 (step 2b.2) and Validation Report (version 03.1), Section 3.6.3, the identified barriers to the implementation of the project activity in comparison to the baseline scenario were validated as follows:

<b>Identified Barriers that would prevent the implementation of remaining alternative scenarios (Step 2; "Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality", version 04.0.0)</b>	<b>Renewable charcoal iron ore reduction system based on new plantations (project scenario)</b>	<b>Coal coke iron ore reduction system (baseline scenario)</b>
a) Barriers to investment and financing	Yes. Raw material that needs to be planted, harvested and produced, i.e. establishment of new dedicated forest plantations.	No. Readily available raw material i.e. coal coke
a) Barriers to investment and financing	Yes. Disbursement of large amounts to establish the new dedicated forest plantations with long pay back periods.	No. Purchase in spot market, immediate production and sales.
a) Barriers to investment and financing	Yes. Lack of appropriate financial structure for loans and funding.	No. No external financial support is needed.
a) Barriers to investment and financing	Yes. Investments must be made using own capital.	No. Investment is not needed (i.e purchase/selling in the market, no infrastructure needed, etc).
b) Sectoral and Policy barriers	Yes. Historically recognized decline in plantations for fuel purposes affecting national forestry stocks.	No. Coal reserves are available with an estimated duration of more than 100 years.



c) Regulatory barriers	Yes. Land acquisition; investment in lands to establish the new dedicated forest plantations	Not applicable. Coal is an imported good.
c) Regulatory barriers	Yes. Establishment of legal reserves and permanent preservation areas in dedicated forest plantation areas.	Not applicable. Coal is an imported good.
c) Regulatory barriers	Yes. Environmental licensing to establish the new dedicated forest plantations that can take at least 6 to 12 months.	Not applicable. Coal is an imported good.

The DOE would like to confirm that the identification of the barriers presented above and the discussion and means of validation applied to confirm each one of them (including the sources of evidences used) are presented in the Validation Report Section 3.6.3, under Step 2, following the requirement contained in the methodology AM0082 v1 that the "Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality" must be applied (latest at the time of submission was version 04.0). The validation follows the requirement contained in VVM (version 1.2) paragraph 115 (a).

In order to further substantiate on how the CDM alleviated the identified barriers of the proposed project activity, the PP presented to the DOE the document "Contract of Caution" (Ref/9.1/), signed between V&M and a Party (undisclosed for confidentiality purposes) in 18/04/2003 and the document "Certified Emission Reduction Sale Agreement" (Ref/9.2/) signed between V&M and the same Party (undisclosed for confidentiality purposes) in 06/02/2003. The DOE has had access to the referred documents.

These were signed as an intention to buy the CERs generated by the proposed project activity presented to UNFCCC in 2003, together with the new methodology that V&M was elaborating then. These documents emphasize the relevance of the CDM for the PP and its deep interest in approving a methodology and implement the project activity. Also, these contracts could be considered relevant evidences in order to confirm that the financing was assured due to the consideration and selling of potential CDM revenues. This further demonstrates how the CDM alleviates the identified barriers, in line with EB 50, Annex 13, paragraph 5 (example 1).



Furthermore, to demonstrate that the CDM significantly contributes to alleviate the barriers which prevent the implementation of the proposed project activity, it is presented below the relation between the potential revenues generated by the carbon credits sales and the investments necessary to implement and maintain the renewable dedicated forest plantations:

**Costs to implement the forest plantations – R\$ (Brazilian Reais)/ hectare (ha)**

(Source: EMBRAPA, 2005 – based on GRAÇA et al, 2000) (Ref/63/)

Year 1.....	R\$ 1,034.80
Year 2.....	R\$ 380.00
Year 3.....	R\$ 360.00
Years 4 to 7 (R\$320.00 x 4) .....	R\$ 1,280.00
Total .....	R\$ 3,054.80

**Project area:** approximately 60,000 ha (Source: spreadsheet “ERs Calculation Tool VMB”)

**Total investment:** 60,000 ha x R\$ 3,054.80 = R\$ 183,288,000

**Amount of CO<sub>2</sub> for the first crediting period (Section A.4.4 of the PDD version 4):**  
5,534,259 tCO<sub>2</sub>e

Price of CO <sub>2</sub> (US\$/ Ton)	R\$/ US\$ (average 2000)	Year	CO <sub>2</sub> Revenues (in R\$)	Relation CO <sub>2</sub> revenues/ Total investments
3.00	1.85		30,715,137	17%
5.00	1.85		51,191,896	28%
10.00	1.85		102,383,792	56%
15.00	1.85		153,575,688	84%

According to the table above the carbon credits revenues could represent 17% to 84% of the investments made in the forest plantations, and were an utterly important incentive to the project activity's implementation. At the time the project was being considered and implemented, an expectation of price up to 20 US\$ per tCO<sub>2</sub>e was



reasonable. It was only in the last couple of years or three that the price of the tCO<sub>2</sub>e declined considerably and such low expectations were impossible to foresee when the project was being considered. The investment is roughly R\$ 183 millions (approximately USD 100 million) and only after the seventh year, is the PP able to start the first harvesting. The baseline scenario, on the other hand, does not present to the PP any major investment or long term commitments, as the coal can be readily purchased in the market.

Moreover, according to the “Combined tool to identify the baseline scenario and demonstrate additionality” version 05.0.0, Outcome of Step 2 item 1(b) (ii): *“explain – using qualitative or quantitative arguments – how the registration of the CDM project activity will alleviate the barriers that prevent the proposed project activity from occurring in the absence of the CDM. If the CDM alleviates the identified barriers that prevent the proposed project activity from occurring, proceed to Step 4, otherwise the project activity is not additional.”* The PDD, therefore, correctly follows the requirement that if the barriers that prevent the proposed project activity are alleviated by the CDM (as further substantiated above), then it is not necessary to apply Step 3 (Investment Analysis). The

Although the investment analysis (Step 3 in the Combined Tool) is not required (i.e. there is only one baseline alternative which is not prevented by the identified barriers), the PP has now presented the spreadsheets which are part of the study prepared at the decision making moment to implement the project activity (cited in the PP’s minutes of the board meeting, listed in Section B.5 of the PDD version 4), which demonstrate that the cost to produce pig iron using renewable charcoal as a reducing agent equals the cost of producing pig iron using coal coke when the cubic meter of charcoal reaches a maximum of R\$43.94 and the real cost for the cubic meter of charcoal was around R\$63.00 prior to project implementation. The source and information presented in the spreadsheet (Ref/9.3/) – which is confidential but also enclosed in response to the review - was verified by the DOE and shows that producing pig iron using coal coke is far more competitive (i.e. cheaper and not affected by barriers) than using renewable charcoal.

In summary, it is the DOE opinion that the validation and explanation provided above are in line with the requirements contained in the: VVM v.01.2 paragraph 115(a); Combined tool to identify the baseline scenario and demonstrate additionality ver 04.0.0 (and 5.0); and EB 50, Annex 13, paragraphs 5, 7 and 9. Section 3.6.2 in this Validation Report carries information already submitted with respect to the barriers identification and relevance for each of the alternatives considered for baseline scenario, in line with the “Combined Tool to identify the Baseline and Demonstrate Additionality”.

### 3.7.5 Common practice analysis (121)





In line with the approved methodology AM0082 version 1, the PDD applies the latest version of the "Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality", version 04.0.0 (Ref/58/).

The DOE hereby confirms that the common practice analysis performed in the PDD (including the "credibility check" performed by the PP) is appropriate and strictly follows the requirements contained in the referred "Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality", version 04.0.0 (Ref/58/).

Refer to the section 3.6.3 above in this Validation Report (Step 4) for further details regarding the common practice analysis.

In summary, the DOE hereby confirms that the proposed CDM project activity is not common practice within the host country (Brazil).

### 3.8 Monitoring plan (124)

The DOE hereby confirms that the monitoring plan complies with the requirements of the methodology. The following parameters will be monitored:

- $P_{PJ,y}$  : Hot metal production in project scenario in year  $y$  (expected hot metal production of the new iron ore reduction system). The pig iron production is weighted. Scales are calibrated according to Standard Operating Procedures based on ISO 9001 standards.
- $N_{v,PJ,y}$  : Number of round trips (to and from) per type  $v$  of vehicle during year  $y$  in the project scenario. This parameter applies to the calculation of  $EP_{Vehicle, PJ, y}$  (biomass transport to the carbonization sites).
- $N_{v,PJ,y}$  : Number of round trips (to and from) per type  $v$  of vehicle during year  $y$  in the project scenario. This parameter applies to the calculations for  $RAT_{Vehicle, PJ, y}$ , transport of reducing agent to iron ore reduction facility in the project scenario.
- $AVD_{i,PJ,y}$  : Average round trip distance (to and from) between the biomass  $i$  production site(s) and the site of the project plantation during year  $y$ . The distance is calculated based on road maps; the highest value shall be considered. This parameter applies to the calculations for  $RAT_{Vehicle, PJ, y}$ , transport of reducing agent to iron ore reduction facility in the project scenario.
- $EF_{v, km, CO_2, PJ, y}$  : CO<sub>2</sub> emission factor for the type  $v$  of vehicle during year  $y$  in the project scenario. Sourced from GHG Protocol Brazilian Program 2010 and Project entity records. This parameter applies to the calculations for  $EP_{Vehicle, PJ, y}$  biomass transport to the carbonization sites, and  $RAT_{Vehicle, PJ, y}$  transport of reducing agent to iron ore reduction facility in the project scenario.



- $EF_{CH_4, charcoal, PJ, y}$  : Emission Factor to produce one tonne of renewable charcoal identified in the project supply chain. Sourced from project entity's records and calculated in line with AM0041 provisions. The PP already adopts the provisions from AM0041 as it is also developing a CDM project activity applying the referred methodology.
- $F_{PJ, charcoal}$  : Quantity of renewable charcoal to produce one tonne of hot metal in the project scenario. The total charcoal consumption and hot metal production are weighted monthly based on Standard Operating Procedures based on ISO 9001 standards.
- $Y_{PJ}$  : Carbonization gravimetric yield. Measurements performed according to AM0041 provisions, Appendix 3 (project entity's records). The PP already adopts the provisions from AM0041 as it is also developing a CDM project activity applying the referred methodology.
- $FC_{i, j, y}$  : Quantity of fuel type  $i$  combusted in process  $j$  during the year  $y$ . In line with the "Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion", version 02 (Ref/54/);
- $NCV_{i, y}$  : Weighted average net calorific value of fuel type  $i$  in year  $y$ . Conversion calculation:  
 Diesel density (Source: GHG Protocol Brazilian Program): 0.84 Kg/l = 1.176 l/Kg  
 $36.12 \text{ MJ/l} * 1.176 \text{ l/Kg} = 42.48 \text{ MJ/Kg} = 42.48 \text{ TJ/Gg}$
- $M_{SFi, t}$  : Mass of synthetic fertilizer type  $i$  applied ("NPK"), tonne in year  $t$ , based on project entity's records and Standard Operating Procedures based on ISO 9001 standards.

The steps taken to assess whether the monitoring arrangements described in the monitoring plan are feasible within the project design are described below.

## 1 - Monitoring of project emissions parameters

Data sources and frequency of data collection are outlined in Section B.7.1 in the PDD (for each parameter). According to the AM0082 version 1 (Ref/42/), all data collected as part of monitoring will be electronically archived and kept for at least for 2 years after the end of the last crediting period.

The carbon content of primary iron produced with renewable charcoal will always be considered zero, leading to conservative results for project emissions and emission reductions. Therefore, the renewable charcoal carbon content are excluded from the project emissions monitoring flow, as per provisions from the AM0082 version 1 (Ref/42/). As the project activity only uses renewable reducing agent, monitoring of



planted areas and wood volume transported to the carbonization units are also included.

The production of the primary carbon, the planted area and the volume of primary carbon transported to the carbonization sites will be monitored.

Methane emissions of the carbonization process will be estimated based on the identification of the gravimetric yield according to a regression equation expressing statistical relationship, as provided by the approved methodology AM0041 "Mitigation of methane emissions in the wood carbonization activity for charcoal production" (Ref/43/). In addition to the gravimetric yield, the transport of the reducing agent produced to the iron ore reduction facility will be monitored.

The operation and management structure for collecting and monitoring the project activity's data is presented in Figure 23 in the PDD version 4 (Ref/2.2/).

### **1.1 – Monitoring of project's reducing agents component emissions parameters**

The PP has a Quality Management system in place that documents and records the significant activities related to forestry activities, including activities related to site preparation and vegetation affected as part of site preparation. The monitoring intervals and specific activities/ staff responsibilities are provided in the Standard Operating Procedures, which are based on ISO rationale and are constantly updated based on the continuous improvement approach, including compliance with safety and quality regulations.

#### *Monitoring the emissions in the establishment of plantations and production of biomass*

Field surveys will be undertaken to verify that the delineated project boundary is congruent with the ex-ante description presented in Annex 5 of the CDM-PDD. Any significant changes shall be recorded and integrated in the Forest Inventory System based on the standard operating procedures. Only biomass sourced by the areas within this project activity's boundary will be accounted for emission reductions calculations.

#### a. Calculation of CO<sub>2</sub> emissions from burning of fossil fuels

The monitoring of the consumption of diesel is done by measuring the working hours by type of equipment used. The vehicle type with highest CO<sub>2</sub> emission factor is conservatively considered in the calculations.

#### b. Calculation of nitrous oxide emissions from nitrogen fertilization practices

The fertilizer used is an N type (NPK).

The project entity will monitor the following parameters, in relation to emissions in the establishment of the dedicated planted forests within the project boundary, through the control of invoices by the SAP system:



- Liters of diesel combusted in forest establishment and maintenance;
- Tons of synthetic fertilizer applied.

#### *Emissions from the transport of biomass to the reducing agents production sites*

Emissions from the transport of biomass to the reducing agents production sites based on the vehicles' fuel consumption. The following data will be monitored:

- Number of round trips per type of vehicle;
- Average round trip distance from the harvesting site to the carbonization units;
- Emission factor per type of vehicle (the most emitent vehicle type is conservatively considered for the calculations).

#### *Emissions from the carbonization of wood (methane emissions)*

Data that will be monitored:

- Gravimetric yield as per AM0041

According to AM0082 version 1, for the monitoring of emissions in the reducing agent production the provisions of the AM0041 methodology shall be considered. Therefore, the following data will be monitored in line with the requirements:

- Wood weight sampling
- Charcoal weight sampling
- Wood moisture sampling
- Charcoal moisture sampling

#### *Emissions from transport of charcoal to the iron ore reduction facility*

The following data will be monitored:

- Number of round trips per type of vehicle;
- Average round trip distance from the carbonization site to the pig iron mill;
- Emission factor per type of vehicle (the most emitent vehicle type is conservatively considered for the calculations).

#### *Emissions from the hot metal production*

Data on variables to be monitored at the entrance of the iron ore reduction facility (reduction process component):

- Reducing agent consumption (quantity of reducing agent used in the iron ore reduction process)
- Origin of the renewable reducing agent (i.e. renewable charcoal) used in the iron ore reduction process.

Data on variables to be monitored at the end of the iron ore reduction process:

- Amount of hot metal produced in the iron ore reduction process;

## **2 – Monitoring of leakage emissions parameters**



This project activity does not incur in any leakage associated with activity displacement. Considering the fact that the project entity has the ownership of the lands, no displacement of activities occurred in these lands due to the project activity.

### **3 – Monitoring the project emission reductions through electronic spreadsheet**

#### *Data gathering and project emission reductions calculation*

The PDD version 4 (Ref/2.2/), Annex 4, provides detailed information regarding the monitoring of the project emissions parameters, as well as information on the spreadsheet database to estimate emission reductions of the project activity.

### **4 - Standard Operating Procedures and quality control/quality assurance (QA/QC)**

The QA/QC procedures under the project follow standard procedures for monitoring and gathering of reliable field measurements. To ensure that the emissions reductions are estimated and monitored accurately, the quality assurance and quality control (QA/QC) procedures such as (1) quality assurance of field monitoring; (2) gathering of field data and; (3) data entry and analysis, are implemented, according to a quality system based on ISO 9001 standards.

All activities subject to monitoring are listed at Figures 21 and 22 in the PDD version 4.

#### *Establishment of plantations*

The following sources of GHG emissions are recorded and accounted in the calculations of GHG reductions. The consumption of fuel and nitrogen fertilizer is stored in the SAP System through the information of the invoices.

- GHG emissions from fossil fuel consumption;
- GHG emissions from application of nitrogen fertilizer.

#### *Carbonization of wood (methane emissions)*

The monitoring of methane emissions from the wood carbonization process will be done through the application of the methodology AM0041. The project entity adopts detailed work instructions to calculate the gravimetric yield, elaborated based on the ISO 9001 criteria. The instructions for the measurement of the wood and charcoal moisture are recorded and tracked through the company's quality management system. The wood and coal weight sampling is regulated by a sampling plan registered in the project entity's quality management system. A new project activity that aims to control the methane emissions in VMFL's carbonization process is being implemented and prepared for submission to the UNFCCC (currently under validation).

The emissions from the wood transport to the carbonization units and of the charcoal to the reduction facility is based on the number of round trips and the average distance.



The amount of transported product is subject to control through operational controls that use the ISO 9001 standards.

### Hot metal production

The origin of the charcoal is strictly controlled through the GFCV – “Charcoal Supply Form” and the invoices. The GFCV collects data such as: transportation company, truck plate identification, origin farm, among others. It is possible to track the date and production orders referring to all charcoal activities, from the wood harvesting (where it is specified the stand, genetic material and harvesting age), wood positioning at field and transport of wood to the carbonization plant.

The amount of hot metal produced is weighed and all data collected is checked by a supervisor and inserted in the SAP system.

In conclusion, the DOE hereby confirms that the project participants are able to implement the monitoring plan.

## **3.9 Sustainable development (127)**

Prior to the submission of the final validation report to the CDM Executive Board, BVC will have to receive the written approval of voluntary participation from the DNA of Brazil, including the confirmation by the DNA of Brazil that the project assists it in achieving sustainable development. Refer to item 3.1 of this report.

## **3.10 Local stakeholder consultation (130)**

The steps taken to assess the adequacy of the local stakeholder consultation are described below.

The DOE has confirmed that the process of inviting local stakeholders to comment on the proposed project activity was initiated on 16/03/2012 and followed the instructions of the “Brazilian Interministerial Commission on Global Climate Change” (Brazilian DNA) for the registration of a CDM project, Resolution # 7 of 05 March 2008 (Art.3, Sections I, II, V) (Ref/37/).

The document "Handbook for Submission of Project Activities within the Scope of the CDM to the Interministerial Commission on Global Climate Change aiming at obtaining a Letter of Approval from the Brazilian Government" (version 2, from 01 July 2008) (Ref/38/) states that registered letters must be sent to the official addresses of the listed institutions, containing an invitation to comment on the project. Stamped envelopes for easy and free of charge mailing return were also sent. The DOE has verified all the letters sent and respective “confirmation of receipts” with evidence provided by the project entity. The list of stakeholders invited to comment on the proposed project activity is presented below:

Ministério Público Estadual – Abaeté – Public prosecutor
Ministério Público Estadual – João Pinheiro and Brasilândia de Minas (Brasilândia de



Minas is part of the Judicial District of João Pinheiro) – Public prosecutor
Ministério Público Estadual – Paineiras – Public prosecutor
Ministério Público Estadual – Paraopeba – Public prosecutor
Ministério Público Estadual – Pompéu – Public prosecutor
Ministério Público Estadual – Morada Nova de Minas – Public prosecutor
Ministério Público Estadual – Lagoa Grande (Lagoa Grande is part of the Judicial District of Presidente Olegário)
Ministério Público Estadual – Curvelo and Felixlândia (Felixlandia is part of the Judicial District of Curvelo) – Public prosecutor
Ministério Público Federal – Federal public prosecutor
SEMAD – Secretaria de Estado de Meio Ambiente e Desenvolvimento Sustentável – State environmental body
SUPRAM – Superintendência Regional de Regularização Ambiental - Belo Horizonte/ MG – Regional environmental body
SUPRAM – Superintendência Regional de Regularização Ambiental – Divinópolis/MG – Regional environmental body
SUPRAM – Superintendência Regional de Regularização Ambiental – Unaí/ MG – Regional environmental body
SMMA – Secretaria Municipal de Meio Ambiente – Municipal environmental secretariat
Prefeitura de Belo Horizonte – city hall
Prefeitura de Abaeté – city hall
Prefeitura de Brasilândia de Minas – city hall
Prefeitura de Felixlândia – city hall
Prefeitura de João Pinheiro – city hall
Prefeitura de Lagoa Grande – city hall
Prefeitura de Paineiras – city hall
Prefeitura de Paraopeba – city hall
Prefeitura de Pompéu – city hall
Prefeitura de Morada Nova de Minas – city hall
Prefeitura de Curvelo – city hall
Câmara Municipal de Belo Horizonte – city council
Câmara Municipal de Brasilândia de Minas – city council
Câmara Municipal de João Pinheiro – city council
Câmara Municipal de Morada Nova de Minas – city council
Câmara Municipal de Lagoa Grande – city council
Câmara Municipal de Felixlândia – city council
Câmara Municipal de Paraopeba – city council
Câmara Municipal de Pompéu – city council
Câmara Municipal de Abaeté – city council
Câmara Municipal de Paineiras – city council
Câmara Municipal de Curvelo – city council
CODEMA - Conselho Municipal de Conservação e Defesa do Meio Ambiente/ Secretariat – Abaeté – municipal environmental body
CODEMA/ Secretariat - Brasilândia de Minas - municipal environmental body
CODEMA/ Secretariat – Felixlândia - municipal environmental body



CODEMA/ Secretariat - João Pinheiro - municipal environmental body
CODEMA - Lagoa Grande - municipal environmental body
CODEMA/ Secretariat – Paineiras - municipal environmental body
CODEMA/ Secretariat – Paraopeba - municipal environmental body
CODEMA/ Secretariat – Pompéu - municipal environmental body
CODEMA/ Secretariat - Morada Nova de Minas - municipal environmental body
CODEMA/ Secretariat – Curvelo - municipal environmental body
FBOMS - Fórum Brasileiro de ONG's e Movimentos Sociais para o Meio Ambiente e Desenvolvimento – Brazilian NGOs' forum
ONG Ponto Terra - NGO
AMDA – Associação Mineira de Defesa do Ambiente - NGO
Fundação Biodiversitas - NGO
Santuário São Paulo da Cruz - church
Aedisi - Associação da Indústria e Comércio do Barreiro – Industry and commerce association
Centro de Saúde do Bairro das Indústrias – health center
Líder comunitário – Bairro Novo das Indústrias – community leader
Polícia Militar do Barreiro – police station
FIEMG – Federação das Indústrias do Estado de Minas Gerais - Núcleo de Responsabilidade Social – State industry federation
FAEMG - Federação da Agricultura e Pecuária do Estado de Minas Gerais – State agriculture federation
AMS – Associação Mineira de Silvicultura – Planted forest activity association
Escola Estadual Padre João Botelho – school
Escola Estadual Margarida Brochado – school
Escola Estadual Duque de Caxias - school
AMO BDI – Associação dos Moradores do Bairro das Indústrias – neighbors association
Parque das Águas - Unidade de Conservação Municipal – Parque Burle Marx – Municipal water conservation
Jornal Guia Milionários – local newspaper
Associação dos moradores do Bairro Novo das Indústrias – neighbors association
De Peito Aberto-Incentivo ao Esporte – sports program
COPASA - Águas Minerais de Minas S/A – State water company
Secretaria de Administração Regional Municipal Barreiro – Regional administration secretariat
Centro de Educação Infantil Arca da Aliança (Belo Horizonte) – children school
Jardim Industrial committee
PUC – Pontifícia Universidade Católica – Barreiro - University
Assessoria de Assuntos Especiais de Vilas e Favelas – Consultancy for special affairs of “favelas”
Associação Helil de Amparo à Criança – Children's aid association
Esporte Clube Dom Bosco – Sports club
Programa Social Vilma Alimentos “Ser Parte” – social program
IABr – Instituto Aço Brasil – Brazilian steel institute



UFOP – Gorceix Foundation
Sant’Ana de Caatinga community - João Pinheiro
Assentamento Nosso Orgulho community – Lagoa Grande
Assentamento Elza Estrela community – Brasilândia de Minas
Canabrava community – Brasilândia de Minas
Andrequicé community – Presidente Olegário
Lagoa do Meio community – Santa Cruz
Pontinha community – Paraopeba
Vereda community – Abaeté
Meleiros community - Curvelo

From the date of the invitation letters’ posting, the CDM-PDD was made available in Portuguese in V & M’s website [www.vmtubes.com.br](http://www.vmtubes.com.br) and at the project entity’s headquarters.

The validation team has checked the details contained in Section E in the PDD version 4 and confirmed that the project entity received comments from SEMAD – “Secretaria de Estado de Meio Ambiente e Desenvolvimento Sustentável” (State environmental body), Andrequicé community, Sant’Ana de Caatinga community and “Centro de Educação Infantil Arca da Aliança”, praising the project’s initiative and emphasizing the project entity’s good relation with the communities. The validation team has confirmed this based on evidence provided by the PP (ref/62/). In conclusion, the DOE hereby confirms that the process of local stakeholder consultation is adequate and has been clearly described in the PDD. All the comments received were positive and raised no issues that required a response from the project entity. Therefore, no responses were sent to the stakeholders, which the DOE considered appropriate.

### 3.11 Environmental impacts (133)

An environmental impact assessment from the establishment of the new iron ore reduction system was not considered significant by the project participants. The new iron ore reduction system generates positive environmental impacts as the reducing agents used in the hot metal production are sourced from renewable sources (dedicated forest plantations), instead of fossil sources.

V&M do Brasil S.A. has an Environmental Management System in place and is certified by ISO 14000. The company strictly complies with the State’s environmental requests having no proceedings against the company during the previous Operating Licenses validity period.

Established in 1952, becoming Mannesmann S.A. in 1977, V&M do Brasil (while still Mannesmann S.A.), was first licensed in 1987 receiving a Corrective Operating License based on an Environmental Control Report/ Environmental Control Plan. Its first renewal occurred in 1994 based on an Environmental Performance Evaluation Report.

In 1998, there was the second renewal of the company’s operating license issued. Different from the previous ones, this license comprised the enterprise as a whole,



certifying all activities in the plant with only one license. In 2003, now as “V&M do Brasil”, a third renewal process took place and “Operation License 498/03” was granted.

In 2009 the operating license for the Barreiro plant was renewed for the fourth time resulting in the issuance of “Operation License 066/2009” (OL-066) (Ref/60/), valid until 2016. An important aspect distinguishes OL-066 from the previous ones: an additional term of three years was granted since the company has an Environmental Management System in place and is certified by ISO 14000. Also, there were no proceedings against the company during the OL’s validation. Therefore, OL-066 is valid for seven years. All relevant environmental impacts deemed for the company’s production processes are covered by the environmental licensing conditions.

Below follows a brief description of V&M Florestal Ltda. (VMFL) Operation License process.

- The V&M Florestal Operation License (Ref/60/), was granted by the State Council for Environmental Policy (COPAM), through the State Forestry Authority (IEF), on 17/11/2003.
- On 17/05/2008, V&M Florestal received the revalidation of the Operation Operating License by the State Council for Environmental Policy (COPAM), with a four year expiry date, the environmental study required was the Environmental Performance Evaluation Report
- On 24/04/2012 the Operation License renovation process started. The environmental study required was the Environmental Performance Evaluation Report. As the process is currently under analysis by the environmental authority, the License is still valid until COPAM decision. The DOE raised FAR 01, which shall be assessed during verification period by the responsible DOE.

In Minas Gerais State, the Normative Deliberation – DN COPAM nº 74/2004 establishes all directives for the classification and obligation of Environmental Licenses for activities that are potentially polluters. The charcoal production activity from planted forests falls into that category, being labeled as a medium potential polluter. As for the environmental impacts, all were identified in the environmental studies carried out by the project entity during its licensing process and all measures taken to mitigate them were approved by the responsible environmental authority when the Licenses were issued.

The V&M Group has the certificates with the highest reputations such as API, OHSAS 18001, ISO 9001, ISO/TS 16949, ISO 14001 and forest management certificate Cerflor, attesting to its excellence in product quality management, administration, environmental management, labour health and safety.

Based on the above, the validation team has concluded that the environmental impacts from the project activity are already taken into account in the current operation licenses for the different industrial activities (e.g. hot metal/steel production and charcoal production/forest management) set by the state of Minas Gerais. The proposed project activity is established in accordance with local and applicable regulations, both at state and national levels.



#### **4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS**

The PDD version 1 using methodology AM0082 version 1 was webhosted on the UNFCCC for global stakeholders comments as per CDM requirements. The project was webhosted from 17<sup>th</sup> April 2012 to 16<sup>th</sup> May 2012.

<http://cdm.unfccc.int/Projects/Validation/DB/UEHN0DNLJ3ZTFJH92YQ56OATC021DA/view.html>

No comments were received.

#### **5 VALIDATION OPINION**

Bureau Veritas Certification has performed a validation of the “Use of Charcoal from Renewable Biomass originated from Forest Plantations for the production of primary iron in Vallorec & Mannesmann do Brasil” Project in Brazil. The validation was performed on the basis of UNFCCC criteria and host country criteria and also on the criteria given to provide for consistent project operations, monitoring and reporting.

The validation consisted of the following three phases: i) a desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

In line with AM0082 “Use of charcoal from planted renewable biomass in the iron ore reduction process through the establishment of a new iron ore reduction system”, version 01 (Ref/42/) and “Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality”, version 04.0.0 (Ref/58/), the baseline scenario and additionality determination is demonstrated through barrier analysis (barriers related to investment/financing, sectoral/policy barriers and technical/regulatory barriers).

By utilizing renewable charcoal as thermo-reducing agent in the iron ore reduction process, the project activity displaces coal coke which would be utilized in the baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented and maintained as designed, the project is likely to achieve the estimated amount of emission reductions.

The review of the PDD version 4 (Ref/2.2/) and the subsequent follow-up interviews have provided Bureau Veritas Certification with sufficient evidence to determine the fulfillment of stated criteria. In our opinion, the project correctly applies and meets the relevant UNFCCC requirements for the CDM and the relevant host country criteria. Bureau Veritas Certification thus requests registration of ‘project title’ as CDM project activity.



The project will use a renewable crediting period of 21 years.

The estimation of overall emission reductions is 5,534,259 tCO<sub>2</sub>e or an average of 790,608 tCO<sub>2</sub>e/year.

## 6 REFERENCES

### Category 1 Documents:

Documents provided by type the name of the company that relate directly to the GHG components of the project.

- /1/ Project Design Document (CDM-PDD) "Use of Charcoal from Renewable Biomass Originated from Forest Plantations for the Production of Primary Iron in Vallorec & Mannesmann do Brasil" version 01, dated 09<sup>th</sup> March 2012
- /2/ Project Design Document (CDM-PDD) "Use of Charcoal from Renewable Biomass Originated from Forest Plantations for the Production of Primary Iron in Vallorec & Mannesmann do Brasil" version 02, dated 14<sup>th</sup> June 2012
- /2.1/ Project Design Document (CDM-PDD) "Use of Charcoal from Renewable Biomass Originated from Forest Plantations for the Production of Primary Iron in Vallorec & Mannesmann do Brasil" version 03, dated 17<sup>th</sup> August 2012
- /2.2/ Project Design Document (CDM-PDD) "Use of Charcoal from Renewable Biomass Originated from Forest Plantations for the Production of Primary Iron in Vallorec & Mannesmann do Brasil" version 04, dated 14<sup>th</sup> June 2013
- /3/ Permits / authorization documents issued by the respective authority for each of the fourteen farms considered in the PDD.
- /4/ V&M Florestal Forestry Management Plant, October 2011.
- /5/ "SAP Primeiros Plantios.pdf"; a screen from the SAP system used in PP company, in which the entire iron ore reduction activities are monitored continuously. The dates for each farm are mentioned in this document, which has 14 pages in total.
- /6/ Contract signed for the general refurbishment of VMB's Blast Furnace 1, 18/09/2000;  
"EValIN\_TER\_111213\_ContratoReformaAF1\_document2011-12-13-101535"
- /6.1/ Contract with Paul Wurth Refractory & Engineering for general refurbishment of Blast Furnace 2 (07/04/2006); "ALTO\_FORNO 2 – Contrato Reforma.pdf"
- /7/ Contract for assembling the Blast Furnace 1 (11/07/2001)  
EValIN\_TER\_111213\_ContratoServicoMontagemAF1\_document2011-12-13-103953
- /8/ Authorization for payment of contract "4038160" regarding the





- refurbishment of blast furnace 1 (12/09/2001);  
 "EValIN\_TER\_111213\_PagamentosReformaAF1\_document2011-12-13-142649"
- /8.1/ Confirmation of 10<sup>th</sup> (monthly) payment regarding the refurbishment of Blast Furnace 1;  
 "EValIN\_TER\_111213\_PagamentosReformaAF1\_document2011-12-13-142649"
- /9/ Minutes\_of\_boarding\_meeting.pdf (12/05/2000)
- /9.1/ Contract of Caution signed with another party regarding CERs purchase, 18<sup>th</sup> April 2003
- /9.2/ Certified Emission Reduction Sale Agreement, signed with the same party as above, 06<sup>th</sup> February 2003
- /9.3/ Spreadsheet "ERegIN\_SUB\_130606\_AnaliseCustoCV.xls"
- /10/ Contrato VM EcoSecurities\_COMPLETO.pdf (02/06/2000)
- /10.1/ Contract (and payments) for consultancy with "Geoconsult", represented by (Prof. Gylvan Meira Filho); "Contrato GC-VMB\_17-01-2005"; "Contrato GC-VMB\_17-01-2005 (aditivo 2)"; "Contrato GC-VMB\_17-01-2005 (aditivo 3)"; "Contrato GC-VMB\_11-05-2009"; "Contrato GC-VMB\_30-11-2010"
- /10.1.2/ Meeting Report for Methodology Assessment-Renewable Reducing Agents in Pig Iron Production" was made in a joint work with EcoSecurities and RSConsultants (2<sup>nd</sup> - 3<sup>rd</sup> March 2007)
- /10.1.3/ Minute of meeting ("070202V&M\_ATA\_reuniao"), which took place in Barreiro, Belo Horizonte, on 02/02/2007. List of participants: Antônio Claret (V&M), Brenda Marise (V&M), Erick Lessa (V&M), Ricardo Figueiredo (V&M), Fábio Feldman (Bioclimático), Gylvan Meira (Geoconsult) and Phillipp Hauser (EcoSecurities).
- /10.2/ Contract with Key Associados (01/04/2009); "Key Associados.pdf"
- /10.2.2/ Assessment on the company's (PP) potential carbon projects, delivered and prepared by Key Associados (25<sup>th</sup> January 2010)
- /10.3/ Contract with Plantar Carbon on 04/03/2011;  
 "ContratoPrestacaoServicosEspecializadosConsultoria.pdf"
- /11/ Letter of Approval from the Interministerial Commission on Global Climate Change (Brazilian DNA), issued on November 10<sup>th</sup>, 2012

### Category 2 Documents:

Background documents related to the design and/or methodologies employed in the design or other reference documents.

/11/ WORLD STEEL IN FIGURES, 2011 (World Steel Association)

/12/ EMBRAPA – "Sistemas Agroflorestais", August, 2003.

[http://sistemasdeproducao.cnptia.embrapa.br/FontesHTML/Eucalipto/CultivodoEucalipto/09\\_sistemas\\_agroflorestais.htm](http://sistemasdeproducao.cnptia.embrapa.br/FontesHTML/Eucalipto/CultivodoEucalipto/09_sistemas_agroflorestais.htm)

/13/ SAMPAIO, R. S. Conceptual evaluation of the switch to coke January, 2001.



- /14/ LACROIX. PH. et al. *High blast furnaces productivity operations with low coke rates in the European Union*. La Revue de Métallurgie, March, 2001.).
- /15 / AMS – Silviculture Association for the state; “About Eucalyptus”, 2003. [http://www.silviminas.com.br/Noticia/Arquivos/noticia\\_132.pdf](http://www.silviminas.com.br/Noticia/Arquivos/noticia_132.pdf)
- /16/ Federal Resolution CNP nº 18, 11 November 1980. Available at: [www.anp.gov.br](http://www.anp.gov.br).
- /17/ Federal Decree nº 99.244, 10 May 1990. Available at: [www.planalto.gov.br](http://www.planalto.gov.br) .
- /18/ Federal Decree nº 365, 26 June 1990. Available at: [www.planalto.gov.br](http://www.planalto.gov.br)
- /19/ National Council for the Environment (CONAMA). Resolution 382, 26 December 2006. <http://www.mma.gov.br/port/conama/res/res06/res38206.pdf>
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- /46/ Guidelines on the demonstration and assessment of prior consideration of the CDM (version 04), EB 62, Annex 13
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(<http://www.siam.mg.gov.br/sla/download.pdf?idNorma=5532>)
- /50/AM0042 - Grid-connected electricity generation using biomass from newly developed dedicated plantation, version 2.1.



- /51/ACM0003 - Emissions reduction through partial substitution of fossil fuels with alternative fuels or less carbon intensive fuels in cement or quicklime manufacture, version 7.4.0;
- /52/ AR - AM005 - Afforestation and Reforestation project activities implemented for industrial and commercial uses, version 4;
- /53/ Tool to calculate baseline, project and/or leakage emissions from electricity consumption, version 01;
- /54/ Tool to calculate project or leakage CO2 emissions from fossil fuel combustion, version 02;
- /55/ Tool for the identification of degraded or degrading lands for consideration in the implementation of CDM A/R project activities, version 01;
- /56/ Tool for the estimation of non-CO2 GHG emissions from burning of biomass attributable to an CDM A/R project activity, version 1 (new tool called "Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity", version 04.0.0);
- /57/ Estimation of direct nitrous oxide emission from nitrogen fertilization, version 01.
- /58/ Combined Tool to Identify the Baseline Scenario and Demonstrate Additionality version 04.0.0
- /59/ Resolution nº 1 of CIMGC – (from the Portuguese Comissão Interministerial de Mudança Global do Clima
- /60/ Environmental Operation License 066/2009 (OL-066)
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- /62/ Invitation letters sent to local stakeholders and comments received; "Comentarios\_Stakeholders.pdf"
- /63/ EMBRAPA 2005 – based on GRAÇA et al, 2000. (ISSN 1517-5030), December 2005.



### **Persons interviewed:**

List persons interviewed during the validation or persons that contributed with other information that are not included in the documents listed above.

- /1/ Felipe Fleury (Environmental Analyst – V&M do Brasil)
- /2/ Eduardo Olímpio (Technical Coordinator – V&M do Brasil)
- /3/ Alexandre Mello (Sustainability Assessor – V&M do Brasil)
- /4/ Maria Cecilia Vilela (Environmental Coordinator – V&M do Brasil)
- /5/ Regis Mendonça Pereira (Engineer – V&M Florestal)
- /6/ Luiz Moraes (Manager – V&M Florestal)
- /7/ Josemir Dias (Engineer – V&M Florestal)
- /8/ Francisco Bernardes (Engineer – V&M Florestal)
- /9/ Fabiano de Souza (Engineer – V&M Florestal)

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## **7 CURRICULA VITAE OF THE DOE'S VALIDATION TEAM MEMBERS**

### **Bureau Veritas Certification – Lead GHG Verifier**

Cláudia Freitas – is graduated in Chemical Engineering and post graduate in Environmental Management System and in MBA Management with experience in environmental management, energy and Clean Development Mechanism projects. She is ISO 14001:2004 Lead Auditor. and qualified as Lead Verifier GHG – Green House Gases. She has validated/ verified several CDM projects in Latin America and has worked as an external consultant in UNFCCC.

### **Bureau Veritas Certification – GHG Verifier**

Felipe Barbirato - is graduated in Economics and post-graduate/specialist in Environmental Analysis and Evaluation, with five years of work experience in the financial market. Started working in the environmental area in 2007, as an independent consultant for the origination and development of CDM project activities. Worked as an Associate Programme Officer in the "Registration & Issuance Team" in the SDM programme within the UNFCCC secretariat, in Germany, providing technical support in different areas of work to the CDM Executive Board and its supporting panels, with focus on CDM project assessment.

### **Bureau Veritas Certification – Technical Specialist**

José Alves de Souza Filho –is graduated in Mechanical Technician and Business Management and post graduate Environmental Management and Quality Engineering and has experience in mechanical maintenance, production, statistical quality control for Process Engineering and Quality Control (mechanical tests) in steel plants. He is ISO 9001:2008 and ISO 14001:2004 lead auditor and has performed audits in forest, laboratories physical and chemical tests.

### **Bureau Veritas Certification – Internal Technical Reviewer**

Marco Prauchner - He is graduated in Mechanical Engineering with experience in Quality and Environmental management in mechanical, plastic and chemical industries. He is ISO 9001:2008 and ISO 14001:2004 Lead Auditor and has also experience in the implementation of Environmental Management Systems. Marco is qualified as Lead Verifier GHG – Green House Gases

### **Bureau Veritas Certification - Technical Specialist (Support to ITR)**

Paulo Abreu - Is graduated in Industrial Engineering Mechanics, with experience in the area of Mechanical Engineering, with emphasis on



thermal engineering in the process of drying and carbonization of biomass, including charcoal research and production, determination of moisture of wood, automation of carbonization furnaces, charcoal physical chemical analysis. He has also experience in the use of charcoal in the metallurgy and Industry.

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## APPENDIX A: COMPANY CDM PROJECT VALIDATION PROTOCOL

**Table 1      Validation requirements based on the Clean Development Mechanism Validation and Verification Manual (Version 01.2)**

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
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## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS		Draft Concl	Final Concl
<b>1. Approval</b>			<b>COUNTRY A</b> <i>Federative Republic of Brazil</i>	<b>COUNTRY B</b> <i>(insert the country name)</i>		
a. Have all Parties involved approved the project activity?	VVM	44	First assessment: The final decision from the DNA will be available only after its first ordinary meeting, after the receiving of all the required documents necessary for evaluation, including this validation report, according to Article 6 of the Resolution nº 1 of CIMGC – Comissão Interministerial de Mudança Global do Clima. Second assessment (pending LoA issuance)		OK	OK
b. Has the DNA of each Party indicated as being involved in the proposed CDM project activity in section A.3 of the PDD provided a written letter of approval? (If yes, provide the reference of the letter of approval, any supporting documentation, and specify if the letter was received from the project participant or directly from the DNA)	VVM	45	Refer to item 1.a above		OK	OK




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## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS		Draft Concl	Final Concl
c. Does the letter of approval from DNA of each Party involved:	VVM	45	Refer to item 1.a above		OK	OK
i. confirm that the Party is a Party of the Kyoto Protocol?	VVM	45.a	Refer to item 1.a above		OK	OK
ii. confirm that participation is voluntary?	VVM	45.b	Refer to item 1.a above		OK	OK
iii. confirm that, in the case of the host Party, the proposed CDM project activity contributes to the sustainable development of the country?	VVM	45.c	Refer to item 1.a above		OK	OK
iv. Refers to the precise proposed CDM project activity title in the PDD being submitted for registration?	VVM	45.d	Refer to item 1.a above		OK	OK
d. Is(are) the letter(s) of approval unconditional with respect to (i) to (iv) above?	VVM	46	Refer to item 1.a above		OK	OK
e. Has(ve) the letter(s) of approval been issued by the respective Party's designated national authority (DNA) and is valid for the CDM project activity under validation?	VVM	47	Refer to item 1.a above		OK	OK
f. Is there doubt with respect to the authenticity of the letter of approval?	VVM	48	Refer to item 1.a above		OK	OK
g. If yes, was verified with the DNA that the letter of approval is authentic?	VVM	48	Refer to item 1.a above		OK	OK
<b>2. Participation</b>			<i>PP1 (V&amp;M do Brasil S.A.; V&amp;M Florestal Ltda.)</i>	<i>PP2 (Vallourec Group)</i>		
a. Have all project participants been listed in a consistent manner in the project documentation?	VVM	51	Yes.	Clarify why "Vallourec Group" is included in Annex 1. This PP is not included in section A.3 in the PDD version 1	CL 01	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			(6/10/2011)		



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS		Draft Concl	Final Concl
b. Has the participation of the project participants in the project activity been approved by a Party to the Kyoto Protocol?	VVM	51	Refer to item 1.a above	Refer to CL 01.	CL 01	OK
c. Are the project participants listed in tabular form in section A.3 of the PDD?	VVM	52	Yes.	Refer to CL 01.	CL 01	OK
d. Is the information in section A.3 consistent with the contact details provided in annex 1 of the PDD?	VVM	52	Yes.	Refer to CL 01.	CL 01	OK
e. Has the participation of each of the project participants been approved by at least one Party involved, either in a letter of approval or in a separate letter specifically to approve participation? (Provide reference of the approval document for each of the project participants)	VVM	52	Refer to item 1.a above	Refer to CL 01.	CL 01	OK
f. Are any entities other than those approved as project participants included in these sections of the PDD?	VVM	52	No.		OK	OK
g. Has the approval of participation issued from the relevant DNA?	VVM	53	Refer to item 1.a	Refer to CL 01.	CL 01	OK
h. Is there doubt with respect to (g) above?	VVM	53	No.		OK	OK
i. If yes, was verified with the DNA that the approval of participation is valid for the proposed CDM project participant?	VVM	53	Not applicable		OK	OK
<b>3. Project design document</b>						
a. Is the PDD used as a basis for validation prepared in accordance with the latest template and guidance from the CDM Executive Board available on the UNFCCC CDM website?	VVM	55	Yes. The PDD used as a basis for validation was prepared in accordance with "Clean Development Mechanism Project Design Document Form", (CDM-PDD), v 03 – in effect as of: 28 July 2006.		OK	OK
b. Is the PDD in accordance with the applicable	VVM	56	Refer to item 3.a		OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
CDM requirements for completing the PDD?					
c. In CDM-PDD section A.1 are the following provided?	EB 41	Ann 12			
i. Title of project	EB 41	Ann 12	Yes. "Use of charcoal from renewable biomass originated from forest plantations for the production of primary iron in Vallorec & Mannesmann do Brasil"	OK	OK
ii. Current version number and date of document	EB 41	Ann 12	Version: 01, Dated: 09 March 2012	OK	OK
d. In CDM-PDD section A.2 are following provided (max. one page)?	EB 41	Ann 12			
i. A brief description of the project activity covering purpose which includes the scenario existing prior to the start or project, present scenario and baseline scenario	EB 41	Ann 12	Yes. The project activity proposes the use of renewable charcoal - a solid source of bioenergy produced from sustainably grown woody biomass through dedicated plantations - as the reducing agent in the iron ore reduction process. The use of renewable charcoal in the iron production process results in the replacement of fossil fuel (coal coke). The source of renewable biomass to be used in the production of the reducing agent, in the context of this project activity, will be through the supply of wood from forest areas managed by V&M Florestal (VMFL). The production of iron and steel requires the use of a substance that provides both thermal energy and reducing power to convert iron ore into primary iron (called pig iron). This process is	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			known as the iron ore reduction and is mostly done with the use of coal coke, produced from coal of fossil origin. The global steel production depends on coal since charcoal represents less than 1% of the primary iron reduction in the world (almost 70% of the steel produced today uses coal as reducing agent) <sup>1</sup> . The basic equipment used in this process is the blast furnace.		



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. Explanation on how the GHG emission reductions are effected	EB 41	Ann 12	<p>Please refer to section 3.d.i above.</p> <p>The baseline for this project activity is the use of coal coke as the reducing agent in the production of pig iron (see details in Section B.4 in the PDD). Following the methodology's conservative guidelines, the net difference between baseline upstream emissions (emissions in the extraction of primary carbon sources, i.e. coal mines) and the correspondent project upstream emissions is accounted as zero, although upstream emissions are higher in the baseline.</p> <p>To implement this project activity, V&amp;M has decided to establish a sustainable and new iron ore reduction system, undertaking new investments in two levels:</p> <p>(i) establishment of new dedicated plantations to enable the sustainable production of renewable charcoal, and</p> <p>(ii) substantial refurbishment of the equipments of its iron ore reduction plant , including both blast furnaces and their peripherals in order to use charcoal at the top of the furnace as well as injection system of charcoal fines.</p>	OK	OK
iii. The PP's views on the contribution of project activity to sustainable development	EB 41	Ann 12	<p>Yes. PDD version 1 only mentions that the contribution will be in a document for the DNA. Refer to guidelines for completing PDD (EB41 Annex 12)</p>	CL 08	OK
iv. Are there any changes/modifications compared to the webhosted PDD?	EB 41	Ann 12	<p>There will be as per CARs/CLs raised</p>	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
e. In CDM-PDD section A.3 are following provided in the tabular format?	EB 41	Ann 12			
i. List of project participants and parties	EB 41	Ann 12	Yes. Refer to item 2.1 above	OK	OK
ii. Identification of Host Party					
iii. Indication whether the Party wishes to be considered as project participant	EB 41	Ann 12	Yes.	OK	OK
f. In CDM-PDD section A.4.1 are following provided?	EB 41	Ann 12			
i. Technical description, location, host party(ies) and address as required	EB 41	Ann 12	<p>Yes. The plant is located in Belo Horizonte and dedicated plantations and carbonization units are located in the following municipalities: Brasilândia de Minas, Curvelo, Felixlândia, João Pinheiro, Lagoa Grande, Paineiras, Paraopeba, Abaeté, Morada Nova de Minas and Pompéu.</p> <p>The iron ore reduction system established by the project activity is scattered within the state of Minas Gerais's territory, being the Barreiro's plant (facilities for iron ore reduction) located in the state capital, in the city of Belo Horizonte.</p> <p>The other municipalities mentioned above (carbonization units) are also all located in the State of Minas Gerais, Federative Republic of Brazil.</p> <p>The address of the plant in Belo Horizonte is: V&amp;M do BRASIL S.A. Av. Olinto Meireles 65</p>	OK	OK





## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			Barreiro – BH/MG		



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. Detailed physical location with unique identification of the project activity (eg. Longitude/latitude) – not to exceed one page	EB 41	Ann 12	Yes. The PDD section B.3 (Table 1).	CAR 04	OK
iii. Are there any changes/modifications compared to the webhosted PDD?	EB 41	Ann 12	Yes, following CARs/CLs.	OK	OK
g. In CDM-PDD section A.4.2 is the list of categories of project activities provided?	EB 41	Ann 12	Yes. Sectoral scope 9 (metal production).	OK	OK
h. In CDM-PDD section A.4.3 are following provided?	EB 41	Ann 12		OK	OK
i. A description of how environmentally safe and sound technology, and know-hoe, is transferred to the Host Party(ies)	EB 41	Ann 12	Not applicable; no transfer of technology to the host country	OK	OK
ii. Explanation of purpose of project activity with scenario existing prior to the start of project, scope or present activities and the baseline scenario	EB 41	Ann 12	Yes.	OK	OK
iii. List and arrangement of the main manufacturing/production technologies, systems and equipments involved	EB 41	Ann 12	Yes. The technology employed by this project activity encompasses the most advanced techniques in the iron ore reduction system, including: (i) the production of reducing agents - the adoption of advanced clones and management practices for the establishment of dedicated plantations and carbonization practices based on research and development conducted specifically for the project activity; (ii) the iron ore reduction plant - pig iron production based on blast furnace technology and the use of charcoal fines	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>The technologies applied in the following processes (including its sub-processes) are well explained in the PDD:</p> <ul style="list-style-type: none"> <li>- Technology employed in the production of the reducing agent (Technology used in forestry);</li> <li>- Technology employed in the carbonization process (the proposed project activity consumes the charcoal produced in a project activity which is also applying for CDM</li> <li>- Technology employed in the iron ore reduction process</li> </ul>		


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## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
iv. The emissions sources and GHGs involved	EB 41	Ann 12	Yes. Refer to section B.3 (Table 2) in the PDD and section 3.m.i below	OK	OK
v. Are there any changes/modifications compared to the webhosted PDD?	EB 41	Ann 12	No.	OK	OK
i. In CDM-PDD section A.4.4 is the estimation of emission reductions provided as requested in a tabular format?	EB 41	Ann 12	Yes. Annual average: 790,608 tCO <sub>2</sub> e.	OK	OK
j. In CDM-PDD section A.4.5 is Information regarding Public funding provided?	EB 41	Ann 12	Yes, The project does not involve Official Development Assistance (ODA) or any other source of public financing from Annex 1 countries.	OK	OK
k. In CDM-PDD section B.1 are following provided?	EB 41	Ann 12		OK	OK
i. The approved methodology and version number	EB 41	Ann 12	Yes. AM0082 "Use of charcoal from planted renewable biomass in the iron ore reduction process through the establishment of a new iron ore reduction system", version 01	OK	OK
ii. Any methodologies or tools which the above approved methodology draws upon and their version number	EB 41	Ann 12	* AM0042 - Grid-connected electricity generation using biomass from newly developed dedicated plantation, version 2.1. * ACM0003 - Emissions reduction through partial substitution of fossil fuels with alternative fuels or less carbon intensive fuels in cement or quicklime manufacture, version 7.4.0; * AM0041 - Mitigation of Methane Emissions in the Wood Carbonization Activity for Charcoal Production, version 1; * AR - AM005 - Afforestation and Reforestation project activities implemented for industrial and	CAR 01 CAR 02	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>commercial uses, version 4; Combined tool to identify the baseline scenario and demonstrate additionality, version 03.0.1;</p> <p>* Tool to calculate baseline, project and/or leakage emissions from electricity consumption, version 01;</p> <p>* Tool to calculate project or leakage CO2 emissions from fossil fuel combustion, version 02;</p> <p>* Tool for the identification of degraded or degrading lands for consideration in the implementation of CDM A/R project activities, version 01;</p> <p>* Tool for the estimation of non-CO2 GHG emissions from burning of biomass attributable to an CDM A/R project activity, version 1 (new tool called "Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity", version 03.1.0);</p> <p>* Estimation of direct nitrous oxide emission from nitrogen fertilization, version 01.</p> <p>The PDD applies the "Combined tool to identify the baseline scenario and demonstrate additionality" (version 03.0.1). There is an updated version.</p> <p>The PDD applies the "Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity", version 03.1.0. There is an updated version.</p>		



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
I. In CDM-PDD section B.2 are following provided?	EB 41	Ann 12			
i. Justification of the choice of methodology that the project activity meets each of the applicability conditions	EB 41	Ann 12	Yes.	OK	OK
ii. Documentations with references that had been used. This can be provided in Annex 3 instead	EB 41	Ann 12	The list of documents referred in the PDD shall be presented in a clear manner (e.g. with footnotes or a reference list at the end of the PDD; Annex 3, etc.).	CAR 03	OK
m. In CDM-PDD section B.3 are following provided?	EB 41	Ann 12			
i. Description of all sources and gases included in the project boundary in the table	EB 41	Ann 12	Yes. The table 2 is complete. The sources of gases, per process involved, in both the baseline and project activity scenarios is correct.	OK	OK
ii. A flow diagram of the project boundary physically delineating the project activity	EB 41	Ann 12	Yes.	OK	OK
iii. The flow diagram with all equipments, systems and flows of mass and energy etc.	EB 41	Ann 12	Yes.	OK	OK
n. In CDM-PDD section B.4 are following provided?	EB 41	Ann 12			
i. Explanation how the most plausible baseline scenario is identified in accordance with the selected baseline methodology	EB 41	Ann 12	Yes. Refer to CAR 01.	CAR 01	OK
ii. Justification of key assumptions and rationales	EB 41	Ann 12	Yes. Refer to section (3.n.i) above.	OK	OK
iii. Transparent illustration of all data used to determine the baseline scenario (variables, parameters, data sources, etc.)	EB 41	Ann 12	Yes. Refer to section (3.n.i) above.	OK	OK
iv. A transparent and detailed description of the	EB	Ann	Yes. Refer to section (3.n.i) above.	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed project activity	41	12			
v. Are there any changes/modifications compared to the webhosted PDD?	EB 41	Ann 12	No.	OK	OK
o. In CDM-PDD section B.5 are following provided?	EB 41	Ann 12			
i. Explanation of how and why this project activity is additional and therefore not the baseline scenario in accordance with the selected baseline methodology	EB 41	Ann 12	Refer to CAR 01.	CAR 01	OK
ii. Justification of key assumptions and rationales	EB 41	Ann 12	Yes. Refer to section (3.o.i) above.	OK	OK
iii. Transparent illustration of all data used to determine the baseline scenario (variables, parameters, data sources etc.)	EB 41	Ann 12	Yes.	OK	OK
iv. Evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity, if the starting date of the project activity is before the date of validation	EB 41	Ann 12	Yes. The PDD version 01 refers to two dates where the CDM incentives were seriously considered: - 12/05/2000 - file's minutes of the V&M do Brasil board meeting of the decision on the CDM; - 02/06/2000: Consultancy contract with Eco Securities;  The board's minutes of meeting where CDM was considered was not provided to the DOE	CL 02  CL 03	OK





## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			The consultant contract with Ecosecurites only contains one page and is not dated.		



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
p. In CDM-PDD section B.6.1 are following provided?	EB 41	Ann 12			
i. Explanation as to how the procedures, in the approved methodology to calculate project emissions, baseline emissions, leakage emissions and emission reductions are applied to the proposed project activity	EB 41	Ann 12	<p>Yes. The procedures are correctly applied.</p> <p>The emissions are calculated considering the following:</p> <p><b>Baseline emissions:</b></p> <p>- <u>Baseline upstream emissions</u> The baseline upstream emissions are attributable to the primary carbon extraction, reducing agent production and transportation inside national boundaries within the new iron ore reduction system.</p> <p>For conservativeness purposes the primary carbon sources extraction GHG emissions attributable to the coal mining related activities are not taken into account.</p> <p>1 - Coal coke reducing agent in the baseline scenario</p> <ul style="list-style-type: none"> <li>a) Coal mining emissions</li> <li>b) Emissions from the operation of mining machinery and fugitive methane emissions from coal mines, coal cleaning, ammonium nitrate usage and mine reclamation</li> <li>c) Coal transport to the coal coke production</li> </ul>	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>sites</p> <p>- Option 2: Baseline emissions from transport based on distance traveled by vehicles</p> <p>d) Coal coke production</p> <p>2 – Baseline emissions in the transportation of reducing agent:</p> <p><u>Baseline process emissions</u></p> <p>a) Calculation of the baseline process emissions</p> <p>b) Calculation of emission factor for baseline process emissions</p> <p>c) Calculation of carbon fixation factor under the baseline scenario</p> <p>Calculation of total baseline emissions = 1,204,837 tCO<sub>2</sub>/y</p> <p><b>Project emissions:</b></p> <p>The emissions associated with the upstream component encompass the emissions directly attributable to the renewable charcoal production (including the establishment of the forest dedicated plantation), while the emissions related to the consumption of the renewable charcoal in the iron ore reduction facility are aggregated</p>		



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>under the process emissions component.</p> <p><u>Project upstream emissions</u></p> <p>1 - Emissions in the establishment of plantations and production of biomass</p> <ul style="list-style-type: none"> <li>a. Calculation of CO2 emissions from burning fossil fuels</li> <li>b. CH4 and N2O emissions from the field burning of biomass</li> <li>c. Calculation of nitrous oxide emissions from nitrogen fertilization practices</li> <li>d. Biomass transport to the carbonization sites</li> </ul> <p>- Option 2: Project emissions from transport based on distance traveled by vehicles</p> <p>2 - Emissions in the production of charcoal, the renewable reducing agent.</p> <p>The project activity uses Option 1 (see Annex 2 of AM0082) "Methane emission factor as function of the gravimetric yield" (tonnage of charcoal per tonnage of biomass) to monitor the methane emission factor as per the gravimetric yield results obtained in charcoal production. The gravimetric yield in the carbonization process will be monitored by the project entity according to the provisions of the AM0041 "Mitigation of methane</p>		



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>emissions in the Wood carbonization Activity for Charcoal Production”.</p> <p>3 - Project emissions in the transportation of reducing agent</p> <p>- Option 2: Project emissions from transport based on distance traveled by vehicles</p> <p><u>Project process emissions:</u></p> <ul style="list-style-type: none"> <li>a) Calculation of the project process emissions</li> <li>b) Calculation of project process emission factor</li> <li>c) Calculation of carbon fixation factor</li> </ul> <p>Calculation of total project emissions = 414,229 tCO<sub>2</sub>/y</p> <p><b>Leakage:</b></p> <p>The leakage emissions calculations conservatively followed the procedures to evaluate the change in upstream emissions associated with the establishment of the primary carbon extraction activity. In this sense, activities assessed are the ones that are measurable and attributable to the project activity and occur outside the new iron ore reduction system under the project scenario.</p>		



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>The PDD adopts a conservative approach all those sources of <u>leakage emissions associated with the primary carbon extraction identified in the baseline will be considered as zero</u> as they occur outside the project proponent national boundaries.</p> <p>The planting of dedicated forests within the project activity's boundaries are in the category of forest plantations after its last rotation. These areas were already owned by the business Group and were covered with productive forests before the establishment of the dedicated plantations; no activity displacement took place in these areas.</p> <p>Therefore, <u>leakage emissions associated to primary carbon extraction identified in this project activity are considered zero.</u></p>		



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. Equations used in calculating emission reductions	EB 41	Ann 12	Yes. The equations applied (1) to (24) are in accordance with the methodology.	OK	OK
iii. Explanation and justification for all relevant methodological choices, including different scenarios or cases, options and default values	EB 41	Ann 12	Yes.	OK	OK
q. In CDM-PDD section B.6.2 are following provided?	EB 41	Ann 12			
i. A compilation of information on the data and parameters that are not monitored throughout the crediting period but that are determined only once and thus remains fixed throughout the crediting period AND that are available when validation is undertaken	EB 41	Ann 12	Yes. The following parameters are included in this section in the PDD: 1) Carbon content in percent of in the non-renewable reducing agent i in the baseline scenario; 2) Reducing agent type i (i.e. coal coke) required to produce one tonne of hot metal 3) Reducing agent type i (i.e. pulverized coal) required to produce one tonne of hot metal 4) Emission factor for vehicle type v with fuel type f (diesel) in the baseline scenario and the project scenario 5) Emission factor for vehicle type v with fuel type f (diesel) in the project scenario 6) Number of round trips (to and from) per type v of vehicle had during the year y in the baseline scenario 7) Average round trip distance (to and from) between the reducing agent type v production site (s) and the site of the iron ore reduction facility in the baseline scenario during the year y 8) CO2 emission factor for the type v of vehicle	OK	OK





## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>during the year y in the baseline scenario</p> <p>9) Emission factor to produce one tonne of coal coke in the baseline scenario supply chain</p> <p>10) Global warming potential of methane valid for the commitment period</p> <p>11) Ratio of molecular weights of N<sub>2</sub>O and N (44/28), tonne-N<sub>2</sub>O (t-N)-1</p> <p>12) Emission Factor for emissions from N inputs</p> <p>13) Nitrogen content of synthetic fertilizer type i applied; producers of synthetic fertilizer purchased and used.</p> <p>14) Fraction that volatilizes as NH<sub>3</sub> and NO<sub>x</sub> for synthetic fertilizers</p> <p>15) Weighted average CO<sub>2</sub> emission factor of fuel type I in year y</p> <p>16) Global warming potential of nitrous oxide valid for the commitment period</p>		



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. The actual value applied	EB 41	Ann 12	Yes, tables are complete .	OK	OK
iii. Explanation and justification for the choice of the source of data	EB 41	Ann 12	Yes.	OK	OK
iv. Clear and transparent references or additional documentation in Annex 3	EB 41	Ann 12	Yes.	OK	OK
v. Where values have been measured, a description of the measurement methods and procedures (e.g. which standards have been used), indicated the responsible person/entity having undertaken the measurement, the date of measurement(s) and the measurement results	EB 41	Ann 12	Yes.	OK	OK
r. In CDM-PDD section B.6.3 are following provided?	EB 41	Ann 12			
i. A transparent <i>ex ante</i> calculation of project emissions, baseline emissions (or, where applicable, direct calculation of emission reductions) and leakage emissions expected during the crediting period, applying all relevant equations provided in the approved methodology	EB 41	Ann 12	Yes. The PDD correctly applies the steps and equations contained in the methodology.  Refer to item (3.p.i) for further information.	OK	OK
ii. Documentation how each equation is applied, in a manner that enables the reader to reproduce the calculation	EB 41	Ann 12	Yes, the results can be reproduced.	OK	OK
iii. Additional background information and or data in Annex 3, including relevant electronic files (i.e. spreadsheets)	EB 41	Ann 12	Yes. In summary, the annexes contained in the PDD follow the requirements from the AM0041.	OK	OK
s. In CDM-PDD section B.6.4 are the results of the	EB	Ann	Yes.	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
<i>ex ante</i> estimation of emission reductions for all years of the crediting period, provided in a tabular format?	41	12			
t. In CDM-PDD section B.7.1 are following provided?	EB 41	Ann 12			
i. Specific information on how the data and parameters that need to be monitored would actually be collected during monitoring for the project activity	EB 41	Ann 12	Yes. Data and parameters to be monitored are provided.	OK	OK
ii. For each parameter the following below information, using the table provided:	EB 41	Ann 12			
a. The source(s) of data that will be actually used for the proposed project activity (e.g. which exact national statistics). Where several sources may be used, explain and justify which data sources should be preferred.	EB 41	Ann 12	Yes.	OK	OK
b. Where data or parameters are supposed to be measured, specify the measurement methods and procedures, including a specification which accepted industry standards or national or international standards will be applied, which measurement equipment is used, how the measurement is undertaken, which calibration procedures are applied, what is the accuracy of the measurement method, who is the responsible person/entity that should undertake the measurements and	EB 41	Ann 12	Yes. QA/QC procedures are described.	OK	OK


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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
what is the measurement interval; (i) A description of the QA/QC procedures (if any) that should be applied; (ii) Where relevant: any further comment. Provide any relevant further background documentation in Annex 4.					
u. In CDM-PDD section B.7.2 are following provided?	EB 41	Ann 12			
i. A detailed description of the monitoring plan	EB 41	Ann 12	<p>Yes. The monitoring is under the responsibility of "V&amp;M" and "V&amp;M Florestal". The PDD contains the following topics which describe the monitoring plan procedures:</p> <ul style="list-style-type: none"> <li>- Monitoring of project emissions parameters</li> <li>- Monitoring and calculating project emissions of the new iron ore reduction system</li> <li>- Monitoring of project's activities organizational chart</li> <li>- Monitoring of project's reducing agents component emissions parameters</li> <li>- Monitoring of leakage emissions parameters</li> <li>- Monitoring the project emission reductions through electronic spreadsheet</li> <li>- Standard Operating Procedures and quality control/quality assurance (QA/QC)</li> </ul>	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>The description also focus on the activities related to the following processes:</p> <ul style="list-style-type: none"> <li>- Establishment of plantations</li> <li>- Carbonization of wood (methane emissions)</li> <li>- Hot metal production</li> </ul> <p>Annex 4 in the PDD provides further details on the monitoring arrangements for the proposed project activity.</p>		



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. The operational and management structure that the project operator will implement in order to monitor emission reductions and any leakage effects generated by the project activity	EB 41	Ann 12	Yes. The project proponent has a Quality Management system in place that documents and records the significant activities related to forest establishment, including activities related to site preparation and vegetation affected as part of site preparation.  The monitoring intervals and specific activities/ staff responsibilities are provided in the Standard Operating Procedures, which are based on ISO rationale and are constantly updated based on the continuous improvement approach, including compliance with safety and quality regulations.	OK	OK
iii. The responsibilities for and institutional arrangements for data collection and archiving	EB 41	Ann 12	Yes. Refer to section (3.u.ii) above.	OK	OK
iv. Indication that the monitoring plan reflect good monitoring practice appropriate to the type of project activity	EB 41	Ann 12	Yes. Refer to section (3.u.ii) above.	OK	OK
v. Relevant further background information in Annex 4	EB 41	Ann 12	Yes.	OK	OK
v. In CDM-PDD section B.8 are following provided?	EB 41	Ann 12			
i. Date of completion of the application of the methodology to the project activity study in DD/MM/YYYY	EB 41	Ann 12	Yes. 30/09/2011.	OK	OK
ii. Contact information of the person(s)/entity(ies) responsible for the application of the baseline and monitoring methodology to the project activity	EB 41	Ann 12	Yes.	OK	OK


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iii. Indication if the person/entity is also a project participant listed in Annex 1	EB 41	Ann 12	Yes.	OK	OK
w. In CDM-PDD section C.1.1 are following provided?	EB 41	Ann 12			
i. The starting date of a CDM project activity, which is the earliest of the date(s) on which the implementation or construction or real action of a project activity begins/has begun (EB33, Para 76/CDM Glossary of terms/EB41, Para 67)	EB 41	Ann 12	<p>The PDD states that the starting date for this project activity is 18<sup>th</sup> September 2000, (date of the contract for the general refurbishment of VMB's Blast Furnace 1). The evidence was verified by the validation team.</p> <p>The DOE confirms that this is the earliest date towards the implementation or construction of the project activity.</p>	OK	OK
ii. A description of how this start date has been determined, and a description of the evidence available to support this start date	EB 41	Ann 12	Yes, refer to section (3.w.i).	OK	OK
iii. If this starting date is earlier than the date of publication of the CDM-PDD for global stakeholder consultation by a DOE, description in Section B.5 contain a of how the benefits of the CDM were seriously considered prior to the starting date (EB41, Para 68).	EB 41	Ann 12	<p>Yes.</p> <p>- 12/05/2000 - file's minutes of the V&amp;M do Brasil board meeting of the decision on the CDM; - 02/06/2000: Consultancy contract with Eco Securities;</p> <p>Refer to CL 02 and CL 03</p>	CL 02 CL 03	OK
x. In CDM-PDD section C.1.2 is the expected operational lifetime of the project activity in years and months provided?	EB 41	Ann 12	<p>No.</p> <p>The operational lifetime of the project activity is not clear. Explain in more details how it is</p>	CL 04	OK





## VALIDATION REPORT

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			considered to have “indefinite lifetime” and whether any refurbishments are envisaged or required in the future.		



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
y. In CDM-PDD section C.2 is it stated whether the project activity will use a renewable or a fixed crediting period and is C.2.1 or C.2.2 completed accordingly?	EB 41	Ann 12	Yes, renewable crediting period is chosen.	OK	OK
z. In CDM-PDD section C.2.1 is it indicated that each crediting period shall be at most 7 years and may be renewed at most two times, provided that, for each renewal, a designated operational entity determines and informs the Executive Board that the original project baseline is still valid or has been updated taking account of new data where applicable?	EB 41	Ann 12	Yes	OK	OK
aa. In CDM-PDD section C.2.1.1 are dates in the following format: (DD/MM/YYYY) provided?	EB 41	Ann 12	Yes.	OK	OK
bb. In CDM-PDD section C.2.1.2 is the length of the first crediting period in years and months provided?	EB 41	Ann 12	Yes.	OK	OK
cc. In CDM-PDD section C.2.2 is the fixed crediting period at most ten (10) years provided?	EB 41	Ann 12	Not applicable	OK	OK
dd. In CDM-PDD section C.2.2.1 are the dates provided in the following format: (DD/MM/YYYY)?	EB 41	Ann 12	Not applicable	OK	OK
ee. In CDM-PDD section C.2.2.2 is the length of the crediting period in years and months Provided?	EB 41	Ann 12	Yes.	OK	OK
ff. In CDM-PDD section D.2 are the conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the Host Party, if environmental impacts are considered significant by the project participants	EB 41	Ann 12	Yes. No significant environmental impacts were identified by the PP.  The project activity conforms with all applicable laws and regulations in the host country.	OK	OK



## VALIDATION REPORT

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or the Host, provided?					
gg. In CDM-PDD section E.1 are the following provided?	EB 41	Ann 12			
i. The process by which comments by local stakeholders have been invited and compiled. An invitation for comments by local stakeholders shall be made in an open and transparent manner, in a way that facilitates comments to be received from local stakeholders and allows for a reasonable time for comments to be submitted.	EB 41	Ann 12	<p>Yes. As per Brazilian DNA Resolution # 7 dated 05/03/2008.</p> <p>The mentioned resolution details the local stakeholder process includes:</p> <ul style="list-style-type: none"> <li>involved stakeholders to be invited (City Hall, Municipality Council, Environmental Agency among others)</li> <li>the way to invite involved stakeholders,</li> <li>the confirmation of the invitation</li> <li>the publication of the PDD in local language in a free internet site.</li> </ul> <p>Registered letters with invitation for comments were mailed to the stakeholders below on 16 March 2012, together with extra stamped envelopes for free of charge mailing return of the comments. From the date of mailing of the invitation letters, the CDM-PDD was made available in Portuguese on the website of V&amp;M do Brasil, and at the administrative headquarters located in the Barreiro plant in Belo Horizonte/MG</p>	OK	OK
ii. The project activity is described in a manner, which allows the local stakeholders to understand the project activity, taking into account confidentiality provisions of the CDM	EB 41	Ann 12	Yes, refer to item gg.i above	OK	OK



## VALIDATION REPORT

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modalities and procedures.					
iii. The local stakeholder process has been completed before submitting the proposed project activity to the DOE for validation.	EB 41	Ann 12	Yes. It was done in accordance to Brazilian DNA Resolution. Refer to gg.i above	OK	OK
hh. In CDM-PDD section E.2 are following provided?	EB 41	Ann 12			
i. Identification of local stakeholders that have made comments	EB 41	Ann 12	The project entity received comments from SEMAD – Secretaria de Estado de Meio Ambiente e Desenvolvimento Sustentável (State environmental body), Andrequicé community, Sant’Ana de Caatinga community and Centro de Educação Infantil Arca da Aliança, praising the project’s initiative and emphasizing the project entity’s good relation with the communities.	OK	OK
ii. A summary of this comments.	EB 41	Ann 12	The comments were sent to the validation team. Please refer to section 3.10 in this Validation Report.	OK	OK
ii. In CDM-PDD section E.3 is the explanation of how due account have been taken of comments received from local stakeholders provided?	EB 41	Ann 12	Yes. Refer to point h.ii above	OK	OK
jj. In CDM-PDD Annex 1 are the following provided?	EB 41	Ann 12			
i. Contact information of project participants	EB 41	Ann 12	Clarify why “Vallourec Group” is included in Annex 1. This PP is not included in section A.3 in the PDD version 1 (9/3/12)	CL 01	OK
ii. For each organization listed in section A.3 the following mandatory fields: Organization, Name of contact person, Street, City, Postfix/ZIP, Country, Telephone and Fax or e-mail	EB 41	Ann 12	Yes.	OK	OK


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kk. In CDM-PDD Annex 2 is information from Parties included in Annex I on sources of public funding for the project activity which shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of those Parties provided?	EB 41	Ann 12	Yes. No public funding is involved.	OK	OK
ll. In CDM-PDD Annex 3 is the background information used in the application of the baseline methodology provided?	EB 41	Ann 12	Yes.	OK	OK
mm. In CDM-PDD Annex 4 is the background information used in the application of the monitoring methodology provided?	EB 41	Ann 12	Yes.	OK	OK
<b>4. Project description</b>					
a. Does the PDD contain a clear description of the project activity that provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation?	VVM	58	Yes. Refer to item 3.f.i if this protocol.	OK	OK
b. Is the description of the proposed CDM project activity as contained in the PDD:	VVM	59			
i. sufficiently covering all relevant elements?	VVM	59	Yes.	OK	OK
ii. accurate?	VVM	59	Yes.	OK	OK
iii. providing the reader with a clear understanding of the nature of the proposed CDM project activity?	VVM	59	Yes.	OK	OK
iv. Are there any changes/modifications compared to the webhosted PDD?	VVM	59	There will be as per CARs/CLs raised	OK	OK
c. Is the proposed CDM project activity in existing	VVM	60	Yes. The project activity establishes a new iron	OK	OK



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facilities or utilizing existing equipments?			ore reduction system, in which the project proponent undertook new investments in two levels: (i) establishment of new dedicated plantations to enable the sustainable production of renewable charcoal, and (ii) substantial refurbishment of the equipments of its iron ore reduction plant, including both blast furnaces and their peripherals in order to use charcoal at the top of the furnace as well as injection system of charcoal fines.		
d. Is the CDM project activity one of the following types:	VVM	60			
i. Large scale?	VVM	60	Yes	OK	OK
ii. Non-bundled small scale projects with emission reductions exceeding 15,000 tonnes per year?	VVM	60	Not applicable	OK	OK
iii. Bundled small scale projects, each with emission reductions not exceeding 15,000 tonnes?	VVM	60	Not applicable	OK	OK
e. If yes to (c) and (d) above, was a physical site inspection conducted to confirm that the description in the PDD reflects the proposed CDM project activity, unless other means are specified in the methodology?	VVM	60	<p>A physical site inspection was conducted by the Validation Team between 14<sup>th</sup> and 18<sup>th</sup> of May 2012. The validation team went to the iron ore reduction plant and five (5) farms ("Itapoã", "Santa Cruz", "Diamante", "Galheiros" and "Pindaibas") and confirms, based on actual verification and document review, that the project description in the PDD is accurate and complete.</p> <p>It represents the actual situation both for the iron ore reduction mill and for the forest plantations</p>	OK	OK



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			<p>owned by “V&amp;M Florestal” and therefore the carbonization units for the charcoal production. The carbonization units are part of another CDM project activity implemented by the PP.</p> <p>The list of interviewed people from V&amp;M, V&amp;M Florestal, Plantar Carbon and Charconsulting will be incorporated in the final report.</p>		





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f. If yes to (d.iii) above, was the number of physical site visits base on sampling?	VVM	60	<p>The sampling was based on ISO approved statistical approach used in internal Bureau Veritas ISO audits – i.e square root of the total number of sites (or farms).</p> <p>Hence in this case it is 5 farms (square root of 22 farms is 4.69 - rounded off to 5). This project activity relies on charcoal production originated at 14 of these 22 farms. The eight remaining farms produce charcoal which is used in another CDM project activity implemented by the PP.</p> <p>The validation team conducted an onsite visit on 14<sup>th</sup> of May 2012 to the “Barreiro’s plant” (iron ore reduction plant).</p>	OK	OK
g. If yes is the sampling size appropriately justified through statistical analysis?	VVM	60	Yes, as above.	OK	OK
h. For other individual proposed small scale CDM project activities with emission reductions not exceeding 15,000 tonnes per year, was a physical site inspection conducted?	VVM	61	Not applicable	OK	OK
i. For all other proposed CDM project activities not referred to in paragraphs 59 – 61, was a physical site inspection conducted?	VVM	62	Not applicable	OK	OK
j. If no, was it appropriately justified?	VVM	62	Not applicable	OK	OK
k. Does the proposed CDM project activity involve the alteration of an existing installation or process?	VVM	63	Yes. Refer to item 4.c above	OK	OK
l. If yes, does the project description clearly state	VVM	63	Yes. Refer to item 4.c above	OK	OK


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the differences resulting from the project activity compared to the pre-project situation?					
<b>5. Baseline and monitoring methodology</b>					
<b>a. General requirement</b>					
a. Do the baseline and monitoring methodologies selected by the project participants comply with the methodologies previously approved by the CDM Executive Board?	VVM	65	Yes. The project applies AM0082 version 01. Wherever the PDD refers to "AM0082", the version applied shall be provided.	CAR 04	OK
b. Is the selected methodology applicable to the project activity?	VVM	66	Refer to (5.b.a) below	-	-
c. Had the PP correctly applied the selected methodology?	VVM	66	Refer to (5.b.d) below	-	-
d. Had the selected methodology been correctly applied with respect to project boundary?	VVM	67	Refer to (5.c) below	-	-
e. Had the selected methodology been correctly applied with respect to baseline identification?	VVM	67	Refer to (5.d) below	-	-
f. Had the selected methodology been correctly applied with respect to Algorithms and/or formulae used to determine emission reductions?	VVM	67	Refer to (5.e) below	-	-
g. Had the selected methodology been correctly applied with respect to additionality?	VVM	67	Refer to (section 6) below.	OK	OK
i. Specific questions per methodology regarding application of the methodology with respect to additionality.			Refer to (section 6) below.	OK	OK
h. Had the selected methodology been correctly applied with respect to monitoring methodology?	VVM	67	Refer to (7.f and 7.g) below.	OK	OK
i. Specific questions per methodology regarding application of the methodology with respect to			Refer to (7.f and 7.g) below.	OK	OK



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monitoring methodology.					
<b><i>b. Applicability of the selected methodology to the project activity</i></b>					
a. Is the selected baseline and monitoring methodology, previously approved by the CDM Executive Board, applicable to the project activity, including that the used version valid?	VVM	68	Yes. For detailed questions see item 5.b.d for list of conditions met between the PDD and the selected methodology.	OK	OK
b. Has the DOE applied specific guidance provided by the CDM Executive Board in respect to the applicable approved methodology?	VVM	69	Not applicable.	OK	OK
c. Is the methodology correctly quoted?	VVM	70	Yes.	OK	OK
d. Are the applicability conditions of the methodology met?	VVM	71	Yes.	OK	OK
i. This methodology is applicable to project activities that seek to reduce emissions in the production of iron and steel by using renewable reducing agents such as charcoal produced from dedicated biomass plantations instead of fossil fuel based reducing agents.	AM00 82	Section I	Yes, this is the case in the project activity.	OK	OK
ii. Project activities would generate emission reductions from partial or complete use of renewable reducing agents from dedicated plantations instead of fossil fuel based reducing agents in the iron ore reduction process;	AM00 82	Section I	Yes, the project activity relies entirely on the use of renewable charcoal sourced from dedicated forest plantations which are under the control of the PP.	OK	OK
iii. Blast furnace technology is used in the iron ore reduction process;	AM00 82	Section I	Yes.	OK	OK
iv. The methodology is applicable to project activities that aim at the establishment of new iron ore reduction systems, which are characterized by a new investment. The types of new investment that characterize the establishment of a new iron ore reduction system under	AM00 82	Section I	Yes. The project proponent conducted the following investment types to establish a new iron ore reduction system:  - Type 1: Production of reducing agents from	OK	OK


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<p>this methodology are listed below and, hence, the methodology is only applicable to project activities that encompass within the same project boundary at least one of the following investment types 3, 4 or 5, those have to be combined with the investment Types 1 and/or 2 below;</p> <p>The eligible types of new investments for projects under this methodology are:</p> <p>Type 1: Production of reducing agents to be used in the production of iron and steel by investing in dedicated plantations by the project entity;</p> <p>Type 2: Establishment of specific long-term binding contracts for the supply of reducing agents to be used in the production of iron and steel, i.e., renewable charcoal from dedicated biomass plantations corresponding to a new investment in the dedicated plantation; this eligibility requirement can be fulfilled whether the long term contractor being listed as a project participant or not;</p> <p>Type 3: Refurbishment/replacement of blast furnace;</p> <p>Type 4: Establishment/acquisition of blast furnace;</p> <p>Type 5: Adaptation of existing blast furnace to the use of charcoal.</p>			<p>dedicated plantations by the project entity; and</p> <p>- Type 3: Refurbishment / replacement of blast furnace;</p>		
v. As dedicated plantations are in the project boundary,	AM00	Section	Yes, "Table 1" is provided in the PDD with the	OK	OK


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all the corresponding land has to be geographically identified and delineated using maps or GIS or similar system identified;	82	n I	unique location of each of the 14 farms.		
vi. The renewable reducing agent shall be sourced from dedicated plantations in the host country, which are under the control of project participants. In case the renewable plantation is sourced from long-term contractors, the project participants will have to have control on it, whether the contractor is also a project participant or not.	AM00 82	Section n I	The charcoal is entirely sourced from dedicated plantations under the control of the PP.	OK	OK
vii. The project activity should demonstrate that the reducing agent originates from renewable sources of biomass in the following way:	AM00 82	Section n I			
viii. The dedicated plantation as required by this methodology shall be located only in tropical conditions	AM00 82	Section n I	Yes. The dedicated plantations are located in the state of Minas Gerais, within the tropical zone.	OK	OK
ix. Evidence (e.g., official land use maps, satellite images/aerial photographs, cadastral information, official land use records) demonstrating the location of plantations in the project boundary are established in areas that fall in one or more of the following categories: (i) Grasslands; (ii) Forest plantation after its last rotation; (iii) Degraded areas	AM00 82	Section n I	Yes. The following category applies: (iii) Forest plantation after its last rotation  The validation team has checked the evidences provided and also confirms the location through site visits.	OK	OK
x. The land degradation can be demonstrated using the. "Tool for the identification of degraded or degrading lands for consideration in implementing CDM A/R project activities".	AM00 82	Section n I	Not applicable. Category (ii) was applied in the PDD.	OK	OK
x.i In case the plantation is implemented on land previously hosting a forest plantation after its last	AM00 82	Section n I	The PDD has not demonstrated that the forest plantation is in its last rotation. In line with the	CAR 05	OK



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rotation, it shall be demonstrated that this land would not be replanted in the absence of the project activity. In order to demonstrate that a forest plantation is in its last rotation, the project proponent shall refer to the plantation management practices which are common practice in the region for the considered species.			methodology, the project proponent shall refer to the plantation management practices which are common practice in the region for the considered species.		
x.ii In case the dedicated plantation is covered under a registered A/R CDM project activity, the dedicated plantation shall not be included in the project boundary as per paragraph 38 EB 25. The demonstration that the biomass originates from renewable source is not required in such a situation. In case only a part of the dedicated plantation is covered under a registered A/R project activity this condition is applicable only to this part of the plantations;	AM00 82	Section I	Not applicable.	OK	OK
x.iii The renewable biomass and the charcoal used in the new iron ore reduction system implemented by the project activity shall not be acquired from the market, since leakage in this case cannot be estimated. The acquisition of renewable biomass supplies through long term contracts with a third party is not considered an acquisition from the market, and the corresponding land has to be identified and included in the project boundary (unless it is covered under a registered A/R project activity);	AM00 82	Section I	Yes. The project activity, in its new iron ore reduction system, relies entirely on charcoal from renewable sources, originated from dedicated plantations within the new iron ore reduction system, of which the supply is guaranteed by VMFL, company of the group and project participant entity. This supply will be monitored throughout the life-time of the project.	OK	OK
x.iv In compliance with the paragraph 38 of the twenty-fifth meeting of the Board decision, for cases that demonstrate the supply of reducing agent from biomass projects registered as the A/R CDM project activities,	AM00 82	Section I	Not applicable.	OK	OK



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upstream emissions from biomass production need not be accounted if they are accounted under the respective A/R CDM projects;					
xv. If the renewable biomass is sourced from a plantation registered as an A/R CDM project activity, the first verification of this A/R CDM project activity should take place before the first harvesting of the wood takes place. <sup>9</sup> The DOE shall verify that the plantation registered as an A/R CDM project activity from which the renewable biomass is sourced has generated cumulated net tCERs or ICERs at the time of verification of the CDM project activity under this methodology (i.e., the change of reluctant in an iron ore reduction system.) If this condition is not met the corresponding biomass shall not be eligible for the generation of CERs in the context of this methodology;	AM00 82	Section n I	Not applicable.	OK	OK
xvi. The land area of dedicated biomass plantations shall be established either through direct planting and/or seedling. In case the dedicated plantation is covered under a registered A/R CDM project activity, this condition is not applicable. In case only a part of the dedicated plantation is covered under a registered A/R CDM project activity, this condition is not applicable only to this part of the plantations ;	AM00 82	Section n I	The land area of the project's dedicated plantations is established through direct planting.	OK	OK
xvii. Flood irrigation is not expected to take place on the plantation sites. In case the dedicated plantation is covered under a registered A/R CDM project activity, this condition is not applicable. In case only a part of the dedicated plantation is covered under a registered A/R	AM00 82	Section n I	Flooding irrigation is not practiced by the project entity. Instead, following the forest management plan, the project entity adopts local irrigation only during planting activities and only during the dry season's periods.	OK	OK



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CDM project activity, this condition is not applicable only to this part of the plantations;					
xviii. For at least ten years before the implementation of the project activity, no forest stocks were on the land where the dedicated plantations will be established; this condition does not apply to forest stocks in the form of productive forest plantations;	AM00 82	Section n I	Refer to CAR 05  Clarify whether the forest stocks are in the form of productive forest plantations.	CAR 05  CL 05	OK
xix. In case blast furnace gas is recovered and used outside of the project boundary for electricity and/or heat generation in the baseline situation, the project activity shall provide similar and/or equivalent energy outputs as the ones identified in the baseline scenario aiming to avoid impacts outside the project boundary due to the project implementation;	AM00 82	Section n I	The project entity already monitors the activities of heat/electricity recovery and use within the limits of this project activity through the monitoring of the CDM activity 0143 registered by the Executive Board on 22 January 2006.	OK	OK
xx. In cases the project scenario involves partial consumption of the mineral coke in the projects new iron ore reduction system this methodology is only applicable if the production of the mineral coke is undertaken within the host country (ies). Thus, the methodology is not applicable to project activities that rely on the use of imported mineral coke in the project scenario;	AM00 82	Section n I	This project activity depends entirely on renewable charcoal produced within national borders and under the control of the project participant, through the management of dedicated plantations.	OK	OK
xxi. This methodology is not applicable to cases in which the most plausible baseline scenario is the non renewable charcoal iron ore reduction system or is an iron ore reduction system partially using non renewable charcoal. In order to ensure a conservative assessment of this applicability condition, the use of non-renewable charcoal shall be assessed in the baseline scenario identification procedure, as per the procedures	AM00 82	Section n I	The iron ore reduction system based on non-renewable charcoal is not a plausible baseline scenario for this project activity. The country's legislation restricts the use of non-renewable reducing agents. Thus, the operation of the iron mill based on non-renewable charcoal as the most plausible baseline scenario would be illegal. The most plausible baseline scenario for this project	OK	OK





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presented in the corresponding section of this methodology			activity is the use of coal coke as a reducing agent for the primary iron production		
xxii. Finally, this methodology is only applicable if the most plausible baseline scenario identified is the production of iron and/or steel based on an iron ore reduction system that relies completely or partially on the use of fossil fuel based;	AM00 82	Section n I			
Guidance for the situation when the plantation (or part of) is covered under an A/R CDM project activity;	AM00 82	Section n I			
If the A/R CDM project activity and the project activity covering the iron ore reduction process are part of an integrated development project (which means that the same project proponents are involved in the two CDM activities):	AM00 82	Section n I	Not applicable	OK	OK
The baseline selection and additionality procedures are to be performed, considering the two activities together, which implies that, the investment analysis and/or the barrier analysis shall encompass the iron ore reduction system as a whole (production of the biomass/reluctant and the operation of the steel mill);	AM00 82	Section n I	Not applicable	OK	OK
The demonstration of additionality of the A/R CDM project activity shall also comply with the requirements of the approved A/R CDM methodology;	AM00 82	Section n I	Not applicable	OK	OK
The project proponents shall refer to the integrated process in the two PDDs and shall submit them for registration together although the crediting period of the iron ore reduction activity may only start after the first harvesting of the trees established in the context of the A/R CDM project activity. This last provision may not	AM00 82	Section n I	Not applicable	OK	OK



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apply to A/R CDM project activities already submitted to the Global Stakeholders Process within the CDM validation and registration procedures before the approval of this methodology by the CDM EB.					



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e. Is the project activity expected to result in emissions other than those allowed by the methodology?	VVM	71	No.	OK	OK
f. Is the choice of the methodology justified?	VVM	71	Yes, the choice is justified in a consistent way.	OK	OK
g. Have the project participants shown that the project activity meets each of the applicability conditions or the approved methodology?	VVM	71	Refer to (5.b.d) above	-	-
h. Have the project participants shown that the project activity meets each of the applicability conditions of any tool or other methodology component referred to the methodology?	VVM	71	Refer to (5.b.d) above	OK	OK
i. Specific questions per methodology regarding applicability conditions of any tool or other methodology component referred to the methodology.			Refer to CAR 01	CAR 01	
i. Is the DOE, based on local and sectoral knowledge, aware that comparable information is available from sources other than that used in the PDD?	VVM	71	Yes. The DOE has crosschecked the PDD against credible and reliable sources to confirm that the project activity meets the applicability conditions of the methodology. In summary, the references quoted in the PDD represent the best available information and the DOE could not identify any other source of evidence which would affect the applicability of the methodology to the project activity.	OK	OK
j. If yes, was the PDD cross checked against the other sources to confirm that the project activity meets the applicability conditions of the methodology? (provide the reference to these	VVM	71	Yes. Third party evidences and references were confirmed by the DOE and the project activity is applicable to the methodology.	OK	OK



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choices)					
k. Can a determination regarding the applicability of the selected methodology to the proposed CDM project activity be made?	VVM	72	Refer to CAR 01	CAR 01	OK
l. If no, clarification of the methodology was requested, in accordance with the guidance provided by the CDM Executive Board?	VVM	72	Pending assessment item k above.	OK	OK
m. If answer to (5.b.d) above is "no", revision or deviation from the methodology was requested, in accordance with the guidance provided by the CDM Executive Board?	VVM	73	Not applicable	OK	OK
n. If yes to (5.b.l) and (5.b.m) above, a request for registration was submitted before the CDM Executive Board has approved the proposed deviation or revision?	VVM	74	Not applicable	OK	OK
<b>c. Project boundary</b>					
a. Does the PDD correctly describe the project boundary, including the physical delineation of the proposed CDM project activity included within the project boundary for the purpose of calculating project and baseline emissions for the proposed CDM project activity?	VVM	78	Yes. The project boundary is correctly defined. It includes the following components: <ul style="list-style-type: none"> <li>- dedicated plantations</li> <li>- carbonization units</li> <li>- iron ore reduction process</li> <li>-</li> </ul> The PDD contains a physical delineation of the proposed project activity.	OK	OK
II. Baseline Methodology: Project Boundary	AM00 82	Section II			
The project boundary includes emissions associated with the production of reducing agents (upstream emissions)	AM00 82	Section II	Yes. Both source of emissions are correctly presented in the PDD.	OK	OK



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and emissions associated with use of the reducing agents in the iron ore reduction facility (process emissions).					
The spatial extent of the project boundary is consistent with the iron ore reduction system. It encompasses the geographical area of raw material supply (i.e., coalmines, biomass production sites), units that convert raw material into reducing agents (coke oven facilities that distil coal into coke; and carbonization units that convert wood into charcoal), the transportation of the raw materials and of the reducing agents (i.e., charcoal and coal coke) to the iron ore reduction facility, and the iron ore reduction facility (blast furnace).	AM00 82	Section II	Yes. Refer to item c.a above.	OK	OK
The project emissions are classified into two major categories, within the iron ore reduction system: (i) upstream emissions - extraction of primary carbon, transportation of the primary carbon sources to the reducing agent production units, conversion of the primary carbon sources into reducing agent supply and their transport to the industrial facility; and (ii) process emissions - emissions in the reduction facility.	AM00 82	Section II	Yes.	OK	OK
Upstream emissions: Production of Reducing Agent	AM00 82	Section II			
(i) Emissions associated with the extraction of primary carbon sources: (a) Emissions in the establishment of dedicated plantations; (b) Emissions from coal mining.	AM00 82	Section II	Yes.  (a) Emissions in the establishment of dedicated plantations are correctly presented in the PDD.  (b) Emissions from coal mining were considered	OK	OK



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			as “zero” in the baseline scenario, which is conservative.		
(ii) Emissions from the transport of primary carbon sources to the reducing agent production sites: (a) Emissions from the transportation of renewable biomass to the carbonization units; (b) Emissions from the transportation of coal to the coke production units.	AM00 82	Section II	Yes.  (a) Emissions from the transportation of renewable biomass to the carbonization units are considered;  (b) Emissions from the transportation of coal to the coke production units are considered as “zero”, which is conservative.	OK	OK
(iii) Emissions in the production of the reducing agent: (a) Emissions from the transformation biomass into charcoal (carbonization); (b) Emissions from the transformation of coal into coke.	AM00 82	Section II	Yes.  (a) Emissions from the transformation biomass into charcoal (carbonization) are considered;  (b) Emissions from the transformation of coal into coke are considered.	OK	OK
(iv) The emissions from the transport of reducing agents to the iron ore reduction units: (a) Transportation of renewable reducing agents to the iron reduction facility (i.e. from charcoal processing unit to the iron ore reduction facility); (b) Transportation of non-renewable reducing agents to the iron reduction facility (i.e. from coal coke processing unit to the iron ore reduction facility).	AM00 82	Section II	Yes.  (a) Emissions due to transportation of renewable reducing agents to the iron reduction facility is considered.  (b) Emissions due to transportation of non-renewable reducing agents to the iron reduction facility is considered.	OK	OK



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(v) As per applicability condition, concerning upstream emissions, in case the plantation is part of a registered A/R CDM project activity, the project emissions generated within the corresponding discrete areas shall not be included in the project boundary. As per the applicability conditions if upstream emissions are outside the national boundary of the host country(ies), the methodology is not applicable.	AM00 82	Section II	Not applicable.	OK	OK
Process emissions: Iron Ore Reduction Facility	AM00 82	Section II			
(i) Emissions associated with the use of each reducing agent in the iron ore reduction process;	AM00 82	Section II	Yes.	OK	OK
(ii) Emissions from use of fossil fuel based reducing agents (e.g., coal coke).	AM00 82	Section II	Yes.	OK	OK
Emissions sources included in or excluded from the project boundary	AM00 82	Section II			
Baseline	AM00 82	Section II			
Iron ore Reduction Process Gases – Included (yes) / Not Included (no) CO2 – Yes CH4 – No N2O – No	AM00 82	Section II	CO2 – Yes (main source of baseline emissions) CH4 – No N2O – No	OK	OK



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Reducing agents transportation  CO2 – Yes CH4 – No N2O - No	AM00 82	Section II	CO2 – No (which is conservative) CH4 – No N2O – No	OK	OK
Reducing agent production  CO2 – Yes CH4 – Yes N2O - No	AM00 82	Section II	CO2 – Yes (emissions from coal coke production) CH4 – No (which is conservative) N2O - No	OK	OK
Transportation of primary carbon sources  CO2 – Yes CH4 – No N2O - No	AM00 82	Section II	CO2 – Yes (Fossil fuel combustion) CH4 – No N2O - No	OK	OK





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Primary Carbon Source  CO2 – Yes CH4 – Yes N2O - Yes	AM00 82	Section II	CO2 – No (which is conservative) CH4 – No (which is conservative) N2O - No (which is conservative)	OK	OK
Project Activity	AM00 82	Section II			
Iron ore Reduction Process Gases – Included (yes) / Not Included (no) CO2 – Yes CH4 – No N2O - No	AM00 82	Section II	CO2 – Yes (main source of project emissions) CH4 – No N2O - No	OK	OK



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Reducing agents transportation  CO2 – Yes CH4 – No N2O - No	AM00 82	Section II	CO2 – Yes (fossil fuel combustion) CH4 – No N2O - No	OK	OK
Reducing agent production  CO2 – Yes CH4 – Yes N2O - No	AM00 82	Section II	CO2 – Yes (the biomass is originated from renewable sources; dedicated forest plantations, therefore this source of emissions is carbon neutral) CH4 – Yes (biomass carbonization process) N2O – No	OK	OK
Transportation of primary carbon sources  CO2 – Yes CH4 – No N2O - No	AM00 82	Section II	CO2 – Yes (fossil fuel combustion; machines and vehicles) CH4 – No N2O - No	OK	OK



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Primary Carbon Source  CO2 – Yes CH4 – Yes N2O - Yes	AM00 82	Section II	CO2 – Yes (fossil fuel combustion in the planting) CH4 – No (no biomass burning in the plantation establishment) N2O – Yes (fertilizers)  Provide further explanation that there is no burning of biomass in the establishment of the plantations. The PDD only mentions “forestry management practices”.	CL 06	OK
b. Is the delineation in the PDD of the project boundary correct and include identification of all locations, processes and equipment including secondary equipment and associated processes such as logistics etc.?	VVM	79	Yes, the project boundary is in line with the methodology. The iron ore reduction system boundary is the project boundary.  Geographic information on dedicated plantations and carbonization units is provided.  The Figure 07 in the PDD contains a word in Portuguese (“ar”), which should be corrected.	CAR 06	OK
c. Does the delineation in the PDD of the project boundary meet the requirements of the selected baseline?	VVM	79	Yes. Refer to item above.	OK	OK
d. Have changes been made to the project boundary in comparison to the webhosted PDD. If yes please comment on the reason for the changes.	VVM	79	No.	OK	OK
e. Have all sources and GHGs required by the methodology been included within the project boundary?	VVM	79	Yes, refer to PDD section B.3	OK	OK



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f. Does the methodology allow project participant to choose whether a source or gas is to be included within the project boundary	VVM	79	Not applicable.	OK	OK
g. If yes, have the project participants justified that choice?	VVM	79	Not applicable.	OK	OK
h. If yes, is the justification provided reasonable? (provide reference to the supporting documented evidence provided by the project participants)	VVM	79	Not applicable.	OK	OK
i. Were any emission sources that will be affected by the project activity and are not addressed by the selected approved methodology identified?	VVM	80	No. The validation team is of the opinion that the sources of gases are correctly reflected in the methodology.	OK	OK
j. If yes, was clarification of, revision to or deviation from the methodology requested?	VVM	80	Not applicable.	OK	OK
<b>d. Baseline identification</b>					
a. Does the PDD identify the baseline for the proposed CDM project activity, defined as the scenario that reasonably represents the anthropogenic emissions by sources of GHGs that would occur in the absence of the proposed CDM project activity?	VVM	81	The baseline scenario is identified as "Iron ore reduction system based on the use of coal coke".  Refer to CAR 01	CAR 01	OK
b. Has any procedure contained in the methodology to identify the most reasonable baseline scenario, been correctly applied?	VVM	82	Refer to CAR 01	CAR 01	OK
This methodology is based on the latest version of the .Combined tool to identify the baseline scenario and to demonstrate additionality. The guidance for identification of the baseline scenario is outlined below.	AM00 82	Section II	No. The PDD has applied version 3 of the "Combined tool to identify the baseline scenario and to demonstrate additionality".  Refer to CAR 01	CAR 01	OK



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Step 1: Identification of alternative scenarios	AM00 82	Section II			
Have the following scenarios been considered? <ul style="list-style-type: none"> <li>• Coal coke iron ore reduction system;</li> <li>• Renewable charcoal from planted biomass from existing plantations for iron ore reduction system;</li> <li>• Renewable charcoal from planted biomass from new plantations for iron ore reduction system;</li> <li>• Non renewable charcoal based iron ore reduction system;</li> <li>• Iron ore reduction system based on the use of a mix of the previous reducing agents.</li> </ul>	AM00 82	Section II	Yes, all realistic scenarios have been discussed. <ul style="list-style-type: none"> <li>• <u>Alternative Scenario 1</u> - Iron ore reduction system based on the use of coal coke;</li> <li>• <u>Alternative Scenario 2</u> - Iron ore reduction system based on the use of renewable charcoal, originated from new forest plantations (project scenario);</li> <li>• <u>Alternative Scenario 3</u> - Iron ore reduction system based on the use of non-renewable charcoal (originated from non-renewable sources);</li> <li>• <u>Alternative Scenario 4</u> - Iron ore reduction system based on the use of a mix of reducing agents;</li> <li>• <u>Alternative Scenario 5</u> - Iron ore reduction system based on the use of renewable charcoal from planted biomass originated from existing plantations.</li> </ul> Refer to CAR 01	CAR 01	OK
Guidance on how to address the mix of reducing agents as an alternative scenario	AM00 82	Section II			
In light of applicable laws of regulations, the legal permissions to use a mix of reducing agents in the iron ore reduction process, e.g., fossil and biogenic shall be assessed.	AM00 82	Section II	Yes, the mix of reducing agents has been discussed in the PDD. There are no regulations in the state of Minas Gerais, that restrict the use of mix of reducing agents in the reducing.	OK	OK
The procedure shall identify if this alternative is legal. If it	AM00	Section	The operational limits on the mixed use of	OK	OK



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is not, this alternative shall not be further assessed in the baseline selection process. In case it is legal to use a mix of reducing agents, shall be assessed and identified if there is any guidance available or restriction applicable limiting the use of mix of reducing agents under local/national legislation. If applicable, the guidance/restrictions under relevant legislation is required to be assessed in the baseline scenario selection process. In case there is no guidance or restriction in local/national regulations, the operational limits on the mixed use of reducing agents in the iron ore reduction process shall be assessed, as per the criteria outlined in the decision tree below, which includes: (i) Locally available data; (ii) Scientific literature and/or industry or sectoral publications; (iii) Third party expert assessment.	82	n II	reducing agents in the iron ore reduction system is based on locally available data and industry and sectoral publications.  There is no limit to a mix of renewable charcoal and coal coke.  Since non renewable charcoal would be illegal, it was not considered in mix possibilities, which is appropriate.		
Is the decision tree contained in the methodology applied?	AM00 82	Section n II	Yes	OK	OK
Sub-step 1a: Compliance with actual laws and regulations. Has the PDD correctly applied the sub-steps below?	AM00 82	Section n II			
The alternatives listed shall be analyzed in the context of applicable laws and regulations. Only those consistent with current legislation shall be given further consideration.	AM00 82	Section n II	Yes. The remaining alternative scenarios in compliance with current legislation are Scenarios 1, 2, 4 and 5.	OK	OK
The project participants shall outline the steps to demonstrate the consistency of alternatives in the context of local and national regulation with respect to	AM00 82	Section n II	Yes.	OK	OK



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production and use of reducing agents					
In the context of renewable reducing agent, policies related to land use, incentives and constraints, including credit and technology shall be assessed to evaluate the impact of policy and regulation on the use of reducing agents in the iron ore reduction process.	AM00 82	Section II	Yes.	OK	OK
Sub-step 1b: Assessment of supply and demand of reducing agents	AM00 82	Section II	Yes, the PDD's discussion is complete and accurate.	OK	OK
Does the PDD present the assessment and conclusion to the supply and demand of reducing agents (both at "sectoral" and "project" levels)?	AM00 82	Section II	Yes.  The plausible remaining alternative scenarios for the project activity, after Step 1b, are Scenarios 1, 2, and 4.	OK	OK
Step 2: Barrier Analysis	AM00 82	Section II			
Does the PDD follow the rationale provided in the Step 2 of the .Combined tool to identify the baseline scenario and to demonstrate additionality?	AM00 82	Section II	Yes. The identified barriers include: a) Barriers/incentives to investment and financing b) Sectoral and policy barriers c) Technical and/or regulatory barriers, e.g. different environmental licensing requirements for different reducing agents.	OK	OK
Does the PDD present a discussion on the barriers and incentives that influence the use of reducing agents in the production of iron and/or steel and possible sources of market failures, such as the impacts of: • Subsidies; • Taxes; • Historical and/or current national and/or sector	AM00 82	Section II	Yes.  Refer to CAR 01.	CAR 01	OK



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<p>policies;</p> <ul style="list-style-type: none"> <li>Barriers and incentives to investment, e.g. the type and availability of debt funding required ensuring long-term supplies of reducing agents such as establishment of forest plantations, technological barriers in the iron ore reduction process, economies of scale, logistic arrangements etc.</li> <li>Regulatory barriers, e.g. different environmental licensing requirements for different reducing agents.</li> </ul>					
<p>The barrier analysis may be applied to the integrated iron ore reduction system including:</p> <p>(1) The production and supply of the renewable reducing agent (establishment of plantations and production of charcoal); and</p> <p>(2) The industrial process (iron ore reduction using a blast furnace technology).</p>	AM00 82	Section II	Yes, the barriers are applied to the integrated iron ore reduction system.	OK	OK
<p>It is good practice to use long-term data, taking into account the factors influencing the production and use of reducing agents. Considering the long-term maturity period associated with the establishment of plantation resources, a minimum period of 10 years prior to the start of the project activity shall be considered.</p>	AM00 82	Section II	Yes, long term data and sources is applied in the PDD and the respective sources are confirmed by the validation team.	OK	OK
<p>Guidance for situation when the plantation (or part of) is covered under an A/R CDM project activity</p>	AM00 82	Section II	Not applicable	OK	OK
<p>If the A/R CDM activity and the activity covering the iron ore reduction process in the mill are two independent project activities (which may imply also that project proponents are different) then:</p> <ul style="list-style-type: none"> <li>A barrier related to the implementation of the</li> </ul>	AM00 82	Section II	Not applicable	OK	OK





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plantation cannot be used for the project activity covering the iron ore reduction process in the mill.					
<p>If the A/R CDM project activity and the project activity covering the iron ore reduction process are part of an integrated development project (which means that the same project proponents are to be involved in the two CDM activities) then:</p> <ul style="list-style-type: none"> <li>• A barrier related to the implementation of the plantation can also be used by the iron ore reduction activity only if it can be proven that there is no reliable renewable wood supply available in the region, which could meet the demand of charcoal for the iron ore reduction process in the mill, as per the outcome of the Sub-step 1b above.</li> </ul>	AM00 82	Section II	Not applicable	OK	OK
Step 3: Investment Analysis	AM00 82	Section II	Not applicable	OK	OK
<p>- Has any investment analysis been conducted?</p> <p>- If yes, was it consistent with the guidance of item 2 of the latest version of the <b>“Tool for the demonstration and assessment of additionality”</b>?</p> <p>- If there were more than one alternatives, was the most attractive alternative chosen as the most plausible baseline scenario?</p>	AM00 82	Section II	<p>No. According to the "Combined tool to identify the baseline scenario and demonstrate additionality", version 03.0.1, the investment analysis is not applicable to this proposed project activity once the Step 2 above has resulted in only one realistic alternative scenario, the coal coke based iron ore reduction system (Alternative Scenario 1).</p> <p>Refer to CAR 01</p>	CAR 01	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
Step 4: Common practice test	AM00 82	Section II			
Has the PDD applied the common practice test to the plausible alternatives taking into account the following items:	AM00 82	Section II	Yes.	OK	OK
The national scenario for iron ore reduction shall be assessed, taking into account the use of reducing agents in either solid (pig iron manufacturing) or liquid (hot metal used in steelmaking) forms;	AM00 82	Section II	It is not clear whether the national scenario for iron ore reduction have been assessed, taking into account the use of reducing agents in either solid (pig iron manufacturing) or liquid (hot metal used in steelmaking) forms.  Furthermore, also clarify Figure 18 in the PDD (page 46). It is not clear what are the reducing agents used in each of these new projects (to be established by 2012).	CL 07 CL 08	OK
The assessment of the sector level data shall only be based on the legally available forms and alternatives of reducing agents options to the iron and steel industry. Therefore, the PP shall consider local, regional and national laws and regulations concerning the use of each of reducing agents (including mix of reducing agents) in the assessment of the common practice within the industry;	AM00 82	Section II	Yes.	OK	OK
Historical and existing sector trends shall be taken into account in light of the relationship between supply and demand of reducing agents;	AM00 82	Section II	Yes.	OK	OK
The common practice test shall be based on publicly available data and/or technical/scientific assessment	AM00 82	Section II	Yes.	OK	OK



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demonstrating the historical and trends patterns of the industry in using each specific reducing agents alternative in the baseline.					
This methodology is only applicable if the most plausible baseline scenario identified is the production of iron and/or steel based on an iron ore reduction system that relies completely or partially on the use of fossil fuel based.	AM00 82	Section II	Refer to CAR 01, CL 07 and CL 08.	CAR 01  CL 07  CL 08	OK



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c. Does the selected methodology require use of tools (such as the “Tool for the demonstration and assessment of additionality” and the “Combined tool to identify the baseline scenario and demonstrate additionality”) to establish the baseline scenario?	VVM	82	Refer to CAR 01.  The methodology does not require the use of the “Tool for the demonstration and assessment of additionality”.	CAR 01	OK
d. If yes, was the methodology consulted on the application of the tools? (In such cases, the guidance in the methodology shall supersede the tool.)	VVM	82	Yes.	OK	OK
i. Has the latest “Combined tool to identify the baseline scenario and demonstrate additionality”	AM00 82	Section II	No. Refer to CAR 01	CAR 01	OK
e. Does the methodology require several alternative scenarios to be considered in the identification of the most reasonable baseline scenario?	VVM	83	Yes.	OK	OK
f. If yes, are all scenarios that are considered by the project participants and are supplementary to those required by the methodology reasonable in the context of the proposed CDM project activity?	VVM	83	Only the scenarios required by the methodology have been considered by the Project Participants.	OK	OK
g. Has any reasonable alternative scenario been excluded?	VVM	83	No.	OK	OK
h. Is the baseline scenario identified reasonably supported by:	VVM	84			
i. Assumptions?	VVM	84	Yes.	OK	OK
ii. Calculations?	VVM	84	Yes.	OK	OK
iii. Rationales?	VVM	84	Yes.	OK	OK
i. Are the documents and sources referred to in the PDD correctly quoted and interpreted?	VVM	84	Yes.	OK	OK


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j. Was the information provided in the PDD cross checked with other verifiable and credible sources, such as local expert opinion, if available? (identify the sources)	VVM	84	Yes.	OK	OK
k. Have all applicable CDM requirements been taken into account in the identification of the baseline scenario for the proposed CDM project activity?	VVM	85	Yes.	OK	OK
l. Have all relevant policies and circumstances been identified and correctly considered in the PDD, in accordance with the guidance by the CDM Executive Board?	VVM	85	Yes.	OK	OK
m. Does the PDD provide a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed CDM project activity?	VVM	86	Yes.	OK	OK
<i>e. Algorithms and/or formulae used to determine emission reductions</i>					
a. Do the steps taken and equations applied to calculate project emissions, baseline emissions, leakage and emission reductions comply with the requirements of the selected baseline and monitoring?	VVM	89	Yes.	OK	OK
b. Have the equations and parameters in the PDD been correctly applied with respect those in the select approved methodology?	VVM	90	Yes. Detailed in the PDD and its calculation spreadsheets.	OK	OK
bib Baseline emissions	AM00	Sectio			



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
	82	n II – page1 5			
(a) Baseline upstream emissions represent emissions associated with production of reducing agents and their transportation (from the extraction to transformation sites; and from transformation sites to iron ore reduction facility);	AM00 82	Section II – page1 5	Yes.	OK	OK
(b) Baseline process emissions associated with the use of reducing agents within the iron ore reduction process in the absence of project.	AM00 82	Section II – page1 5	Yes.	OK	OK
(c) Are the baseline emissions calculated as per the formula below:  $BE_y = RAE_{BL,y} + IRE_{BL,y}$	AM00 82	Section II – page1 5	Yes.	OK	OK
b. ii Baseline upstream emissions	AM00 82	Section II – page1 5			
(a) Upstream emissions are detailed in Annex 1. The detailed procedure laid out in Annex 1 can only be applied for the calculation of the upstream emissions if the upstream processes are under the control of the project participants. If one or several upstream steps are not under control of the project proponents, the alternatives as explained after each step in Annex 1 shall	AM00 82	Section II – page1 5	Yes. Following the methodology's conservative guidelines, the net difference between baseline upstream emissions (emissions in the extraction of primary carbon sources, i.e. coal mines) and the correspondent project upstream emissions is accounted as zero, although upstream emissions are higher in the baseline.	OK	OK



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be used instead of the detailed calculation. It should be noted that monitoring tables (including those in sections of data/parameters to be monitored and not monitored) include all the variables contained in the Annex 1.			The baseline scenario encompasses only the use of coal coke as reducing agent in the new iron ore reduction system, no emissions associated to the establishment of plantation shall be considered in the upstream baseline emission calculations.		
(b) If a same reducing agent (reluctant) is used both in the baseline and the project situations, the project proponents shall use the same emission factors for the upstream steps (for baseline and project situations) unless they can carefully justify why these values should be different in the two situations.	AM00 82	Section II – page 1 5	Not applicable.	OK	OK
(c) The baseline upstream emissions are attributable to the production and transportation of reducing agents to the iron ore facility. For conservativeness and simplification purposes, the project proponent shall only account upstream emissions that occur within the national boundary. In addition, taking into account the cost-effectiveness, simplification good practices and conservativeness rationale, the project proponent may choose to neglect all or part of the baseline upstream emissions.	AM00 82	Section II – page 1 6	Refer to item bias above	OK	OK
(d) Is the assessment of baseline upstream emissions carried out as per the equation below:  $RAE_{BL,y} = PCE_{BL,y} + RAP_{BL,RA,y} + RAT_{Vehicle,BL,y}$	AM00 82	Section II – page 1 6	Yes. Refer to section B.6.1 in the PDD (“baseline upstream emissions”).	OK	OK
(e) If the identified baseline scenario involves: (1) The complete use of coal coke as reducing agent in	AM00 82	Section II –	Coal mining emissions are not considered in the PDD, which is conservative.	OK	OK



## VALIDATION REPORT

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the iron ore reduction system: Baseline upstream emissions shall take into account GHG emissions attributable to coal mining, coal coke production and transportation to the iron ore facility;		page1 6			
(f) If the identified baseline scenario involves: (2) The use of renewable and non-renewable reducing agent mix in the iron ore reduction system: Baseline upstream emissions shall take into account GHG emissions attributable to the fossil fuel reducing agent and renewable charcoal activities in proportion to their use in the iron ore reduction system.	AM00 82	Section II – page1 6	Not applicable.	OK	OK
Baseline process emissions	AM00 82	Section II – page 16			
(a) The GHG emissions attributable to emissions in the iron ore reduction process under the baseline scenario are calculated as per the expected hot metal production of the new iron ore reduction system.	AM00 82	Section II – page 16	Yes.	OK	OK
(b) If the baseline iron ore reduction system was used by the project proponents before the start of the project activity, historical information shall be used to derive the baseline emission factors.	AM00 82	Section II – page 16	Not applicable.	OK	OK
(c) If the project participant have historically used charcoal, but the baseline scenario is a coal coke based iron ore reduction system (or corresponds to a mixed use of renewable and non renewable reluctant), then the calculation of baseline process emissions shall be based on the Engineering data/Feasibility study developed for	AM00 82	Section II – page 16	Yes, values applied are based on metallurgical engineering expert report and capped value by the methodology.	OK	OK




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the assessment of this baseline option by the project developer. For reasons of conservativeness the ratio of use of coal coke per tonne of hot metal is to be capped by the value provided in IPCC 2006 Guidelines i.e. 0.358 t coal coke/tonne hot metal. This cap shall also be applied in case of a mixed iron ore reduction process i.e. 0.358 t [coal coke + charcoal] / tonne hot metal.					
Calculation of the baseline process emissions	AM00 82	Section II – page 17			
Are they calculated as per the formula below: $IRE_{BL,y} = (P_{PJ,y} \cdot EF_{Ind,BL}) - (P_{PJ,y} \cdot C_{CHM,BL,y} \cdot \frac{44}{12})$	AM00 82	Section II – page 17	Yes.	OK	OK
Calculation of emission factor for baseline process emissions	AM00 82	Section II – page 17			
In this step, the definition of emission factor is strictly associated with the type of reducing agent on which the iron ore reduction system is based as per the baseline and additionality assessment. Baseline emission factor for baseline process emissions shall be calculated as follows. $EF_{Ind,BL} = \sum_i \frac{(\%C_{BL,i} \cdot RA_{BL,i})}{100} \cdot \frac{44}{12}$	AM00 82	Section II – page 17	Yes.	OK	OK



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c. Calculation of carbon fixation factor under the baseline scenario  $Cc_{HM, BL, y} = \frac{\%C_{HM, PJ, y}}{100}$	AM00 82	Section II – page 17	Yes.  Clarify what does the following statement in the PDD mean: “The percentage of carbon in the hot metal in the project situation was conservatively considered as 0.” (PDD page 57)	CL 09	OK
Project Emissions	AM00 82	Section II – page 18			
(a) Project upstream emissions represent emissions associated with production of reducing agents and their transportation in the project scenario (from the extraction to transformation sites; and from transformation sites to iron ore reduction facility). (b) Project process emissions associated with the use of reducing agents within the iron ore reduction process in the project scenario.	AM00 82	Section II – page 18	Yes. Project upstream streams are considered. Project process emissions are zero (renewable charcoal from dedicated forest plantations is used in the blast furnace).	OK	OK
The following equations outline the calculation of the project emissions from two components of the projects, i.e., process emissions and upstream emissions.  $PE_y = RAE_{PJ, y} + IRE_{PJ, y}$	AM00 82	Section II – page 18	Yes.	OK	OK
Project upstream emissions	AM00 82	Section II – page 18			


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Upstream emissions are detailed in Annex 2. The detailed procedure laid out in Annex 2 can only be applied for the calculation of the upstream emissions if the upstream processes are under the control of the project participants. If one or several upstream steps are not under control of the project proponents, the alternatives as explained after each step in Annex 2 shall be used instead of the detailed calculation.	AM00 82	Section II – page 18	Yes. Annex 2 is applied to calculate the emissions attributable to the establishment of the dedicated plantations in lands of plantations after last rotation. The project activity also applies “Option 1” (as per Annex 2 of AM0082) “Methane emission factor as function of the gravimetric yield” (tonnage of charcoal per tonnage of biomass) to monitor the methane emission factor as per the gravimetric yield results obtained in charcoal production. The gravimetric yield in the carbonization process will be monitored by the project entity according to the provisions of the AM0041 “Mitigation of methane emissions in the Wood carbonization Activity for Charcoal Production”.	OK	OK
The upstream emissions are attributable to the production and transport of reducing agents to the iron ore facility due to the project activity implementation. As per the applicability conditions the planted biomass establishment and supplies of the new iron reduction system shall be located at project activity host country. In this sense project proponents shall only account upstream emissions that occur within the national boundary.	AM00 82	Section II – page 18	Yes, only upstream emissions which occur within the national boundary are accounted for.	OK	OK
The project upstream emissions calculations shall be carried out as outlined below: $RAE_{PJ,y} = PCE_{PJ,y} + RAP_{PJ, RA,y} + RAT_{Vehicle,PJ,y}$	AM00 82	Section II – page 18	Yes, as per Equation (11) in the PDD.	OK	OK



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<p>If the investment decision of the project proponent involves:</p> <p>(1) New planted biomass charcoal based iron ore reduction system: Project upstream emissions shall take into account the emissions attributable to the plantation establishment, renewable charcoal production and its transportation to the iron ore facility. In case total or part of the dedicated plantation is covered under a registered A/R CDM project activity, the GHG emissions related to the corresponding area of land shall not be accounted in the project upstream emissions, in compliance with the paragraph 38 of the twenty-fifth meeting of the Board decision</p>	AM00 82	Section II – page 19	Yes, the emissions attributable to the plantation establishment, renewable charcoal production and its transportation to the iron ore facility are correctly considered in the PDD. Equations (12) to (20) in the PDD.	OK	OK
<p>If the investment decision of the project proponent involves:</p> <p>(2) New iron ore reduction system based on use of a mix of reducing agents: Project upstream emissions shall take into account the emissions attributable to the fossil fuel reducing agent and renewable reducing agent production and transport in proportion to their use in the iron ore reduction system under the project scenario. As per the applicability conditions in cases the project scenario involves a partial consumption of the mineral coke this methodology is only applicable if the production of the mineral coke is undertaken within the host country (ies).</p>	AM00 82	Section II – page 19	Not applicable.	OK	OK

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Project process emissions: The process emissions from the use of reducing agent in the new iron ore reduction process shall be calculated using the steps outlined below:	AM00 82	Section II – page 19			
a. Calculation of the project process emissions $IRE_{PJ, y} = (P_{PJ, y} \cdot EF_{Ind, PJ, y}) - (P_{PJ, y} \cdot C_{cHM, PJ, y} \cdot \frac{44}{12})$	AM00 82	Section II – page 19	Yes, equation (21) in the PDD.	OK	OK
b. Calculation of project process emission factor $EF_{Ind, PJ, y} = \sum_i \frac{(\%C_{PJ, i} \cdot RA_{PJ, i})}{100} \cdot \frac{44}{12}$	AM00 82	Section II – page 20	Yes, equation (22) in the PDD.	OK	OK
In this step the definition of the emission factor is strictly associated with the type of reducing agent on which the new iron ore reduction system is based. The emission factor calculation shall follow the rationale below based on the reducing agents adopted in the project scenario. Project process emissions shall be calculated using the following formula:	AM00 82	Section II – page 20	Yes, equation (23) in the PDD.	OK	OK
c. Calculation of carbon fixation factor $C_{cHM, PJ, y}$ $C_{cHM, PJ, y} = \frac{\%C_{HM, PJ, y}}{100}$	AM00 82	Section II – page 20	Yes, equation (23) in the PDD.	OK	OK
Leakage					
Are the emissions from activities that are measurable and attributable to the project activity and that occur	AM00 82	Section II –	There is no displacement of economic activities / households which occurred in the establishment	OK	OK



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outside the iron ore reduction system under the project scenario relative to the baseline taken into account?		page 21	of the dedicated plantations. Leakage emissions associated with coal mining in the baseline are conservatively not taken into account. Leakage is considered to be zero.		
Information shall be collected and relevant emissions are calculated in order to assess the leakage emissions from the project activity.	AM0082	Section II – page 21	Yes.	OK	OK
Leakage emissions of this activity of the primary carbon extraction (dedicated plantations) should only be accounted if the corresponding area is not part of a registered A/R CDM project.	AM0082	Section II – page 21	Not applicable.	OK	OK
The increased emissions from the displacement of economic activities such as harvest of fuel wood for meeting domestic energy needs and use of lands as pastures for grazing/fodder collection are taken into account for calculation of leakage associated with production of biomass resources needed for producing charcoal.	AM0082	Section II – page 21	Yes, they do not occur.	OK	OK
Leakage associated with the displacement of economic activities of households shall be assessed and if they are identified and attributable to the project activity. In case project plantations are part of a registered A/R CDM activity this condition is not applicable to the corresponding areas.	AM0082	Section II – page 21	There is no displacement of economic activities of households).	OK	OK
The assessment of leakage emissions under this methodology is carried out considering emissions associated with primary carbon extraction activities, in the project scenario relative to the emissions of the	AM0082	Section II – page 21	Yes. Equation (24) in the PDD.	OK	OK


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baseline scenario.  $LK_y = LK_{PJ, Activity\_Disp, y} - LK_{BL, Activity\_Disp, y}$					
Determination of activity displacement	AM00 82	Section II – page 22			
Activity displacement is expected to occur in the economic activities associated with land uses within the project area and attributable to the project activity shift to areas outside the project increasing emissions in areas outside the project boundary. The following steps enable the assessment of activity displacement.	AM00 82	Section II – page 22			
a. No activity displacement No displacement of activities associated with the project is expected from the project and $LK_{Activity\_Disp, t = 0}$ if:	AM00 82	Section II – page 22			
<ul style="list-style-type: none"> <li>Project participants shall evaluate the product supplies from the project with those from the baseline scenario to determine the balance between the product supplies of both scenarios. For example, if the primary carbon extraction activities do not affect the amount of products that were produced prior to the project, no activity displacement can be expected to occur as a result of the implementation of the primary carbon extraction activity. Suitable evidence shall be presented at the time of project validation;</li> </ul>	AM00 82	Section II – page 22	<p>The planting of dedicated forests within the project activity's boundaries are in the category of forest plantations after its last rotation. These areas were already owned by the business Group and were covered with productive forests before the establishment of the dedicated plantations; no activity displacement took place in these areas.</p> <p>Further substantiate that the planting of dedicated forests within the project activity's boundaries are</p>	CAR 05	OK



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<ul style="list-style-type: none"> <li>Leakage prevention activities are implemented as part of the project so that activity displacement from the project is prevented. The evidence on the leakage prevention activities implemented in the project shall be presented at the time of project validation;</li> <li>Area outside the project serves as temporary (seasonal) substitute to provide the foregone goods from the project;</li> <li>Pre-project activities are displaced to the areas outside the project boundary that have lower biomass compared to the areas of the project from which land use activities are displaced as a result of the project. The evidence in this regard should be in the form of official records demonstrating that the areas where economic activities are displaced to have biomass volume equals to or less than the ones identified in the area of the project from which the activity(ies) displacement occurred. In situations other than those described above, activity displacement and land use change is assumed to occur outside the project. The assessment and quantification of such activity displacement shall be undertaken using the methods outlined below.</li> </ul>			<p>in the category of forest plantations after its last rotation.</p> <p>Refer to CAR 05.</p>		
b. Activity displacement					
If the displacement of households or the shifting of pre-project activities results in biomass losses that can be reasonably attributed to the project activity, then emissions from activity displacement occur. The displacement of economic activities from a primary carbon extraction activity to areas outside the project	AM00 82	Section II – page 22	Not applicable.	OK	OK





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boundary can have potential impacts on the land use in terms of the loss of vegetation due to conversion to other land uses or due to prolonged and unregulated harvest of forest products such as fuel wood. The categories of activities considered under activity displacement are represented below.					
<ul style="list-style-type: none"> <li>Land use change . conversion of forest land outside the project boundary to agriculture, grazing and other land uses;</li> <li>Degradation of biomass resources . from the prolonged harvest of fuel wood.</li> </ul>	AM00 82	Section II – page 23	Not applicable.	OK	OK
Emission reductions					
Upstream emissions are to be counted in the emission reduction calculation only in case the project upstream emissions are higher than the baseline upstream emissions.	AM00 82	Section II – page 23	Not applicable.	OK	OK
Despite the interdependency among the components of the iron ore reduction system, the differences in the total estimation of upstream emissions (production of reducing agents) in the baseline and upstream emissions in the project shall be accounted as zero if these emissions in baseline are higher than those of the project. Thus only emissions reductions based on the use of renewable reducing agents in the iron ore reduction facility will generate CERs.	AM00 82	Section II – page 23	Yes.	OK	OK
Formula: $ER_y = BE_y - PE_y - LE_y - MAX(0, RAE_{BL,y} - RAE_{PJ,y})$	AM00 82	Section II – page 23			



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Data and Parameters not monitored	AM00 82	Section II – pages 23-31															
<table><tr><td>Data / Parameter:</td><td>%C<sub>BL,i</sub></td></tr><tr><td>Data unit:</td><td>%</td></tr><tr><td>Description:</td><td>Carbon content in percent of in the non-renewable reducing agent <i>i</i> in the baseline scenario</td></tr><tr><td>Source of data:</td><td>Refer to Baseline Emissions section for applicable guidance</td></tr><tr><td>Measurement procedures (if any):</td><td>N/A</td></tr><tr><td>Any comment:</td><td>The carbon content of renewable reducing agent shall be considered zero as this carbon is neutral due to its renewable biomass dedicated plantations origin</td></tr></table>	Data / Parameter:	%C <sub>BL,i</sub>	Data unit:	%	Description:	Carbon content in percent of in the non-renewable reducing agent <i>i</i> in the baseline scenario	Source of data:	Refer to Baseline Emissions section for applicable guidance	Measurement procedures (if any):	N/A	Any comment:	The carbon content of renewable reducing agent shall be considered zero as this carbon is neutral due to its renewable biomass dedicated plantations origin	AM00 82	Section II – pages 23-31	Data / Parameter: %C BL,i Data unit: % Description: Carbon content in percent of in the non-renewable reducing agent <i>i</i> in the baseline scenario Source of data: SAMPAIO 2001, table 6 Measurement procedures (if any): Data used for baseline assessment based on a report made by a metallurgical engineering expert Value applied: 87% Any comment: N/A	OK	OK
Data / Parameter:	%C <sub>BL,i</sub>																
Data unit:	%																
Description:	Carbon content in percent of in the non-renewable reducing agent <i>i</i> in the baseline scenario																
Source of data:	Refer to Baseline Emissions section for applicable guidance																
Measurement procedures (if any):	N/A																
Any comment:	The carbon content of renewable reducing agent shall be considered zero as this carbon is neutral due to its renewable biomass dedicated plantations origin																
<table><tr><td>Data / Parameter:</td><td>RA<sub>BL,i</sub></td></tr><tr><td>Data unit:</td><td>tonne of reducing agent/tonne of hot metal</td></tr><tr><td>Description:</td><td>Reducing agent type <i>i</i> (i.e., coal coke) required to produce one tonne of hot metal</td></tr><tr><td>Source of data:</td><td>Refer to Baseline Emissions section, for applicable guidance</td></tr><tr><td>Measurement procedures (if any):</td><td>N/A</td></tr><tr><td>Any comment:</td><td></td></tr></table>	Data / Parameter:	RA <sub>BL,i</sub>	Data unit:	tonne of reducing agent/tonne of hot metal	Description:	Reducing agent type <i>i</i> (i.e., coal coke) required to produce one tonne of hot metal	Source of data:	Refer to Baseline Emissions section, for applicable guidance	Measurement procedures (if any):	N/A	Any comment:		AM00 82	Section II – pages 23-31	Data / Parameter: RA BL, <i>i</i> Data unit: tonne of reducing agent/ tonne of hot metal Description: Reducing agent type <i>i</i> (i.e. coal coke) required to produce one tonne of hot metal Source of data: AM0082 Measurement procedures (if any): Data to assess the baseline are taken from a metallurgic expert report = 0.358 tons of reducing agent. The above used datum was established as cap, as per the methodology AM0082 provisions. Value applied: 0.358 Any comment: N/A	OK	OK
Data / Parameter:	RA <sub>BL,i</sub>																
Data unit:	tonne of reducing agent/tonne of hot metal																
Description:	Reducing agent type <i>i</i> (i.e., coal coke) required to produce one tonne of hot metal																
Source of data:	Refer to Baseline Emissions section, for applicable guidance																
Measurement procedures (if any):	N/A																
Any comment:																	



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			<p>Data / Parameter: BL, i RA</p> <p>Data unit: tonne of reducing agent/ tonne of hot metal</p> <p>Description: Reducing agent type i (i.e. pulverized coal) required to produce one tonne of hot Metal</p> <p>Source of data: SAMPAIO 2001</p> <p>Measurement procedures (if any):</p> <p>Data to assess the baseline are taken from a metallurgic expert report.</p> <p>Value applied: 0.174</p> <p>Any comment: N/A</p>		



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Data / Parameter:	$EF_{vf, BL}$	AM00 82	Section II – pages 23-31	Data / Parameter: EF vf BL , Data unit: kg CO2/litre Description: Emission factor for vehicle type v with fuel type f (diesel) in the baseline scenario and the project scenario Source of data: GHG Protocol Brazilian Program, 2010, <a href="http://www.ghgprotocolbrasil.com.br/">http://www.ghgprotocolbrasil.com.br/</a> and 2006 IPCC Guidelines for National GHG Inventories, Volume 2, Chapter 1, Table 1.4 Value applied: 2.622312 Measurement procedures (if any): Calculated (see Section B.6.1) Any comment: Diesel is the fuel used by the project entity. Vehicle type: Train Calculated using IPCC lower limit 72600 kgCO2e/TJ	OK	OK										
Data unit:	kg CO <sub>2</sub> litre <sup>-1</sup>															
Description:	Emission factor for vehicle type v with fuel type f in the baseline scenario															
Source of data:	The following data sources may be used if the relevant conditions apply:															
<table><tr><th>Data source</th><th>Conditions for using the data source</th></tr><tr><td>a) Values provided by the fuel supplier in invoices;</td><td>This is the preferred source</td></tr><tr><td>b) Measurements by the project participants;</td><td>If a) is not available.</td></tr><tr><td>c) Regional or national default values;</td><td>If a) is not available</td></tr><tr><td>d) IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol.2 (Energy) of 2006 IPCC Guidelines on National GHG Inventories.</td><td>These sources can only be used for liquid fuels and should be based on well-documented, reliable sources (such as national energy balances) If a) is not available</td></tr></table>							Data source	Conditions for using the data source	a) Values provided by the fuel supplier in invoices;	This is the preferred source	b) Measurements by the project participants;	If a) is not available.	c) Regional or national default values;	If a) is not available	d) IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol.2 (Energy) of 2006 IPCC Guidelines on National GHG Inventories.	These sources can only be used for liquid fuels and should be based on well-documented, reliable sources (such as national energy balances) If a) is not available
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Measurement procedures (if any):	For a) and b): Measurements should be undertaken in line with national or international standards For a): If the fuel supplier does provide the NCV value and the CO <sub>2</sub> emissions factor on the invoice and these two values are based on measurements for this specific fuel, the CO <sub>2</sub> factor should be used. If option a) is not available then options b), c) or d) should be used															
Any comment:																
Data / Parameter:	$n_{vf, BL, y}$	AM00 82	Section II – pages 23-31	N/A. Option 2 is applied. Baseline emissions from transport based on distance traveled by vehicles	OK	OK										
Data unit:	Unit numbers															
Description:	Number of vehicles type v with fuel type f in year y in the baseline scenario															
Source of data:	Refer to Baseline Emissions section for applicable guidance															
Measurement procedures (if any):	N/A															
Any comment:																
Data / Parameter:	$k_{vf, BL, y}$	AM00 82	Section II – pages 23-31	N/A. Option 2 is applied. Baseline emissions from transport based on distance traveled by vehicles	OK	OK										
Data unit:	km per year y															
Description:	Kilometers travelled by each of vehicle type v with fuel type f in the baseline scenario															
Source of data:	Refer to Baseline Emissions section for applicable guidance															
Measurement procedures (if any):	N/A															
Any comment:																


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CHECKLIST QUESTION		Ref.	§	COMMENTS	Draft Concl	Final Concl
Data / Parameter:	$e_{vf, BL}$	AM00 82	Section II – pages 23-31	N/A. Option 2 is applied. Baseline emissions from transport based on distance traveled by vehicles	OK	OK
Data unit:	Litre/km					
Description:	Average fuel consumption of vehicle type $v$ with fuel type $f$ in the baseline scenario					
Source of data:	Refer to Baseline Emissions section for applicable guidance					
Measurement procedures (if any):	N/A					
Any comment:						
Data / Parameter:	$v_{BL}$	AM00 82	Section II – pages 23-31	N/A. Option 2 is applied. Baseline emissions from transport based on distance traveled by vehicles	OK	OK
Data unit:	Unit numbers					
Description:	vehicle type in the baseline scenario					
Source of data:	Refer to Baseline Emissions section for applicable guidance					
Measurement procedures (if any):	N/A					
Any comment:						
Data / Parameter:	$f_{BL}$	AM00 82	Section II – pages 23-31	N/A. Option 2 is applied. Baseline emissions from transport based on distance traveled by vehicles	OK	OK
Data unit:	Unit numbers					
Description:	fuel type in the baseline scenario					
Source of data:	Refer to Baseline Emissions section for applicable guidance					
Measurement procedures (if any):	N/A					
Any comment:						



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CHECKLIST QUESTION		Ref.	§	COMMENTS	Draft Concl	Final Concl										
<b>Data / Parameter:</b>	F <sub>BL, machine, y</sub>	AM00 82	Section II – pages 23-31	N/A	OK	OK										
<b>Data unit:</b>	tCO <sub>2</sub> /t Coal															
<b>Description:</b>	GHG emissions from fossil fuel consumption due to the coal mining machinery in the baseline scenario during year y															
<b>Source of data:</b>	<div>The following data sources may be used if the relevant conditions apply:<table><tr><th>Data source</th><th>Conditions for using the data source</th></tr><tr><td>a) Values provided by the fuel supplier in invoices;</td><td>This is the preferred source</td></tr><tr><td>b) Measurements by the project participants;</td><td>If a) is not available.</td></tr><tr><td>c) Regional or national default values;</td><td>If a) is not available These sources can only be used for liquid fuels and should be based on well-documented, reliable sources (such as national energy balances)</td></tr><tr><td>d) IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol.2 (Energy) of 2006 IPCC Guidelines on National GHG Inventories.</td><td>If a) is not available</td></tr></table></div>						Data source	Conditions for using the data source	a) Values provided by the fuel supplier in invoices;	This is the preferred source	b) Measurements by the project participants;	If a) is not available.	c) Regional or national default values;	If a) is not available These sources can only be used for liquid fuels and should be based on well-documented, reliable sources (such as national energy balances)	d) IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol.2 (Energy) of 2006 IPCC Guidelines on National GHG Inventories.	If a) is not available
Data source	Conditions for using the data source															
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<b>Measurement procedures (if any):</b>	For a) and b): Measurements should be undertaken in line with national or international standards For a): If the fuel supplier does provide the NCV value and the CO <sub>2</sub> emissions factor on the invoice and these two values are based on measurements for this specific fuel, the CO <sub>2</sub> factor should be used. If option a) is not available then options b), c) or d) should be used															
<b>Any comment:</b>	Use the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” to estimate this factor. One time value based on conservative minimum consumption of electricity can be used to determine the annual electricity consumption. The data on coal has to be collected from actual data of mines															
<b>Data / Parameter:</b>	E <sub>BL, machine, y</sub>	AM00 82	Section II – pages 23-31	N/A	OK	OK										
<b>Data unit:</b>	tCO <sub>2</sub> /t Coal															
<b>Description:</b>	GHG emissions from electricity consumption due to the coal mining machinery in the baseline scenario during year y															
<b>Source of data:</b>	Use the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” to estimate this factor. One time value based on minimum consumption of electricity can be used to determine the annual electricity consumption. The data on coal has to be collected from actual data of mines. Refer to Baseline Emissions section for applicable guidance															
<b>Measurement procedures (if any):</b>	N/A															
<b>Any comment:</b>																



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## VALIDATION REPORT

CHECKLIST QUESTION		Ref.	§	COMMENTS	Draft Concl	Final Concl
Data / Parameter:	F <sub>BL, fugitive, y</sub>	AM00 82	Section n II – pages 23-31	N/A	OK	OK
Data unit:	tCO <sub>2</sub> (e)/t Coal					
Description:	CH <sub>4</sub> fugitive emissions due to the coal mining activity in the baseline scenario during year y					
Source of data:	Refer to Baseline Emissions section for applicable guidance					
Measurement procedures (if any):	N/A					
Any comment:	Use Methane GWP factor of 21 to covert CH <sub>4</sub> emissions to CO <sub>2</sub> emissions					
Data / Parameter:	E <sub>BL, clean, y</sub>	AM00 82	Section n II – pages 23-31	N/A	OK	OK
Data unit:	tCO <sub>2</sub> /t Coal					
Description:	Electricity consumption GHG emissions due to the coal cleaning activities in the baseline scenario during year y					
Source of data:	Use the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" to estimate this factor. One time value based on conservative minimum consumption of electricity can be used to determine the annual electricity consumption. The data on coal has to be collected from actual data of mines Refer to Baseline Emissions section for applicable guidance					
Measurement procedures (if any):	N/A					
Any comment:	N/A					
Data / Parameter:	E <sub>BL, Am, y</sub>	AM00 82	Section n II – pages 23-31	N/A	OK	OK
Data unit:	tCO <sub>2</sub> /t Coal					
Description:	GHG emissions due to the use of ammonium nitrate and mine reclamation activities in the baseline scenario during year y					
Source of data:	Refer to Baseline Emissions section for applicable guidance					
Measurement procedures (if any):	N/A					
Any comment:	N/A					
Data / Parameter:	N <sub>V, BL, y</sub>	AM00 82	Section n II – pages 23-31	Data / Parameter: NV, BL,y Data unit: Unit numbers Description: Number of round trips (to and from) per type v of vehicle had during the year y in the baseline scenario Source of data: Vale mining company (see: <a href="http://www.vale.com">http://www.vale.com</a> ) Measurement procedures (if any): Calculated (see Section B.6.1, Baseline Emissions, Item 1 (c)) Value applied: 138.85	OK	OK
Data unit:	Unit numbers					
Description:	Number of round trips (to and from) per type v of vehicle had during the year y in the baseline scenario					
Source of data:	Refer to Baseline Emissions section for applicable guidance					
Measurement procedures (if any):	Estimated					
Any comment:	Monitoring number of round trips per vehicle type v in year y					





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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			Any comment: Train transportation is not considered as round trip as a train does not return empty to its point of departure; it is always loaded with some other type of cargo to make the return travel and therefore this different cargo transportation is not accounted.		
Data / Parameter: $AVD_{i,BL,y}$ Data unit: KM Description: Average round trip distance (to and from) between the biomass $v$ production site (s) and the site of plantation during the year $y$ in the baseline scenario (km); Source of data: Refer to Baseline Emissions section for applicable guidance Measurement procedures (if any): Estimated Any comment:	AM00 82	Section II – pages 23-31	N/A	OK	OK
Data / Parameter: $AVD_{j,BL,y}$ Data unit: KM Description: Average round trip distance (to and from) between the reducing agent type $v$ production site (s) and the site of the iron ore reduction facility in the baseline scenario during the year $y$ Source of data: Refer to Baseline Emissions section for applicable guidance Measurement procedures (if any): Estimated Any comment:	AM00 82	Section II – pages 23-31	Data / Parameter: $AVD_{j,BL,y}$ Data unit: Km Description: Average round trip distance (to and from) between the reducing agent type $v$ production site (s) and the site of the iron ore reduction facility in the baseline scenario during the year $y$ Source of data: Average distance estimated based on road map (Source: Google Maps, 2010) Measurement procedures (if any): Distance from Itaguaí (Sepetiba seaport) to Belo Horizonte/MG (mill) Value applied: 474 Any comment: Train transportation is not considered as round trip as a train does not return empty to its point of departure; it is always loaded with some other type of cargo to make the return travel and therefore this	OK	OK





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## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl												
			different cargo transportation is not accounted.														
<table><tr><td>Data / Parameter:</td><td>EF<sub>v, km, CO2, BL, y</sub></td></tr><tr><td>Data unit:</td><td>tCO<sub>2</sub>/km</td></tr><tr><td>Description:</td><td>CO<sub>2</sub> emission factor for the type v of vehicle during the year y in the baseline scenario</td></tr><tr><td>Source of data:</td><td>Refer to Baseline Emissions section for applicable guidance</td></tr><tr><td>Measurement procedures (if any):</td><td>N/A</td></tr><tr><td>Any comment:</td><td></td></tr></table>	Data / Parameter:	EF <sub>v, km, CO2, BL, y</sub>	Data unit:	tCO <sub>2</sub> /km	Description:	CO <sub>2</sub> emission factor for the type v of vehicle during the year y in the baseline scenario	Source of data:	Refer to Baseline Emissions section for applicable guidance	Measurement procedures (if any):	N/A	Any comment:		AM00 82	Section II – pages 23-31	Data / Parameter: EF v, km, CO2, BL, y Data unit: tCO2/km Description: CO2 emission factor for the type v of vehicle during the year y in the baseline scenario Source of data: ANTT/Vale, 2009; GHG Protocol Brazilian Program, 2010; IPCC, 2006 Measurement procedures (if any): Calculated (see Section B.6.1, Baseline Emissions, Item 1 (c)) Value applied: 0.02589 Any comment: Vehicle type: Train	OK	OK
Data / Parameter:	EF <sub>v, km, CO2, BL, y</sub>																
Data unit:	tCO <sub>2</sub> /km																
Description:	CO <sub>2</sub> emission factor for the type v of vehicle during the year y in the baseline scenario																
Source of data:	Refer to Baseline Emissions section for applicable guidance																
Measurement procedures (if any):	N/A																
Any comment:																	
<table><tr><td>Data / Parameter:</td><td>EF<sub>CO2e, coal coke, BL, y</sub></td></tr><tr><td>Data unit:</td><td>tCO<sub>2</sub>e/ t of Coal coke</td></tr><tr><td>Description:</td><td>Emission factor to produce one tonne of coal coke in the baseline scenario</td></tr><tr><td>Source of data:</td><td>Refer to Baseline Emissions section for applicable guidance</td></tr><tr><td>Measurement procedures (if any):</td><td>Estimated</td></tr><tr><td>Any comment:</td><td></td></tr></table>	Data / Parameter:	EF <sub>CO2e, coal coke, BL, y</sub>	Data unit:	tCO <sub>2</sub> e/ t of Coal coke	Description:	Emission factor to produce one tonne of coal coke in the baseline scenario	Source of data:	Refer to Baseline Emissions section for applicable guidance	Measurement procedures (if any):	Estimated	Any comment:		AM00 82	Section II – pages 23-31	Data / Parameter: EF CO2e, coal coke, BL, y Data unit: tCO2e/ t of coal coke Description: Emission factor to produce one tonne of coal coke in the baseline scenario supply chain Source of data: AM0082, Annex 1, Table 3 and SAMPAIO, 2001 Measurement procedures (if any): Calculated (see Section B.6.1, Baseline Emissions, Item 1 (d)) Value applied: 0.537 Any comment: N/A	OK	OK
Data / Parameter:	EF <sub>CO2e, coal coke, BL, y</sub>																
Data unit:	tCO <sub>2</sub> e/ t of Coal coke																
Description:	Emission factor to produce one tonne of coal coke in the baseline scenario																
Source of data:	Refer to Baseline Emissions section for applicable guidance																
Measurement procedures (if any):	Estimated																
Any comment:																	



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## VALIDATION REPORT

CHECKLIST QUESTION		Ref.	§	COMMENTS	Draft Concl	Final Concl
Data / Parameter:	EF <sub>CH4, charcoal, BL, y</sub>	AM00 82	Section II – pages 23-31	N/A	OK	OK
Data unit:	tCH <sub>4</sub> / t of charcoal					
Description:	Emission Factor to produce one tonne of renewable charcoal identified in the baseline scenario					
Source of data:	Refer to Baseline Emissions section for applicable guidance					
Measurement procedures (if any):	N/A					
Any comment:	N/A					
Data / Parameter:	F <sub>BL, charcoal</sub>	AM00 82	Section II – pages 23-31	N/A	OK	OK
Data unit:	t charcoal/t of hot metal					
Description:	Quantity of charcoal necessary to produce one tonne of hot metal in the baseline scenario					
Source of data:	Refer to Baseline Emissions section for applicable guidance					
Measurement procedures (if any):	N/A					
Any comment:	N/A					
Data / Parameter:	GWP <sub>CH4</sub>	AM00 82	Section II – pages 23-31	Data / Parameter: GWP CH4 Data unit: (tCO <sub>2e</sub> /tCH <sub>4</sub> ) Description: Global warming potential of methane valid for the commitment period Source of data: IPCC default Measurement procedures (if any): N/A Value applied: 21 Any comment: N/A	OK	OK
Data unit:	(tCO <sub>2e</sub> /tCH <sub>4</sub> )					
Description:	Global warming potential of methane valid for the commitment period					
Source of data:	IPCC 2006 guidelines					
Measurement procedures (if any):	N/A					
Any comment:	N/A					
Data / Parameter:	Y <sub>BL</sub>	AM00 82	Section II – pages 23-31	N/A	OK	OK
Data unit:	t charcoal/ t wood on dry basis					
Description:	Carbonization gravimetric yield in the baseline scenario					
Source of data:	Refer to Baseline Emissions section for applicable guidance					
Measurement procedures (if any):	N/A					
Any comment:						
Data / Parameter:	kWh <sub>BL</sub>	AM00 82	Section II – pages 23-31	No blast furnace gas is recovered and used outside of the project boundary for electricity and/or heat generation purposes. The project entity already monitors the activities of blast furnace gas recovery for heat and electricity	OK	OK
Data unit:	KiloWatt					
Description:	Electricity generation from blast furnace recovered gas in the baseline scenario					
Source of data:	Measuring device					
Measurement procedures (if any):	Check the measuring device for power generation and consumption					
Any comment:	Data collected from internal sources of an average of minimum 3 years of electricity generation. Measurement occurs continuously					



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## VALIDATION REPORT

CHECKLIST QUESTION		Ref.	§	COMMENTS	Draft Concl	Final Concl
				generation through the monitoring of the CDM Project 0143, registered by the Executive Board on 22 January 2006. However, the heat and electricity generated is used within this project activity boundary.		
Data / Parameter:	$EF_{diesel.PJ} \cdot EF_{gasoline.PJ}$	AM00 82	Section II – pages 23-31	0.0027018 tCO <sub>2</sub> /l of diesel * 0.5 of diesel/km	OK	OK
Data unit:	Kg CO <sub>2</sub> /t			Gasoline is not applicable		
Description:	Emission factor for road transportation (diesel and gasoline) in the project scenario					
Source of data:	GPG 2000, IPCC Guidelines					
Measurement procedures (if any):	Estimated					
Any comment:	N/A	AM00 82	Section II – pages 23-31	Not applicable, the project activity applies Option 2 from the “Tool to calculate project or leakage CO <sub>2</sub> emissions from fossil fuel combustion”, version 02.	OK	OK
Data / Parameter:	$C_F$					
Data unit:	Dimensionless					
Description:	Combustion factor, accounting for the proportion of fuel that is actually burnt					
Source of data:	Based on IPCC/public available data					
Measurement procedures (if any):	N/A					
Monitoring frequency:	Every seven years					
QA/QC procedures:	N/A					
Any comment:	N/A					



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## VALIDATION REPORT

CHECKLIST QUESTION		Ref.	§	COMMENTS	Draft Concl	Final Concl								
Data / Parameter:	$EF_{v,PJ}$	AM00 82	Section II – pages 23-31	Data / Parameter: vf PJ EF ,	OK	OK								
Data unit:	kg CO <sub>2</sub> /litre			Data unit: kg CO <sub>2</sub> /litre										
Description:	Emission factor for vehicle type v with fuel type f in the project scenario			Description: Emission factor for vehicle type v with fuel type f (diesel) in the project scenario										
Source of data:	The following data sources may be used if the relevant conditions apply:			Source of data: GHG Protocol Brazilian Program, 2010, <a href="http://www.ghgprotocolbrasil.com.br/">http://www.ghgprotocolbrasil.com.br/</a> and 2006 IPCC Guidelines for National GHG Inventories, Volume 2, Chapter 1, Table 1.4										
	<table><tr><th>Data source</th><th>Conditions for using the data source</th></tr><tr><td>a) Values provided by the fuel supplier in invoices;</td><td>This is the preferred source</td></tr><tr><td>b) Measurements by the project participants;</td><td>If a) is not available.</td></tr><tr><td>c) Regional or national default values;</td><td>If a) is not available</td></tr><tr><td></td><td>These sources can only be used for liquid fuels and should be based on well-documented, reliable sources (such as national energy balances)</td></tr><tr><td>d) GPG 2000 or  IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol.2 (Energy) of 2006 IPCC Guidelines on National GHG Inventories.</td><td>If a) is not available</td></tr></table>			Data source			Conditions for using the data source	a) Values provided by the fuel supplier in invoices;	This is the preferred source	b) Measurements by the project participants;	If a) is not available.	c) Regional or national default values;	If a) is not available	
Data source	Conditions for using the data source													
a) Values provided by the fuel supplier in invoices;	This is the preferred source													
b) Measurements by the project participants;	If a) is not available.													
c) Regional or national default values;	If a) is not available													
	These sources can only be used for liquid fuels and should be based on well-documented, reliable sources (such as national energy balances)													
d) GPG 2000 or  IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol.2 (Energy) of 2006 IPCC Guidelines on National GHG Inventories.	If a) is not available													
Measurement procedures (if any):	For a) and b): Measurements should be undertaken in line with national or international standards For a): If the fuel supplier does provide the NCV value and the CO <sub>2</sub> emissions factor on the invoice and these two values are based on measurements for this specific fuel, the CO <sub>2</sub> factor should be used. If option a) is not available then options b), c) or d) should be used			Measurement procedures (if any): Calculated (see Section B.6.1) Any comment: Diesel is the fuel used by the project entity. Vehicle type: Truck Calculated using IPCC upper limit 74800 kgCO <sub>2</sub> e/TJ This parameter is the same value as parameter i, y COEF , CO <sub>2</sub> emission coefficient of fuel type i in year y (t CO <sub>2</sub> /l)										
Any comment:														
Data / Parameter:	$EF_{v, km, CO_2, PJ, y}$	AM00 82	Section II – pages 23-31	Data / Parameter: v, km,CO <sub>2</sub> , PJ,y EF	OK	OK								
Data unit:	tCO <sub>2</sub> /km			Data unit: tCO <sub>2</sub> /km										
Description:	CO <sub>2</sub> emission factor for the type v of vehicle during the year y in the project scenario			Description: CO <sub>2</sub> emission factor for the type v of vehicle during year y in the project scenario										
Source of data:	Project monitoring data			Source of data: GHG Protocol Brazilian Program 2010 and Project entity records										
Measurement procedures (if any):	IPCC 2006			Measurement procedures (if any): Calculated (see calculation in Section B.6.1, Project Upstream Emissions, item 1, (d)) and item 3, respectively.										
Any comment:														



## VALIDATION REPORT

CHECKLIST QUESTION		Ref.	§	COMMENTS	Draft Concl	Final Concl
				Value applied: 0.00135 and 0.00363		
Data / Parameter:	CF	AM00 82	Section II – pages 23-31	Not applicable, no displacement of households or activities.	OK	OK
Data unit:	tonnes C (tonne d.m.)-1					
Description:	Carbon fraction of dry biomass					
Source of data:	IPCC default					
Measurement procedures (if any):	N/A					
Any comment:						


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## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
c. Does the methodology provide for selection between different options for equations or parameters?	VVM	90	The equations and parameters have been defined in line with the methodology.	OK	OK
d. If yes, has adequate justification been provided (based on the choice of the baseline scenario, context of the proposed CDM project activity and other evidence provided)?	VVM	90	Yes. Justification has been provided in accordance with the applied methodology.	OK	OK
e. If yes, have correct equations and parameters been used, in accordance with the methodology selected?	VVM	90	Refer to (5.e.b) above	-	-
f. Will data and parameters be monitored throughout the crediting period of the proposed CDM project activity?	VVM	91	Yes.	OK	OK
g. If no, and these data and parameters will remain fixed throughout the crediting period, are all data sources and assumptions:	VVM	91	Not applicable.	OK	OK
i. Appropriate and correct?	VVM	91	Yes.	OK	OK
ii. Applicable to the proposed CDM project activity?	VVM	91	Yes.	OK	OK
iii. Resulting in a conservative estimate of the emission reductions?	VVM	91	Yes.	OK	OK
h. Will data and parameters be monitored on implementation and hence become available only after validation of the project activity?	VVM	91	No	OK	OK
i. If yes, are the estimates provided in the PDD for these data and parameters reasonable?	VVM	91	Not applicable.	OK	OK
<b>6. Additionality of a project activity</b>					
a. Does the PDD describe how a proposed CDM project activity is additional?	VVM	94	The PDD applied the "Combined tool to identify the baseline scenario and demonstrate	CAR 01 CL 02	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>additionality" (version 03.0.1).</p> <p>Refer to section 3k.ii above.</p> <p>Refer to CAR 01</p> <p>The project start date is considered to be: 18/09/2000: Contract for the general refurbishment of Blast Furnace 1</p> <p>The prior consideration of the CDM is presented with:</p> <ul style="list-style-type: none"> <li>* 12/05/2000: file's minutes of the V&amp;M do Brasil board meeting of the decision on the CDM;</li> <li>* 02/06/2000: Consultancy contract with Eco Securities.</li> </ul> <p>Refer to CL 02 and CL03</p>	CL 03	



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
b. Were the following steps of the tool to assess additionality used:	EB 39	Ann 10			
i. Identification of alternatives to the project activity?	EB 39	Ann 10	Refer to CAR 01	CAR 01	OK
ii. Investment analysis to determine that the proposed project activity is either: 1) not the most economically or financially attractive, or 2) not economically or financially feasible?	EB 39	Ann 10	Not applicable.	OK	OK
iii. Barriers analysis?	EB 39	Ann 10	Refer to CAR 01	CAR 01	OK
iv. Common practice analysis?	EB 39	Ann 10	Refer to CAR 01	CAR 01	OK
c. In step 1 (i) have all the sub-steps as below been followed?	EB 39	Ann 10	The PDD has applied "Combined tool to identify the baseline scenario and demonstrate additionality" (version 03.0.1). The steps below are not applicable as the methodology does not refer to the Tool for Additionality.	OK	OK
i. Sub-step 1a: Define alternatives to the project activity	EB 39	Ann 10	Not applicable. As above.	OK	OK
ii. Sub-step 1b: Consistency with mandatory laws and regulations	EB 39	Ann 10	Not applicable. As above.	OK	OK
d. Have the following alternatives been included while defining alternatives as per sub-step 1a?	EB 39	Ann 10	Not applicable. As above.	OK	OK
i. (a) The proposed project activity undertaken without being registered as a CDM project activity;	EB 39	Ann 10	Not applicable. As above.	OK	OK
ii. (b) Other realistic and credible alternative scenario(s) to the proposed CDM project activity scenario that deliver outputs services or	EB 39	Ann 10	Not applicable. As above.	OK	OK





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services with comparable quality, properties and application areas, taking into account, where relevant, examples of scenarios identified in the underlying methodology;					
iii. (c) If applicable, continuation of the current situation (no project activity or other alternatives undertaken).	EB 39	Ann 10	Not applicable. As above.	OK	OK
e. Has the project participant included the technologies or practices that provide outputs or services with comparable quality, properties and application areas as the proposed CDM project activity and that have been implemented previously or are currently being introduced in the relevant country/region?	EB 39	Ann 10	Not applicable. As above.	OK	OK
f. Has the outcome of Step 1a: Identified realistic and credible alternative scenario(s) to the project activity done correctly? Please briefly mention the outcome.	EB 39	Ann 10	Not applicable. As above.	OK	OK
g. Is the alternative(s) in compliance with all mandatory applicable legal and regulatory requirements, even if these laws and regulations have objectives other than GHG reductions, e.g. to mitigate local air pollution.?	EB 39	Ann 10	Not applicable. As above.	OK	OK
h. If an alternative does not comply with all mandatory applicable legislation and regulations, has it been shown that, based on an examination of current practice in the country or region in which the law or regulation applies, those applicable legal or regulatory requirements are	EB 39	Ann 10	Not applicable. As above.	OK	OK



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systematically not enforced and that noncompliance with those requirements is widespread in the country?					
i. Has the outcome of Step 1b: Identified realistic and credible alternative scenario(s) to the project activity that are in compliance with mandatory legislation and regulations taking into account the enforcement in the region or country and EB decisions on national and/or sectoral policies and regulations done correctly? Please state the outcome.	EB 39	Ann 10	Not applicable. As above.	OK	OK
j. Has PP selected Step 2 (Investment analysis) or Step 3 (Barrier analysis) or both Steps 2 and 3?	EB 39	Ann 10	Not applicable. As above.	OK	OK
k. In step 2, have all the sub-steps as below been followed?	EB 39	Ann 10	Not applicable. As above.	OK	OK
i. Sub-step 2a: Determine appropriate analysis method;	EB 39	Ann 10	Not applicable. As above.	OK	OK
ii. Sub-step 2b: Option I. Apply simple cost analysis;	EB 39	Ann 10	Not applicable. As above.	OK	OK
iii. Sub-step 2b: Option II. Apply investment comparison analysis;	EB 39	Ann 10	Not applicable. As above.	OK	OK
iv. Sub-step 2b: Option III. Apply benchmark analysis;	EB 39	Ann 10	Not applicable. As above.	OK	OK
v. Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III);	EB 39	Ann 10	Not applicable. As above.	OK	OK
vi. Sub-step 2d: Sensitivity analysis (only applicable to Options II and III).	EB 39	Ann 10	Not applicable. As above.	OK	OK
l. In sub-step 2a has the determination of	EB	Ann	Not applicable. As above.	OK	OK



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appropriate method of analysis done as per the guidance as below?	39	10			
i. Simple cost analysis if the CDM project activity and the alternatives identified in Step 1 generate no financial or economic benefits other than CDM related income (Option I).	EB 39	Ann 10	Not applicable. As above.	OK	OK
ii. Otherwise, use the investment comparison analysis (Option II) or the benchmark analysis (Option III). Specify option used with justification.	EB 39	Ann 10	Not applicable. As above.	OK	OK
m. Has the below guideline followed for sub-step 2b Option I. Apply simple cost analysis? Document the costs associated with the CDM project activity and the alternatives identified in Step1 and demonstrate that there is at least one alternative which is less costly than the project activity.	EB 39	Ann 10	Not applicable. As above.	OK	OK
n. Has the below guideline followed for sub-step 2b Option II. Apply investment comparison analysis? Identify the financial indicator, such as IRR, NPV, cost benefit ratio, or unit cost of service most suitable for the project type and decision-making context. Please specify	EB 39	Ann 10	Not applicable. As above.	OK	OK
o. Has the below guideline followed for Sub-step 2b: Option III. Apply benchmark analysis?	EB 39	Ann 10	Not applicable. As above.	OK	OK
i. Identify the financial/economic indicator, such as IRR, most suitable for the project type and decision context.	EB 39	Ann 10	Not applicable. As above.	OK	OK
ii. When applying Option II or Option III, the financial/economic analysis shall be based on	EB 39	Ann 10	Not applicable. As above.	OK	OK



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parameters that are standard in the market, considering the specific characteristics of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer. Only in the particular case where the project activity can be implemented by the project participant, the specific financial/economic situation of the company undertaking the project activity can be considered.					
iii. Discount rates and benchmarks shall be derived from: (a) Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data; (b) Estimates of the cost of financing and required return on capital (e.g. commercial lending rates and guarantees required for the country and the type of project activity concerned), based on bankers views and private equity investors/funds' required return on comparable projects; (c) A company internal benchmark (weighted average capital cost of the company), only in the particular case referred to above in 2. The project developers shall demonstrate that this benchmark has been consistently used in the past, i.e. that project activities under similar conditions	EB 39	Ann 10	Not applicable. As above.	OK	OK



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developed by the same company used the same benchmark; (d) Government/official approved benchmark where such benchmarks are used for investment decisions; (e) Any other indicators, if the project participants can demonstrate that the above Options are not applicable and their indicator is appropriately justified. Please specify benchmark and justify.					
p. Has the below guideline followed for Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III)?	EB 39	Ann 10	Not applicable. As above.	OK	OK
i. Calculate the suitable financial indicator for the proposed CDM project activity and, in the case of Option II above, for the other alternatives. Include all relevant costs (including, for example, the investment cost, the operations and maintenance costs), and revenues (excluding CER revenues, but possibly including inter alia subsidies/fiscal incentives, ODA, etc., where applicable), and, as appropriate, non-market cost and benefits in the case of public investors if this is standard practice for the selection of public investments in the host country.	EB 39	Ann 10	Not applicable. As above.	OK	OK
ii. Present the investment analysis in a transparent manner and provide all the relevant assumptions, preferably in the CDM-PDD, or in separate annexes to the CDM-PDD.	EB 39	Ann 10	Not applicable. As above.	OK	OK
iii. Justify and/or cite assumptions.	EB	Ann	Not applicable. As above.	OK	OK

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iv. In calculating the financial/economic indicator, the project's risks can be included through the cash flow pattern, subject to project-specific expectations and assumptions.	EB 39	Ann 10	Not applicable. As above.	OK	OK
v. Assumptions and input data for the investment analysis shall not differ across the project activity and its alternatives, unless differences can be well substantiated.	EB 39	Ann 10	Not applicable. As above.	OK	OK
vi. Present in the CDM-PDD a clear comparison of the financial indicator for the proposed CDM activity. Please specify details for above.	EB 39	Ann 10	Not applicable. As above.	OK	OK
q. Has the below guideline followed for Sub-step 2d: Sensitivity analysis (only applicable to Options II and III)? Include a sensitivity analysis that shows whether the conclusion regarding the financial/economic attractiveness is robust to reasonable variations in the critical assumptions.	EB 39	Ann 10	Not applicable. As above.	OK	OK
r. Has the outcome of Step 2 clearly mentioned with justification?	EB 39	Ann 10	Not applicable. As above.	OK	OK
s. In step 3: Barrier analysis have all the sub-steps as below been followed?	EB 39	Ann 10	Not applicable. As above.	OK	OK
i. Sub-step 3a: Identify barriers that would prevent the implementation of the proposed CDM project activity;	EB 39	Ann 10	Not applicable. As above.	OK	OK
ii. Sub-step 3 b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity).	EB 39	Ann 10	Not applicable. As above.	OK	OK
t. Has the below guideline followed for Sub-step 3a:	EB	Ann	Not applicable. As above.	OK	OK



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Identify barriers that would prevent the implementation of the proposed CDM project?	39	10			
i. (a) Investment barriers: For alternatives undertaken and operated by private entities: Similar activities have only been implemented with grants or other non-commercial finance terms. No private capital is available from domestic or international capital markets due to real or perceived risks associated with investment in the country where the proposed CDM project activity is to be implemented, as demonstrated by the credit rating of the country or other country investments reports of reputed origin.	EB 39	Ann 10	Not applicable. As above.	OK	OK
ii. (b) Technological barriers: Skilled and/or properly trained labour to operate and maintain the technology is not available in the relevant country/region, which leads to an unacceptably high risk of equipment disrepair and malfunctioning or other underperformance; Lack of infrastructure for implementation and logistics for maintenance of the technology, Risk of technological failure: the process/technology failure risk in the local circumstances is significantly greater than for other technologies that provide services or outputs comparable to those of the proposed CDM project activity, as demonstrated by relevant scientific literature or technology	EB 39	Ann 10	Not applicable. As above.	OK	OK





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manufacturer information, The particular technology used in the proposed project activity is not available in the relevant region.					
iii. (c) Barriers due to prevailing practice: The project activity is the “first of its kind”.	EB 39	Ann 10	Not applicable. As above.	OK	OK
iv. (d) Other barriers, preferably specified in the underlying methodology as examples.	EB 39	Ann 10	Not applicable. As above.	OK	OK
u. Has the outcome from Step 3a clearly mentioned in PDD?	EB 39	Ann 10	Not applicable. As above.	OK	OK
v. Has the below guideline followed for Sub-step 3 b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity)?	EB 39	Ann 10	Not applicable. As above.	OK	OK
i. If the identified barriers also affect other alternatives, explain how they are affected less strongly than they affect the proposed CDM project activity. In other words, demonstrate that the identified barriers do not prevent the implementation of at least one of the alternatives. Any alternative that would be prevented by the barriers identified in Sub-step 3a is not a viable alternative, and shall be eliminated from consideration.	EB 39	Ann 10	Not applicable. As above.	OK	OK
ii. Provide transparent and documented evidence, and offer conservative interpretations of this documented evidence, as to how it demonstrates the existence and significance of the identified barriers and whether alternatives	EB 39	Ann 10	Not applicable. As above.	OK	OK


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are prevented by these barriers.					
iii. The type of evidence to be provided should include at least one of the following: (a) Relevant legislation, regulatory information or industry norms; (b) Relevant (sectoral) studies or surveys (e.g. market surveys, technology studies, etc) undertaken by universities, research institutions, industry associations, companies, bilateral/multilateral institutions, etc; (c) Relevant statistical data from national or international statistics; (d) Documentation of relevant market data (e.g. market prices, tariffs, rules); (e) Written documentation of independent expert judgments from industry, educational institutions (e.g. universities, technical schools, training centers), industry associations and others. Please specify.	EB 39	Ann 10	Not applicable. As above.	OK	OK
w. Has the outcome from Step 3 clearly mentioned in PDD?	EB 39	Ann 10			
x. In step 4: Common practice analysis have all the sub-steps as below followed?	EB 39	Ann 10	Not applicable. As above.	OK	OK
i. Sub-step 4a: Analyze other activities similar to the proposed project activity;	EB 39	Ann 10	Not applicable. As above.	OK	OK
ii. Sub-step 4b: Discuss any similar Options that are occurring.	EB 39	Ann 10	Not applicable. As above.	OK	OK
y. Has the below guideline followed for Sub-step 4a: Analyze other activities similar to the proposed project activity? Provide an analysis of any other activities that are operational and that are similar	EB 39	Ann 10	Not applicable. As above.	OK	OK



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to the proposed project activity. Other CDM project activities are not to be included in this analysis. Provide documented evidence and, where relevant, quantitative information. On the basis of that analysis, describe whether and to which extent similar activities have already diffused in the relevant region.					
z. Has the below guideline followed for Sub-step 4b: Discuss any similar Options that are occurring? If similar activities are identified, then it is necessary to demonstrate why the existence of these activities does not contradict the claim that the proposed project activity is financially/economically unattractive or subject to barriers. This can be done by comparing the proposed project activity to the other similar activities, and pointing out and explaining essential distinctions between them that explain why the similar activities enjoyed certain benefits that rendered it financially/economically attractive (e.g., subsidies or other financial flows) and which the proposed project activity cannot use or did not face the barriers to which the proposed project activity is subject. In case similar projects are not accessible, the PDD should include justification about non-accessibility of data/information.	EB 39	Ann 10	Not applicable. As above.	OK	OK
aa. Has the outcome from Step 4 clearly mentioned	EB 39	Ann 10	Not applicable. As above.	OK	OK



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in PDD?					
bb. Has it been proved that the project is additional?	EB 39	Ann 10	Not applicable. As above.	OK	OK



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<b><i>a. Prior consideration of the clean development mechanism</i></b>					
a. Is the project activity start date prior to the date of publication of the PDD for stakeholder comments?	VVM	98	Yes. The project start date in the PDD is 18 <sup>th</sup> September 2000, when the contract for the general refurbishment of VMB's Blast Furnace 1.  The GSC process started on 17/04/2012	OK	OK
b. If yes, were the CDM benefits considered necessary in the decision to undertake the project as a proposed CDM project activity?	VVM	98	Refer to CL 02 and CL 03	CL 02 CL 03	OK
c. Is the start date of the project activity, reported in the PDD, in accordance with the "Glossary of CDM terms", which states that "The starting date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a project activity begins."?	VVM	99	Yes.	OK	OK
d. Does the project activity require construction, retrofit or other modifications?	VVM	99	The PDD does not clearly present the refurbishments required in the blast furnace, when the project start date was defined.  Also clarify whether periodical refurbishments are envisaged during the project's implementation.	CL 10 CL 11	OK
e. If yes, is it ensured that the date of commissioning cannot be considered as the project activity start date?	VVM	99	Yes. Refer to CL 10 and CL 11.	CL 10 CL 11	OK
f. Is it a new project activity (a project activity with a start date on or after 02 August 2008) or an existing project activity (a project activity with a start date before 02 August 2008)?	VVM	100	The project activity is an existing project activity, with start date before August 2008.	OK	OK



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g. For a new project, for which PDD has not been published for global stakeholder consultation or a new methodology proposed to the CDM Executive Board before the project activity start date, had PP's informed the host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status? (Provide reference to such confirmation from host Party DNA and UNFCCC secretariat).	VVM	101	Not applicable.	OK	OK
h. For an existing project activity, for which the start date is prior to the date of publication of the PDD for global stakeholder consultation, are the following evidences provided:	VVM	102			
ii. evidence that must indicate that awareness of the CDM prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project, including, inter alia:	VVM	102	Refer to CL 02 and CL 03	CL 02 CL 03	OK
a. minutes and/or notes related to the consideration of the decision by the Board of Directors, or equivalent, of the project participant, to undertake the project as a proposed CDM project activity?	VVM	102	Refer to CL 02 and CL 03	CL 02 CL 03	OK
iii. reliable evidence from project participants that must indicate that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation, including, inter alia:	VVM	102			



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a.	contract	with	consultants	for	VVM	102	<div>- 13/01/2003 (Eco Securities Ltd): date of the final version of the PDD sent for the submission of the proposed new methodology NM0002; - 20/08/2003 (Eco Securities and INCaF): date of the final version of the PDD sent for the submission of the proposed new methodology NM0029; - 18/04/2005 (Eco Securities and INCaF): date of the final version of the PDD sent for the submission of the proposed new methodology NM0104; - 20/01/2005: First payment for the consultancy with Geoconsult (Prof. Gylvan Meira Filho): - 20/01/2005 to 20/12/2005: payments for amounts 01 to 13; - 30/03/2006: contractual amendment for consultancy, valid until 09/12/2006; - 15/01/2007: contractual amendment for consultancy, valid until 09/12/2007; - 11/02/2008: contractual amendment for consultancy, valid until 09/12/2008.</div> <div>Why is it considered that the contract with “Geoconsult” is related to CDM Activities? Provide further explanation and evidences in order to confirm that real and continuing actions were taken to secure the CDM status in parallel with the project’s implementation.</div> <div>- 01/04/2009: Consultancy contract with Key</div>	CL 12  CL 13	OK



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			<p>Associados; - 04/03/2011: Consultancy contract for the elaboration of the CDM project signed with Plantar Carbon Ltda.</p> <p>Why is it considered that the contract with “Key Associados” is related to CDM Activities? Provide further explanation and evidences in order to confirm that real and continuing actions were taken to secure the CDM status in parallel with the project’s implementation.</p>		




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b. Emission Reduction Purchase Agreements or other documentation related to the sale of the potential CERs (including correspondence with multilateral financial institutions or carbon funds)?	VVM	102	No.	OK	OK
c. evidence of agreements or negotiations with a DOE for validation services?	VVM	102	No.	OK	OK
d. submission of a new methodology to the CDM Executive Board?	VVM	102	Refer to item iii.a above	OK	OK
e. publication in newspaper?	VVM	102	No.	OK	OK
f. interviews with DNA?	VVM	102	No.	OK	OK
g. earlier correspondence on the project with the DNA or the UNFCCC secretariat?	VVM	102	No.	OK	OK
h. Has the chronology of events including time lines been appropriately captured and explained/detailed in the PDD?	VVM	102	Yes. Clarify what does the following date and action refer to: “- 27/07/2009: issuance of duplicate of the Operation License 066/2009/SUPRAM CM;”	CL 13	OK
<b>b. Identification of alternatives</b>					
a. Does the approved methodology that is selected by the proposed CDM project activity prescribe the baseline scenario and hence no further analysis is required?	VVM	105	No.	OK	OK
b. If no, does the PDD identify credible alternatives to the project activity in order to determine the most realistic baseline scenario?	VVM	105	Yes.	OK	OK
c. Does the list of alternatives given in the PDD ensure that:	VVM	106			



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i. the list of alternatives includes as one of the options that the project activity is undertaken without being registered as a proposed CDM project activity?	VVM	106	Yes, detailed in the PDD.	OK	OK
ii. the list contains all plausible alternatives that the DOE, on the basis of its local and sectoral knowledge, considers to be viable means of supplying the outputs or services that are to be supplied by the proposed CDM project activity?	VVM	106	Yes, detailed in PDD.	OK	OK
iii. the alternatives comply with all applicable and enforced legislation?	VVM	106	Yes.	OK	OK
<b>c. Investment analysis</b>					
a. Has investment analysis been used to demonstrate the additionality of the proposed CDM project activity?	VVM	108	An investment analysis has not been used in the PDD.	OK	OK
b. If yes, does the PDD provide evidence that the proposed CDM project activity would not be:	VVM	108			
i. the most economically or financially attractive alternative?	VVM	108	Not applicable	OK	OK
ii. economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs)?	VVM	108	Not applicable	OK	OK
c. Was this shown by one of the following approaches?	VVM	109	Not applicable	OK	OK
i. The proposed CDM project activity would produce no financial or economic benefits other than CDM-related income. Document the costs associated with the proposed	VVM	109	Not applicable	OK	OK



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CDM project activity and the alternatives identified and demonstrate that there is at least one alternative which is less costly than the proposed CDM project activity.					
ii. The proposed CDM project activity is less economically or financially attractive than at least one other credible and realistic alternative.	VVM	109	Not applicable	OK	OK
iii. The financial returns of the proposed CDM project activity would be insufficient to justify the required investment.	VVM	109	Not applicable	OK	OK
d. Is the period of assessment limited to the proposed crediting period of the CDM project activity?	EB 61	Ann 13	Not applicable	OK	OK
e. Does the project IRR and equity IRR calculations reflect the period of expected operation of the underlying project activity (technical lifetime), or - if a shorter period is chosen - include the fair value of the project activity assets at the end of the assessment period?	EB 61	Ann 13	Not applicable	OK	OK
f. Does the IRR calculation include the cost of major maintenance and/or rehabilitation if these are expected to be incurred during the period of assessment?	EB 61	Ann 13	Not applicable	OK	OK
g. Do the project participants justify the appropriateness of the period of assessment in the context of the underlying project activity, without reference to the proposed CDM crediting period?	EB 61	Ann 13	Not applicable	OK	OK



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h. Does the cash flow in the final year include a fair value of the project activity assets at the end of the assessment period?	EB 61	Ann 13	Not applicable	OK	OK
i. Has the fair value been calculated in accordance with local accounting regulations where available, or international best practice?	EB 61	Ann 13	Not applicable	OK	OK
j. Does the fair value calculations include both the book value of the asset and the reasonable expectation of the potential profit or loss on the realization of the assets?	EB 61	Ann 13	Not applicable	OK	OK
k. Was depreciation, and other non-cash items related to the project activity, which have been deducted in estimating gross profits on which tax is calculated, added back to net profits for the purpose of calculating the financial indicator (e.g. IRR, NPV)?	EB 61	Ann 13	Not applicable	OK	OK
l. Has taxation been included as an expense in the IRR/NPV calculation in cases where the benchmark or other financial indicator is intended for post-tax comparisons?	EB 61	Ann 13	Not applicable	OK	OK
m. Are the input values used in all investment analysis valid and applicable at the time of the investment decision taken by the project participant?	EB 61	Ann 13	Not applicable	OK	OK
n. Is the timing of the investment decision consistent and appropriate with the input values?	EB 61	Ann 13	Not applicable	OK	OK
o. Are all the listed input values been consistently applied in all calculations?	EB 61	Ann 13	Not applicable	OK	OK
p. Does the investment analysis reflect the	EB	Ann	Not applicable	OK	OK


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economic decision making context at point of the decision to recommence the project in the case of project activities for which implementation ceases after the commencement and where implementation is recommenced due to consideration of the CDM?	61	13			
q. Have project participants supplied the spreadsheet versions of all investment analysis?	EB 61	Ann 13	Not applicable	OK	OK
r. Are all formulas used in this analysis readable and all relevant cells be viewable and unprotected?	EB 61	Ann 13	Not applicable	OK	OK
s. In cases where the project participant does not wish to make such a spreadsheet available to the public has the PP provided an exact read-only or PDF copy for general publication?	EB 61	Ann 13	Not applicable	OK	OK
t. In case the PP wishes to black-out certain elements of the publicly available version, is it justifiable?	EB 61	Ann 13	Not applicable	OK	OK
u. Was the cost of financing expenditures (i.e. loan repayments and interest) included in the calculation of project IRR?	EB 61	Ann 13	Not applicable	OK	OK
v. In the calculation of equity IRR, has only the portion of investment costs which is financed by equity been considered as the net cash outflow?	EB 61	Ann 13	Not applicable	OK	OK
w. Has the portion of the investment costs which is financed by debt been considered a cash outflow in the calculation of equity IRR? (this is not allowed)	EB 61	Ann 13	Not applicable	OK	OK
x. Was a pre-tax benchmark be applied?	EB	Ann	Not applicable	OK	OK

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y. In cases where a post-tax benchmark is applied, is actual interest payable taken into account in the calculation of income tax?	EB 61	Ann 13	Not applicable	OK	OK
z. In such situations, was interest calculated according to the prevailing commercial interest rates in the region, preferably by assessing the cost of other debt recently acquired by the project developer and by applying a debt-equity ratio used by the project developer for investments taken in the previous three years?	EB 61	Ann 13	Not applicable	OK	OK
aa. In cases where a benchmark approach is used is the applied benchmark appropriate to the type of IRR calculated?	EB 61	Ann 13	Not applicable	OK	OK
bb. Has local commercial lending rates or weighted average costs of capital (WACC) selected as appropriate benchmarks for a project IRR?	EB 61	Ann 13	Not applicable	OK	OK
cc. Has required/expected returns on equity selected as appropriate benchmark for an equity IRR?	EB 61	Ann 13	Not applicable	OK	OK
dd. In case benchmarks supplied by relevant national authorities selected is it applicable to the project activity and the type of IRR calculation presented?	EB 61	Ann 13	Not applicable	OK	OK
ee. In the cases of projects which could be developed by an entity other than the project participant is the benchmark applied based on parameters that are standard in the market?	EB 61	Ann 13	Not applicable	OK	OK
ff. Whether a company-specific benchmark or a benchmark based on parameters that are standard in the market is suitable in the context	EB 61	Ann 13	Not applicable	OK	OK



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of the underlying project activity?					
gg. Have internal company benchmarks/expected returns (including those used as the expected return on equity in the calculation of a weighted average cost of capital - WACC) been applied in cases where there is only one possible project developer?	EB 61	Ann 13	Not applicable	OK	OK
hh. In such cases, have these values been used for similar projects with similar risks, developed by the same company or, if the company is brand new, would have been used for similar projects in the same sector in the country/region?	EB 61	Ann 13	Not applicable	OK	OK
ii. Has a minimum clear evidence of the resolution by the company's Board and/or shareholders been provided to the effect as above?	EB 61	Ann 13	Not applicable	OK	OK
jj. Has a thorough assessment of the financial statements of the project developer - including the proposed WACC - to assess the past financial behavior of the entity during at least the last 3 years in relation to similar projects been conducted?	EB 61	Ann 13	Not applicable.	OK	OK
kk. If the benchmark is based on parameters that are standard in the market, is the cost of equity determined either by: (a) selecting the values provided in Appendix A; or by (b) calculating the cost of equity using best financial practices, based on data sources which can be clearly validated by the DOE, while properly justifying all underlying factors?	EB 61	Ann 13	Not applicable.	OK	OK




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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ll. If a company internal benchmark is used, are the values in the table in Appendix A used, as a simple default option?	EB 61	Ann 13	Not applicable.	OK	OK
mm. If a company's internal benchmark is used for the expected return on equity, is the cost of debt based on the weighted average cost of debt financing of the legal entity owning the CDM project activity?	EB 61	Ann 13	Not applicable.	OK	OK
nn. For loans, is the weighted average cost of outstanding long-term debt used?	EB 61	Ann 13	Not applicable.	OK	OK
oo. For bonds, is the weighted average yield of the bonds during the last three months prior to the submission of the CDM-PDD for validation or prior to the investment decision, whichever is earlier, used? The use of bonds to determine the cost of debt is only appropriate for corporate bonds issued in the host country of the CDM project.	EB 61	Ann 13	Not applicable.	OK	OK
pp. In cases where the debt finance structure of the project is not yet available (e.g. a letter of intent for debt funding is not available), the cost of debt can be assumed as the commercial lending rate in the country or the yield of a 10 year bond issued by the government of the host country or, if this is not available, the bond with the maturity which is closest to 10 years. Was the following documented in the CDM-PDD?	EB 61	Ann 13	Not applicable.	OK	OK
i. for bonds: the key parameters of the bond including the time of maturity, yield,	EB 61	Ann 13	Not applicable.	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
registration issuance in the financial system and set-up in the market;					
ii. for loans from a financial institution: the contract of lending between the financial institution and the legal entity owning the assets of the project activity, or, in absence of the contract, a letter from the bank stating its intention to award the loan and the key terms for the loan;	EB 61	Ann 13	Not applicable.	OK	OK
iii. for debt financing from a parent company: the transfer of capital to the legal entity, documented with the contract of lending between the parent company and the legal entity owning the assets of the project activity and/or the parameters of the corporate bonds as mentioned above. (This latter option is only valid for corporate bonds issued in the host country of the CDM project activity)	EB 61	Ann 13	Not applicable.	OK	OK
qq. If the benchmark is based on parameters that are standard in the market, is the cost of debt calculated as the cost of financing in the capital markets (e.g. commercial lending rates and guarantees required for the country and the type of project activity concerned), based on documented evidence from financial institutions with regard to the cost of debt financing of comparable projects?	EB 61	Ann 13	Not applicable.	OK	OK
rr. In cases where this data is not available, is the	EB	Ann	Not applicable.	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
commercial lending rate in the host country used to calculate the cost of debt?	61	13			
ss. If a company's internal benchmark is used for the expected return on equity, is the percentage of debt financing and equity financing reflect the long-term debt/equity finance structure of the legal entity owning the assets of the project activity?	EB 61	Ann 13	Not applicable.	OK	OK
tt. If: (a) the legal entity owning the assets of the project activity has balance sheets audited by a third party within two years prior to the submission of the CDM-PDD for validation; and (b) the accounting books of the legal entity reflect at least the total value of all the assets needed for the project activity. Is the percentage determined based on the latest balance sheet provided under local fiscal/accounting standards and rules?	EB 61	Ann 13	Not applicable.	OK	OK
uu. If the debt/equity finance structure is not yet available, was 50% debt and 50% equity financing assumed as a default?	EB 61	Ann 13	Not applicable.	OK	OK
vv. Is the benchmark based on parameters that are standard in the market?	EB 61	Ann 13	Not applicable.	OK	OK
ww. If yes, is the typical debt/equity finance structure observed in the sector of the country used?	EB 61	Ann 13	Not applicable.	OK	OK
xx. If such information is not readily available, was 50% debt and 50% equity financing assumed as a default?	EB 61	Ann 13	Not applicable.	OK	OK
yy. Has an investment comparison analysis and not	EB	Ann	Not applicable.	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
a benchmark analysis used when the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services?	61	13			
zz. Have variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues been subjected to reasonable variation (positive and negative) and the results of this variation been presented in the PDD and be reproducible in the associated spreadsheets?	EB 61	Ann 13	Not applicable.	OK	OK
aaa. Have a corrective action been raised for a variable to be included in the sensitivity analysis which constitute less than 20% and have a material impact on the analysis ?	EB 61	Ann 13	Not applicable.	OK	OK
bbb. Is the range of variations selected is reasonable in the project context?	EB 61	Ann 13	Not applicable.	OK	OK
ccc. Dos the variations in the sensitivity analysis at least cover a range of +10% and -10%, unless this is not deemed appropriate in the context of the specific project circumstances?	EB 61	Ann 13	Not applicable.	OK	OK
ddd. In cases where a scenario will result in the project activity passing the benchmark or becoming the most financially attractive alternative, is an assessment done of the probability of the occurrence of this scenario in comparison to the likelihood of the assumptions in the presented investment analysis, taking into	EB 51	Ann 58	Not applicable.	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
consideration correlations between the variables as well as the specific socio-economic and policy context of the project activity?					
eee. Was the plant load factor defined ex-ante in the CDM-PDD according to one of the following options:	EB 48	Ann 11	Not applicable.	OK	OK
i. The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project activity for implementation approval?	EB 48	Ann 11	Not applicable.	OK	OK
ii. The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company)?	EB 48	Ann 11	Not applicable.	OK	OK
fff. Was a thorough assessment of all parameters and assumptions used in calculating the relevant financial indicator, and determine the accuracy and suitability of these parameters using the available evidence and expertise in relevant accounting practices conducted?	VVM	111	Not applicable.	OK	OK
ggg. Were the parameters cross-checked against third-party or publicly available sources, such as invoices or price indices?	VVM	111	Not applicable.	OK	OK
hhh. Were feasibility reports, public announcements and annual financial reports related to the proposed CDM project activity and the project participants reviewed?	VVM	111	Not applicable.	OK	OK
iii. Was the correctness of computations carried out and documented by the project participants	VVM	111	Not applicable.	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
assessed?					
jjj. Was the sensitivity analysis by the project participants to determine under what conditions variations in the result would occur, and the likelihood of these conditions assessed?	VVM	111	Not applicable.	OK	OK
kkk. Is the type of benchmark applied is suitable for the type of financial indicator presented?	VVM	112	Not applicable.	OK	OK
lll. Do any risk premiums applied determining the benchmark reflect the risks associated with the project type or activity?	VVM	112	Not applicable.	OK	OK
mmm. To determine this, was it assessed whether it is reasonable to assume that no investment would be made at a rate of return lower than the benchmark by:	VVM	112			
i. assessing previous investment decisions by the project participants involved?	VVM	112	Not applicable.	OK	OK
ii. determining whether the same benchmark has been applied?	VVM	112	Not applicable.	OK	OK
iii. determining if there are verifiable circumstances that have led to a change in the benchmark?	VVM	112	Not applicable.	OK	OK
nnn. Did the project participants rely on values from Feasibility Study Reports (FSR) that are approved by national authorities for proposed CDM project activities?	VVM	113	Not applicable.	OK	OK
ooo. If yes:	VVM	113			
i. has the FSR been the basis of the decision to proceed with the investment in the project, i.e. that the period of time between	VVM	113	Not applicable.	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
the finalization of the FSR and the investment decision is sufficiently short for the DOE to confirm that it is unlikely in the context of the underlying project activity that the input values would have materially changed?					
ii. Are the values used in the PDD and associated annexes fully consistent with the FSR?	VVM	113	Not applicable.	OK	OK
iii. If not, was the appropriateness of the values validated?	VVM	113	Not applicable.	OK	OK
iv. On the basis of its specific local and sectoral expertise, is confirmation provided, by cross-checking or other appropriate manner, that the input values from the FSR are valid and applicable at the time of the investment decision?	VVM	113	Not applicable.	OK	OK
<b>d. Barrier analysis</b>					
a. Has barrier analysis been used to demonstrated the additionality of the proposed CDM project activity?	VVM	115	As the PDD applies the “Combined Tool to identify the baseline scenario and demonstrate additionality”, the additionality is demonstrated with the baseline scenario determination process. This is in line with the methodology. The barriers analysis is discussed under the “Baseline section”, i.e barriers analysis was applied in order to identify credible and alternative scenarios for baseline determination.  Refer to CAR 01	CAR 01	OK



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b. If yes, does the PDD demonstrate that the proposed CDM project activity faces barriers that:	VVM	115	Refer to item day above	OK	OK
i. prevent the implementation of this type of proposed CMD project activity?	VVM	115	Refer to item day above	OK	OK
ii. do not prevent the implementation of at least one of the alternatives?	VVM	115	Refer to item day above	OK	OK
c. Are there any issues that have a clear direct impact on the financial returns of the project activity, other than: risk related barriers, for example risk of technical failure, that could have negative effects on the financial performance; or barriers related to the unavailability of sources of finance for the project activity? {If yes, these issues cannot be considered barriers and shall be assessed by investment analysis. [Refer to (6.c) above]}	VVM	116	Refer to item d.a above	OK	OK
d. Were the barriers determined as real by:	VVM	117			
i. assessing the available evidence and/or undertaking interviews with relevant individuals (including members of industry associations, government officials or local experts if necessary) to determine whether the barriers listed in the PDD exist?	VVM	117	Refer to item d.a above	OK	OK
ii. ensuring that existence of barriers is substantiated by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics?	VVM	117	Refer to item d.a above	OK	OK
iii. Is existence of a barrier substantiated only	VVM	117	Refer to item d.a above	OK	OK





## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
by the opinions of the project participants? (If yes, this barrier cannot be considered as adequately substantiated)					
e. Were the barriers determined as preventing the implementation of the project activity but not the implementation of at least one of the possible alternatives by applying local and sectoral expertise to judge whether a barrier or set of barriers would prevent the implementation of the proposed CDM project activity and would not equally prevent implementation of <i>at least one of</i> the possible alternatives, in particular the identified baseline scenario?	VVM	117	Refer to item d.a above	OK	OK
<b>e. Common practice analysis</b>					
a. Is this a proposed large-scale, or first-of-its kind small-scale project activity?	VVM	119	Refer to CAR 01	CAR 01	OK
b. If yes, was common practice analysis carried out as a credibility check of the other available evidence used by the project participants to demonstrate additionality?	VVM	119	Refer to CAR 01	CAR 01	OK
c. Was it assessed whether the geographical scope (e.g. defined region) of the common practice analysis is appropriate for the assessment of common practice related to the project activity's technology or industry type? (For certain technologies the relevant region for assessment will be local and for others it may be transnational/global.	VVM	120	Refer to CAR 01	CAR 01	OK
d. Was a region other than the entire host country	VVM	120	Refer to CAR 01	CAR 01	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
chosen?					
e. If yes, was the explanation why this region is more appropriate assessed?	VVM	120	Refer to CAR 01	CAR 01	OK
f. Using official sources and local and industry expertise, was it determined to what extent similar and operational projects (e.g., using similar technology or practice), other than CDM project activities, have been undertaken in the defined region?	VVM	120	Refer to CAR 01	CAR 01	OK
g. Are similar and operational projects, other than CDM project activities, already "widely observed and commonly carried out" in the defined region?	VVM	120	Refer to CAR 01	CAR 01	OK
h. If yes, was it assessed whether there are essential distinctions between the proposed CDM project activity and the other similar activities?	VVM	120	Refer to CAR 01	CAR 01	OK
<b>7. Monitoring plan</b>					
a. Does the PDD include a monitoring plan?	VVM	122	Yes.	OK	OK
b. Is this monitoring plan based on the approved monitoring methodology applied to the proposed CDM project activity?	VVM	122	Yes, the monitoring plan follows the requirements contained in the methodology. Please refer to section B.7 and Annex 4 in the PDD.	OK	OK
c. Were the list of parameters required by the selected methodology identified?	VVM	123	Yes, in section B.7.1 of the PDD.	OK	OK
d. Does the monitoring plan contains all necessary parameters?	VVM	123	Yes.	OK	OK
e. Are the parameters clearly described?	VVM	123	Yes.	OK	OK
f. Does the means of monitoring described in the plan comply with the requirements of the	VVM	123	Yes.	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl																
methodology?																					
g. Are the following parameters monitored in line with the requirements?	AM0082	Section III																			
<table><tr><td>Data / Parameter:</td><td>P<sub>PI, y</sub></td></tr><tr><td>Data unit:</td><td>Tonnes of Hot Metal (t)</td></tr><tr><td>Description:</td><td>Hot metal production in project scenario in year y (expected hot metal production of the new iron ore reduction system)</td></tr><tr><td>Source of data:</td><td>Iron reduction facility operation</td></tr><tr><td>Measurement procedures (if any):</td><td>Total production is weighted</td></tr><tr><td>Monitoring frequency:</td><td>Measured daily, aggregated annually</td></tr><tr><td>QA/QC procedures:</td><td>100% of the total iron ore reduction facility shall be weighted</td></tr><tr><td>Any comment:</td><td>N/A</td></tr></table>	Data / Parameter:	P <sub>PI, y</sub>	Data unit:	Tonnes of Hot Metal (t)	Description:	Hot metal production in project scenario in year y (expected hot metal production of the new iron ore reduction system)	Source of data:	Iron reduction facility operation	Measurement procedures (if any):	Total production is weighted	Monitoring frequency:	Measured daily, aggregated annually	QA/QC procedures:	100% of the total iron ore reduction facility shall be weighted	Any comment:	N/A	AM0082	Section III	<p>Data / Parameter: PJ, y P</p> <p>Data unit: Tonnes of Hot Metal (t)</p> <p>Description: Hot metal production in project scenario in year y (expected hot metal production of the new iron ore reduction system).</p> <p>Source of data: Project entity records</p> <p>Measurement procedures (if any):</p> <p>Total production is weighted;</p> <p>Type 1: Scale EI 4039</p> <p>Accuracy class: Maximum cargo 60.000 kg/</p> <p>Minimum cargo 400 kg</p> <p>Serial number: .....40381</p> <p>Calibration frequency: ...12 months</p> <p>Date of last calibration: ..19/05/2011</p> <p>Validity: .....21/05/2012</p> <p>Type 2: Scale EI 4040 – Used to weigh scrap - LD (Toledo)</p> <p>Accuracy class: Maximum cargo 25.000 kg/</p> <p>Minimum cargo 200 kg</p> <p>Serial number: ..... don't</p> <p>Calibration frequency: ...12 months</p> <p>Date of last calibration: .....19/05/2011</p> <p>Validity: .....21/05/2012</p> <p>Value applied: 650,000</p> <p>Monitoring frequency: Measured daily, aggregated</p>	OK	OK
Data / Parameter:	P <sub>PI, y</sub>																				
Data unit:	Tonnes of Hot Metal (t)																				
Description:	Hot metal production in project scenario in year y (expected hot metal production of the new iron ore reduction system)																				
Source of data:	Iron reduction facility operation																				
Measurement procedures (if any):	Total production is weighted																				
Monitoring frequency:	Measured daily, aggregated annually																				
QA/QC procedures:	100% of the total iron ore reduction facility shall be weighted																				
Any comment:	N/A																				



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			annually. QA/QC procedures: 100% of the total pig iron production shall be weighted. Scales are calibrated according to Standard Operating Procedures based on ISO 9001 standards.		



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## VALIDATION REPORT

CHECKLIST QUESTION			Ref.	§	COMMENTS	Draft Concl	Final Concl
Data / Parameter:	$\%C_{PI,i}$		AM00 82	Section n III	Considered as zero, in line with the methodology.	OK	OK
Data unit:	%						
Description:	Carbon content of the non-renewable reducing agent <i>i</i> , in percent						
Source of data:	Project monitoring data						
Measurement procedures (if any):	Sample measurement shall be done using representative statistical calculations						
Monitoring frequency:	Measured monthly, averaged annually						
QA/QC procedures:	Standard Operating procedures (SOPs) including procedures of regular calibration of measuring equipment shall be applied						
Any comment:	The carbon content of renewable reducing agent shall be considered zero as this carbon is neutral due to its renewable biomass dedicated plantations origin						
Data / Parameter:	$RA_{PI,i}$		AM00 82	Section n III	Non-renewable reducing agent consumption is considered to be zero in the project scenario.	OK	OK
Data unit:	tonne of reducing agent/ tonne of hot metal						
Description:	Non-renewable reducing agent type <i>i</i> (e.g. coal coke, coal, etc) requirement to produce one tonne of hot metal in the project scenario						
Source of data:	Project monitoring data						
Measurement procedures (if any):	Actual consumption of reducing agent will be measured, by appropriate methods						
Monitoring frequency:	Measured monthly, averaged annually						
QA/QC procedures:	Standard Operating procedures (SOPs) including procedures of regular calibration of measuring equipment shall be applied						
Any comment:	N/A						
Data / Parameter:	$\%C_{HM,PI,\gamma}$		AM00 82	Section n III	Considered as zero, in line with the methodology.	OK	OK
Data unit:	%						
Description:	Percentage of carbon in hot metal						
Source of data:	Iron reduction facility operation						
Measurement procedures (if any):	Sample measurement shall be done using representative statistical calculations						
Monitoring frequency:	Measured monthly, averaged annually						
QA/QC procedures:	Standard Operating procedures (SOPs) including procedures of regular calibration of measuring equipment shall be applied						
Any comment:	The carbon content of the pig iron produced with renewable charcoal only will always be considered zero						
Data / Parameter:	$V_{PI}$		AM00 82	Section n III	Not applicable, Option 2 is applied: Project emissions from transport based on distance traveled by vehicles.	OK	OK
Data unit:	Unit numbers						
Description:	vehicle type in the project scenario						
Source of data:	Project monitoring data						
Measurement procedures (if any):	Monitoring each vehicle type						
Monitoring frequency:	Continuously						
QA/QC procedures:	N/A						
Any comment:							



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## VALIDATION REPORT

CHECKLIST QUESTION		Ref.	§	COMMENTS	Draft Concl	Final Concl
Data / Parameter:	$f_{PJ}$	AM00 82	Section n III	Not applicable, Option 2 is applied: Project emissions from transport based on distance traveled by vehicles.	OK	OK
Data unit:	Unit numbers					
Description:	fuel type in the project scenario					
Source of data:	Project monitoring data					
Measurement procedures (if any):	Monitoring each fuel type					
Monitoring frequency:	Continuously					
QA/QC procedures:	N/A					
Any comment:						
Data / Parameter:	$n_{v,PJ,y}$	AM00 82	Section n III	Not applicable, Option 2 is applied: Project emissions from transport based on distance traveled by vehicles.	OK	OK
Data unit:	Unit numbers					
Description:	Number of vehicles type $v$ with fuel type $f$ in year $y$ in the project scenario					
Source of data:	Project monitoring data					
Measurement procedures (if any):	N/A					
Monitoring frequency:	Continuously					
QA/QC procedures:	Data to be verified from project records					
Any comment:	Monitoring number of each vehicle type used					
Data / Parameter:	$k_{v,PJ,y}$	AM00 82	Section n III	Not applicable, Option 2 is applied: Project emissions from transport based on distance traveled by vehicles.	OK	OK
Data unit:	km in year $y$					
Description:	Distance travelled by each of vehicle type $v$ with fuel type $f$ in the project scenario					
Source of data:	Project monitoring data					
Measurement procedures (if any):	N/A					
Monitoring frequency:	Continuously					
QA/QC procedures:	Data to be verified from project records					
Any comment:	Monitoring kilometers for each of vehicle type $V$ with fuel type $F$					
Data / Parameter:	$e_{v,PJ}$	AM00 82	Section n III	Not applicable, Option 2 is applied: Project emissions from transport based on distance traveled by vehicles.	OK	OK
Data unit:	Litre/km					
Description:	Average fuel consumption of vehicle type $v$ with fuel type $f$ in the project scenario					
Source of data:	Local/national/IPCC					
Measurement procedures (if any):	N/A					
Monitoring frequency:	Continuously					
QA/QC procedures:						
Any comment:	Local and regional value has the priority					



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CHECKLIST QUESTION		Ref.	§	COMMENTS	Draft Concl	Final Concl
Data / Parameter:	$N_{v,PJ,y}$	AM00 82	Section III	Data / Parameter: v,PJ, y N	OK	OK
Data unit:	Unit numbers			Data unit: Unit numbers		
Description:	Number of round trips (from and to) per type $V$ of vehicles during in the project scenario			Description: Number of round trips (to and from) per type v of vehicle during year y in the project scenario		
Source of data:	Project monitoring data			Source of data: Project entity records		
Measurement procedures (if any):	Monitoring number of round trips per vehicle type $V$ in year y			Measurement procedures (if any): Estimated and/or calculated (calculation presented in Section B.6.1, Project Emissions, item 1 (d)).		
Monitoring frequency:	Annual			Value applied: 68,366		
QA/QC procedures:	N/A			Monitoring frequency: Annual		
Any comment:				QA/QC procedures: N/A		
				Any comment: This parameter applies to the calculations for Vehicle, PJ, y EP biomass transport to the carbonization sites.		
				Data / Parameter: v,PJ, y N		
				Data unit: Unit numbers		
				Description: Number of round trips (to and from) per type v of vehicle during year y in the project scenario		
				Source of data: Project entity records		
				Measurement procedures (if any): Estimated and/or calculated based on the trucks entrance in the pig iron mill (Calculation presented in Section B.6.1, Project Emissions, item 3).		
				Value applied: 19,949		
				Monitoring frequency: Annual		



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			QA/QC procedures: Standard Operating Procedures based on ISO 9001 standards. Any comment: This parameter applies to the calculations for Vehicle, PJ, y RAT , transport of reducing agent to iron ore reduction facility in the project scenario.		





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## VALIDATION REPORT

CHECKLIST QUESTION		Ref.	§	COMMENTS	Draft Concl	Final Concl
Data / Parameter:	AVD <sub>i,PJ,y</sub>	AM00 82	Section III	Data / Parameter: i,PJ, y AVD	OK	OK
Data unit:	KM			Data unit: Km		
Description:	Average of round trips (from and to) distance between the reducing agent type i production site (s) and the site of the project activity during the year y			Description: Average round trip distance (to and from) between the biomass i production site(s) and the site of the project plantation during year y		
Source of data:	Project monitoring data			Source of data: Project entity records.		
Measurement procedures (if any):	Weighted average based on the distances defined on Official records Road Maps data			Measurement procedures (if any): Distance calculated based on road maps; the highest value shall be considered (Calculation presented in Section B.6.1, Project Emissions, item 1 (d))		
Monitoring frequency:	Annual			Value applied: 16		
QA/QC procedures:	N/A			Monitoring frequency: Annual		
Any comment:				QA/QC procedures: Standard Operating Procedures based on ISO 9001 standards.		
				Any comment: This parameter applies to the calculations for Vehicle, PJ, y EP biomass transport to the carbonization sites.		
				Data / Parameter: i,PJ, y AVD		
				Data unit: Km		
				Description: Average round trip distance (to and from) between the reducing agent type i production site(s) and the site of the project activity during the year y		
				Source of data: Project entity records		
				Measurement procedures (if any): Distance calculated based on road maps; the highest value shall be considered.		



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			Value applied: 802 Monitoring frequency: Annual QA/QC procedures: Standard Operating Procedures based on ISO 9001 standards. Any comment: This parameter applies to the calculations for Vehicle, PJ, y RAT , transport of reducing agent to iron ore reduction facility in the project scenario.		



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## VALIDATION REPORT

CHECKLIST QUESTION		Ref.	§	COMMENTS	Draft Concl	Final Concl
Data / Parameter:	EF <sub>CH4, charcoal, PJ,y</sub>	AM00 82	Section n III	Data / Parameter: CH <sub>4</sub> , charcoal, PJ,y EF	OK	OK
Data unit:	t CH <sub>4</sub> /t of charcoal			Data unit: tCH <sub>4</sub> / t of charcoal		
Description:	Emission Factor to produce one tonne of renewable charcoal identified in the project supply chain			Description: Emission Factor to produce one tonne of renewable charcoal identified in the project supply chain		
Source of data:	Project supply chain			Source of data: Project entity records		
Measurement procedures (if any):	Estimated based on the data monitored from the reducing agent supply operation to the iron ore reduction facility or based in the reliable data			Measurement procedures (if any):		
Monitoring frequency:	Annual			Calculation based on AM0041 provisions		
QA/QC procedures:				Value applied: 0.0457		
Any comment:	Local and regional value has the priority			Monitoring frequency: Annual		
				QA/QC procedures: Standard Operating Procedures should be applied based on provisions of AM0041 and ISO 9001 standards.		
				Any comment: N/A		
Data / Parameter:	F <sub>PJ, charcoal</sub>	AM00 82	Section n III	Data / Parameter: PJ , charcoal F	OK	OK
Data unit:	Tonne of charcoal/tonne of hot metal			Data unit: Tonne of charcoal / tonne of hot metal		
Description:	Quantity of renewable charcoal to produce one tonne of hot metal in the project scenario			Description: Quantity of renewable charcoal to produce one tonne of hot metal in the project scenario.		
Source of data:	Project operation			Source of data: Project entity records		
Measurement procedures (if any):	Actual data of Blast furnace operation			Measurement procedures (if any):		
Monitoring frequency:	Monitored daily, calculated annually			Charcoal and hot metal are weighted monthly.		
QA/QC procedures:	SOPs			Value applied: 0.6		
Any comment:	N/A			Monitoring frequency: Monthly		
				QA/QC procedures: Standard Operating Procedures based on ISO 9001 standards.		
				Any comment: N/A		


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CHECKLIST QUESTION		Ref.	§	COMMENTS	Draft Concl	Final Concl
Data / Parameter:	Y <sub>PJ</sub>	AM00 82	Section III	Data / Parameter: PJ Y	OK	OK
Data unit:	Tonne of charcoal/tonne of wood on dry basis			Data unit: Tonne of charcoal / tonne of wood on dry basis		
Description:	Carbonization gravimetric yield			Description: Carbonization gravimetric yield		
Source of data:	As per the options provided in the NM			Source of data: Project entity records		
Measurement procedures (if any):	Estimated or adopted as per the procedures provided in the project section of this methodology			Measurement procedures (if any): Measurements performed according to AM0041 provisions, Appendix 3.		
Monitoring frequency:	Annual			Value applied: 0.35 Monitoring frequency: Annual		
QA/QC procedures:				QA/QC procedures: Standard Operating Procedures should be applied based on provisions of AM0041 and ISO 9001 standards.		
Any comment:				Any comment: N/A		



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CHECKLIST QUESTION		Ref.	§	COMMENTS	Draft Concl	Final Concl	
Data / Parameter:	F PJ, machine, y	AM00 82	Section III	Not applicable.	OK	OK	
Data unit:	tCO <sub>2</sub> /t Coal						
Description:	GHG emissions from fossil fuel consumption due to the coal mining machinery in the project scenario during year y						
Source of data:	The following data sources may be used if the relevant conditions are met						
	Data source						Conditions for using the source
	a) Values provided by the fuel supplier in invoices						This is the preferred source
	b) Measurements by the project participants						If a) is not available
	c) Regional or national default values						If a) is not available
Measurement procedures (if any):	For a) and b): Measurements should be undertaken in line with national and international standards. For a): If the fuel supplier does provide the NCV value and the CO <sub>2</sub> emissions factor on the invoice and these two values are based on measurements for this specific fuel, the CO <sub>2</sub> factor should be used. If a) is not available then Options b), c) or d) should be used						
	For a) and b): Measurements should be undertaken in line with national and international standards. For a): If the fuel supplier does provide the NCV value and the CO <sub>2</sub> emissions factor on the invoice and these two values are based on measurements for this specific fuel, the CO <sub>2</sub> factor should be used. If a) is not available then Options b), c) or d) should be used						
Monitoring frequency:	Measured daily, aggregated annually						
QA/QC procedures:	Standard Operating procedures (SOPs) including procedures of regular calibration of measuring equipment shall be applied						
Any comment:	Use the "Tool to calculate project or leakage CO <sub>2</sub> emissions from fossil fuel combustion" to estimate this factor. One time value based on consumption of electricity can be used to determine the electricity consumption. The data on coal has to be collected from data of mines						



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CHECKLIST QUESTION			Ref.	§	COMMENTS	Draft Concl	Final Concl
Data / Parameter:	$E_{PI, machine, y}$		AM00 82	Section III	Not applicable.	OK	OK
Data unit:	tCO <sub>2</sub> /t Coal						
Description:	GHG emissions from electricity consumption due to the coal mining machinery in the project scenario during year y						
Source of data:	Project monitoring data						
Measurement procedures (if any):	N/A						
Monitoring frequency:	Annual						
QA/QC procedures:	Standard Operating procedures (SOPs) including procedures of recalibration of measuring equipment shall be applied						
Any comment:	Use the "Tool to calculate baseline, project and/or leakage emissions" to estimate this factor. One time value based on conservative minimum consumption of electricity can be used to determine the annual electricity consumption. The data on coal has to be collected from actual data of mines						
Data / Parameter:	$F_{PI, fugitive, y}$		AM00 82	Section III	Not applicable.	OK	OK
Data unit:	tCO <sub>2</sub> /t Coal						
Description:	CH <sub>4</sub> fugitive emissions due to the coal mining activity in the project scenario during year y						
Source of data:	Project monitoring data						
Measurement procedures (if any):	N/A						
Monitoring frequency:	Annual						
QA/QC procedures:	Standard Operating procedures (SOPs) including procedures of recalibration of measuring equipment shall be applied						
Any comment:	N/A						
Data / Parameter:	$E_{PI, clean, y}$		AM00 82	Section III	Not applicable.	OK	OK
Data unit:	tCO <sub>2</sub> /t Coal						
Description:	Electricity consumption GHG emissions due to the coal cleaning activity in the project scenario during year y						
Source of data:	Project monitoring data						
Measurement procedures (if any):	N/A						
Monitoring frequency:	Annual						
QA/QC procedures:	Standard Operating procedures (SOPs) including procedures of recalibration of measuring equipment shall be applied						
Any comment:	Use the "Tool to calculate baseline, project and/or leakage emissions" to estimate this factor. One time value based on conservative minimum consumption of electricity can be used to determine the annual electricity consumption. The data on coal has to be collected from actual data of mines						



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CHECKLIST QUESTION			Ref.	§	COMMENTS	Draft Concl	Final Concl
Data / Parameter:	$E_{PI, Am, y}$		AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	tCO <sub>2</sub> /t Coal						
Description:	GHG emissions due to the use of ammonium nitrate and mine reclamation activities in the project scenario during year y						
Source of data:	Project monitoring data						
Measurement procedures (if any):	N/A						
Monitoring frequency:	Annual						
QA/QC procedures:	Standard Operating procedures (SOPs) including procedures of regular calibration of measuring equipment shall be applied						
Any comment:	N/A						
Data / Parameter:	$EF_{CO_2e, coal\ coke, PI, y}$		AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	tCO <sub>2</sub> e/t of Coal coke						
Description:	Emission factor to produce one tonne of coal coke in the project supply chain						
Source of data:	Project supply chain						
Measurement procedures (if any):	Estimated based on the data monitored from the reducing agent supply operation to the iron ore reduction facility or based in the reliable data						
Monitoring frequency:	Annual						
QA/QC procedures:	SOPs						
Any comment:	Local and regional value has the priority						
Data / Parameter:	$AF_{y_2}, AF_{y_1}$		AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	hectares						
Description:	Area of land use at year y <sub>2</sub> and year y <sub>1</sub> , respectively						
Source of data:	Survey						
Measurement procedures (if any):	N/A						
Monitoring frequency:	Year 1						
QA/QC procedures:							
Any comment:							
Data / Parameter:	$nH_y$		AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	numeric						
Description:	Number of sample households resident in the vicinity of the project						
Source of data:	Official sources & survey						
Measurement procedures (if any):	N/A						
Monitoring frequency:	Year 1						
QA/QC procedures:							
Any comment:	Data collected from official sources or surveys						




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CHECKLIST QUESTION			Ref.	§	COMMENTS	Draft Concl	Final Concl
Data / Parameter:	$NH_r$		AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	number						
Description:	Total number of displaced households resident in the vicinity of the						
Source of data:	Official records/survey						
Measurement procedures (if any):	N/A						
Monitoring frequency:	Year 1						
QA/QC procedures:							
Any comment:	Number of households and their activities displaced						
Data / Parameter:	$B_{LB}$		AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	tonnes d.m. ha <sup>-1</sup>						
Description:	living biomass of trees (aboveground and belowground biomass) per area subject to land use/cover change						
Source of data:	Based on public and available data						
Measurement procedures (if any):	N/A						
Monitoring frequency:	Year 1						
QA/QC procedures:							
Any comment:							
Data / Parameter:	$CF$		AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	tonnes C (tonne d.m.) <sup>-1</sup>						
Description:	carbon fraction for biomass in the area subject to land use/cover change						
Source of data:	Based on public and available data						
Measurement procedures (if any):	N/A						
Monitoring frequency:	Year 1						
QA/QC procedures:							
Any comment:							
Data / Parameter:	$EF_{all-pools}$		AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	Factor						
Description:	Expansion factor (1.2 to 1.5) to convert the carbon stock of living trees to carbon stock representing all pools depending on vegetation (low vegetation density areas should use lower end of expansion factor vice versa)						
Source of data:	Project monitoring data						
Measurement procedures (if any):	N/A						
Monitoring frequency:	Year 1						
QA/QC procedures:							
Any comment:	Expansion factor depends upon the density of vegetation						





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CHECKLIST QUESTION			Ref.	§	COMMENTS	Draft Concl	Final Concl
Data / Parameter:	$NH_e$		AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	numeric						
Description:	Total number of emigrant households						
Source of data:	Official records/project data						
Measurement procedures (if any):	N/A						
Monitoring frequency:	Year 1						
QA/QC procedures:							
Any comment:	Surveys and monitoring						
Data / Parameter:	$FG_p$		AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	$m^3 yr^{-1}$						
Description:	annual volume of fuelwood use						
Source of data:	Based on public and available data						
Measurement procedures (if any):	N/A						
Monitoring frequency:	Year 1						
QA/QC procedures:							
Any comment:							
Data / Parameter:	$D$		AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	tonnes d.m. $m^{-3}$						
Description:	basic wood density						
Source of data:	Based on public and available data						
Measurement procedures (if any):	N/A						
Monitoring frequency:	Year 1						
QA/QC procedures:							
Any comment:	Local and regional value has the priority						
Data / Parameter:	$BEF_2$		AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	Factor						
Description:	biomass expansion factor for converting volumes of extracted roundwood to total above-ground biomass (including bark)						
Source of data:	Project monitoring data						
Measurement procedures (if any):	N/A						
Monitoring frequency:	Year 1						
QA/QC procedures:							
Any comment:	Local and regional value has the priority						


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## VALIDATION REPORT

CHECKLIST QUESTION		Ref.	§	COMMENTS	Draft Concl	Final Concl
Data / Parameter:	$P_y$	AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	number of persons in year y					
Description:	Population of the region					
Source of data:	Official sources & survey					
Measurement procedures (if any):	N/A					
Monitoring frequency:	Year 1					
QA/QC procedures:						
Any comment:	Data collected from official sources or surveys					
Data / Parameter:	HS	AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	number of persons per household					
Description:	Average size of resident household					
Source of data:	Official sources & survey					
Measurement procedures (if any):	N/A					
Monitoring frequency:	Year 1					
QA/QC procedures:						
Any comment:	Data collected from official sources or surveys					
Data / Parameter:	FCA	AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	Ratio					
Description:	Proportion of per capita fuelwood consumption from agricultural/ lands including purchases, to the total per capita annual fuelwood consumption from all sources (estimated from household survey data scaled between 0 to 1)					
Source of data:	Based on public and available data					
Measurement procedures (if any):	N/A					
Monitoring frequency:	Year 1					
QA/QC procedures:						
Any comment:	N/A					
Data / Parameter:	PG	AM00 82	Section n III	Not applicable.	OK	OK
Data unit:	%					
Description:	Annual human population growth					
Source of data:	Official sources & survey					
Measurement procedures (if any):	N/A					
Monitoring frequency:	Year 1					
QA/QC procedures:						
Any comment:	Data collected from official sources or surveys					



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CHECKLIST QUESTION		Ref.	§	COMMENTS	Draft Concl	Final Concl																
<table><tr><td>Data / Parameter:</td><td>kWh<sub>pf</sub></td></tr><tr><td>Data unit:</td><td>KiloWatt</td></tr><tr><td>Description:</td><td>Electricity generation from blast furnace recovered gas in the project</td></tr><tr><td>Source of data:</td><td>Project monitoring data</td></tr><tr><td>Measurement procedures (if any):</td><td>Check the measuring device for power generation and consumption</td></tr><tr><td>Monitoring frequency:</td><td>Annually</td></tr><tr><td>QA/QC procedures:</td><td></td></tr><tr><td>Any comment:</td><td>Data collected from internal sources. Measurement occurs continuously</td></tr></table>		Data / Parameter:	kWh <sub>pf</sub>	Data unit:	KiloWatt	Description:	Electricity generation from blast furnace recovered gas in the project	Source of data:	Project monitoring data	Measurement procedures (if any):	Check the measuring device for power generation and consumption	Monitoring frequency:	Annually	QA/QC procedures:		Any comment:	Data collected from internal sources. Measurement occurs continuously	AM00 82	Section III	Not applicable.	OK	OK
Data / Parameter:	kWh <sub>pf</sub>																					
Data unit:	KiloWatt																					
Description:	Electricity generation from blast furnace recovered gas in the project																					
Source of data:	Project monitoring data																					
Measurement procedures (if any):	Check the measuring device for power generation and consumption																					
Monitoring frequency:	Annually																					
QA/QC procedures:																						
Any comment:	Data collected from internal sources. Measurement occurs continuously																					
g. Are the monitoring arrangements described in the monitoring plan feasible within the project design?		VVM	123	Yes.	OK	OK																
h. Does the monitoring plan provide details regarding calibration of monitoring equipments/instruments or does it include zero check as a substitute for calibration. As per EB guidance related to calibration (monitoring) requirements, zero check can not be considered as a substitute for calibration?		EB 24	37	Provide the evidence of calibration for the monitored equipments/instruments	OK	OK																
i. Are the following means of implementation of the monitoring plan sufficient to ensure that the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified:		VVM	123		OK	OK																
i. data management procedures?		VVM	123	Yes.	OK	OK																
ii. quality assurance procedures?		VVM	123	Yes.	OK	OK																
iii. quality control procedures?		VVM	123	Yes.	OK	OK																
<b>8. Sustainable development</b>																						
a. Does the CDM project activity assists Parties not included in Annex I to the Convention in achieving sustainable development?		VVM	125	Yes.	OK	OK																



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
b. Does the letter of approval by the DNA of the host Party confirm the contribution of the proposed CDM project activity to the sustainable development of the host Party?	VVM	126	The final decision from the DNA will be available only after its first ordinary meeting, after the receiving of all the required documents necessary for evaluation, including this validation report, according to Article 6 of the Resolution nº 1 of CIMGC – Comissão Interministerial de Mudança Global do Clima.	OK	OK
<b>9. Local stakeholder consultation</b>					
a. Were local stakeholders (public, including individuals, groups or communities affected, of likely to be affected, by the proposed CDM project activity or actions leading to the implementation of such an activity) invited by the PPs to comment on the proposed CDM project activity prior to the publication of the PDD on the UNFCCC website?	VVM	128	<p>Yes. The validation team confirms that the process of inviting local stakeholders to comment on the proposed project activity was triggered on 16/03/12 and followed the instructions of the Brazilian Inter-ministerial Commission on Global Climate Change (Comissão Interministerial de Mudança Global do Clima – CIMGC) for the registration of a CDM project activity (ref/37/) (ref/38/).</p> <p>In line with the above, registered letters must be sent to the official addresses of listed institutions, containing an invitation to comment on the project. Stamped envelopes for easy and free of charge mailing return were also sent.</p> <p>From the date of the invitation letters' posting, the CDM-PDD was made available in Portuguese in V &amp; M's website <a href="http://www.vmtubes.com.br">www.vmtubes.com.br</a> and at the project entity's headquarters.</p>	OK	OK
b. Have comments by local stakeholders that can reasonably be considered relevant for the	VVM	129	Yes.	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
proposed CDM project activity been invited?					
c. Is the summary of the comments received as provided in the PDD complete?	VVM	129	The description in the PDD is complete.	OK	OK
d. Have the project participants taken due account of any comments received and described this process in the PDD?	VVM	129	Not applicable, the comments praise the company's initiative and support the project activity.	OK	OK
<b>10. Environmental impacts</b>					
a. Have the project participants submitted documentation on the analysis of the environmental impacts of the project activity?	VVM	131	The project is fully established according to local and national regulations and laws. The validation team has confirmed this through site visit and by checking the Environmental Impact Assessments and Operating Licenses. PP is requested to provide information regarding the environmental licensing in the PDD and the environmental impact studies.	CL 15	OK
b. Have the project participants undertaken an analysis of environmental impacts?	VVM	132	No. V&M do Brasil and V&M Florestal keep the necessary investments to ensure that the social and environmental impacts of the plant are positive. The company is guided by sustainability, both in economic development and environmental conservation and social responsibility, supporting projects to promote citizenship, culture and human development. The V&M Group has the certificates with the highest reputations such as API, OHSAS 18001, ISO 9001, ISO/TS 16949, ISO 14001 and forest management certificate Cerflor, attesting to its excellence in product quality management, administration, environmental management, labour health and safety.	OK	OK



## VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			The validation team considers that the project activity will bring positive environmental impacts.		
c. Does the host Party require an environmental impact assessment?	VVM	132	No.	OK	OK
d. If yes, have the project participants undertaken an environmental impact assessment?	VVM	132	Not applicable.	OK	OK





## VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion





## VALIDATION REPORT

<p>CAR 01: The PDD applies the "Combined tool to identify the baseline scenario and demonstrate additionality" (version 03.0.1). There is an updated version.</p>	<p>3.k.ii</p>	<p>The Combined Tool version was updated throughout the PDD version 2, accordingly. Other changes were made in the PDD in order to comply with the latest version of this tool.</p>	<p>The PDD has been revised and it now incorporates the "Combined tool to identify the baseline scenario and demonstrate additionality" (version 04.0.0; EB 66, Annex 48).</p> <p>Refer to sections B.4 in the PDD. The steps applied to identify the baseline scenario and demonstrate additionality are in line with the Tool.</p> <p>The alternatives considered are:</p> <ul style="list-style-type: none"> <li>• <u>Scenario 1</u> - Iron ore reduction system based on the use of coal coke ;</li> <li>• <u>Scenario 2</u> - Iron ore reduction system based on the use of renewable charcoal, originated from new forest plantations (project scenario);</li> <li>• <u>Scenario 3</u> - Iron ore reduction system based on the use of non-renewable charcoal (originated from non-renewable sources);</li> <li>• <u>Scenario 4</u> - Iron ore reduction system based on the use of a mix of reducing agents;</li> <li>• <u>Scenario 5</u> - Iron ore</li> </ul>	<p>253</p>
			<p>reduction system based on the use of renewable charcoal from planted</p>	



## VALIDATION REPORT

		<p>biomass originated from existing plantations.</p> <p><b>Outcome of Step 1a:</b> the plausible alternative scenarios to the project activity are Scenarios 1, 2, 4 and 5.</p> <p><b>Outcome of Step 1b:</b> The plausible alternative scenarios for the project activity are Scenarios 1, 2, and 4.</p> <p>Barriers analysis (Step 2) considers the alternatives mentioned above (outcome step 1b).</p> <p><b>Outcome of Sub-step 2a:</b> The barriers that would prevent the occurrence of one or more alternative scenarios are:</p> <ul style="list-style-type: none"> <li>a) Barriers/incentives to investment and financing;</li> <li>b) Sectoral and policy barriers;</li> <li>c) Technical and/or regulatory barriers, e.g. different environmental licensing requirements for different reducing agents.</li> </ul>
		<p>The Step 2.b contained in the PDD discusses listed barriers (as above). The evidences and</p>

VALIDATION REPORT



		<p>objective demonstration and assessment of barriers" (EB 50, Annex 13). The mix in reducing agents used in the blast furnace was also addressed in line with the methodology.</p> <p><b>Outcome of Sub-step 2b:</b> the only scenario which is not prevented by any of the mentioned barriers is Scenario 1. Therefore, this scenario (coal coke based iron ore reduction system) has been determined as the baseline scenario.</p> <p><b>Step 3</b> was not applied in the PDD (in line with the methodology), as Step 2 has resulted in only one alternative scenario, i.e. coal coke based iron ore reduction system.</p> <p><b>Step 4</b> has also followed the guidelines and the common practice analysis (including the credibility check) are correct. The F factor <u>is not</u> greater than 0.2 and Nall-Ndiff <u>is not</u> greater than 3.</p> <p>All the sources and references are correctly quoted in the PDD.</p> <p>The conclusion is that the project activity is additional and the baseline scenario is the coal coke</p>



## VALIDATION REPORT

			based iron ore reduction system. <u>CAR 01 is closed.</u>
CAR 02: The PDD applies the “Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity”, version 03.1.0. There is an updated version.	3.k.ii	The “Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity” version was updated accordingly.	The latest tool for the “Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity” (version 04.0.0) has been applied in the revised PDD.  <u>CAR 02 is closed.</u>
CAR 03: The list of documents referred in the PDD shall be presented in a clear manner (e.g. with footnotes or a reference list at the end of the PDD; Annex 3, etc.).	3.l.ii	Although there was already a reference list at the end of the PDD version 1, called “References”, the references of PDD version 1 were all transferred to footnotes in PDD version 2, as requested.	The PDD has been revised and it presents the references in a clear and correct manner. The validation team considers that it allows any reader to understand its content in a comprehensive manner.  <u>CAR 03 is closed.</u>



## VALIDATION REPORT

CAR 04: Guidelines for completing PDD version 7 requires section A.4.1.4 is in maximum one page.		<p>The maps shown in Section A.4.1.4 of PDD version 1 were transferred to Section B.3 in the PDD version 2.</p> <p><u>Note</u> that due to this change some figures numbering was altered in version 2 of the PDD.</p>	<p>The response and revision in the PDD has been accepted by the validation team.</p> <p><u>CAR 04 is closed.</u></p>
CAR 05: The PDD has not demonstrated that the forest plantation is in its last rotation. In line with the methodology, the project proponent shall refer to the plantation management practices which are common practice in the region for the considered species.	5.b.d.xi	<p>Eucalyptus plantations are cultivated in 7-year rotations. After harvesting, a new forest can grow by coppicing. New trees can be planted at every 7, 14 or 21 years (see references EMBRAPA 2003 and AMS 2003, already sent to the audit team).</p> <p>In order to demonstrate that the project activity's forest plantation lands are in the category of forest plantation in its last rotation, official documents from the government body authorizing the reforestation projects to be implemented were sent to the audit team; these authorizations date back to 1974.</p>	<p>The answer has been accepted by the validation, which confirms the references mentioned to demonstrate that the forest plantations are in the category of "last rotation".</p> <p>The supporting evidences have been checked by the validation team. No revision is required in the PDD.</p> <p><u>CAR 05 is closed.</u></p>



## VALIDATION REPORT

CAR 06: The Figure 07 in the PDD contains a word in Portuguese (“ar”), which should be corrected.	5.c.b	The word “AR” was translated accordingly.	The PDD has been revised accordingly. The Figure (now “Figure 4”, due to revisions in the PDD) contains only text in English.  <u>CAR 06 is closed.</u>
CL 01: Clarify why “Vallourec Group” is included in Annex 1. This PP is not included in section A.3 in the PDD version 1 (6/10/2011)	2.a	Vallourec Group is indeed included in Section A.3 of PDD version 1, and therefore is as well included in Annex 1.  However, due to PP internal decision, Vallourec Group was removed from Section 3 in PDD version 2, and so was removed from Annex 1.	The PDD has been revised and “Vallourec Group” was removed from section A.3 and Annex 1 in the PDD.  <u>CL 01 is closed.</u>



## VALIDATION REPORT

CL 02: The board's minutes of meeting where CDM was considered was not provided to the DOE.	3.o.iv	<p>The referred document was sent to the audit team.</p> <p>About the participants:</p> <p>Dr. Marco Antonio - CEO</p> <p>Mr. Manfred Leyerer - CFO</p> <p>Mr. Rubens Ferreira - Superintendent of Planning</p> <p>About signatures:</p> <p>The first is from Dr. Marco Antonio and the second from Mr. Manfred Leyerer. This kind of document was only signed by the board and, as a superintendent, Mr. Rubens has not signed.</p>	<p>The board's minute of meeting was submitted as requested and verified by the validation team.</p> <p>The document is dated 12<sup>th</sup> May 2000 and the DOE has confirmed that the CDM was seriously considered in the decision to implement the proposed project activity, as approved by the company's board of directors, and in line with the guidelines provided by the EB.</p> <p><u>CL 02 is closed.</u></p>
CL 03: The consultant contract with Ecosecurites only contains one page and is not dated.	3.o.iv	<p>The referred document was compiled and sent again to the audit team.</p>	<p>The evidence was submitted and was confirmed by the validation team. The date 12/06/2000 is correct.</p> <p><u>CL 03 is closed.</u></p>



## VALIDATION REPORT

<p>CL 04: The operational lifetime of the project activity is not clear. Explain in more details how it is considered to have “indefinite lifetime” and whether any refurbishments are envisaged or required in the future.</p>	<p>3.x</p>	<p>Further explanation on the operational lifetime of the blast furnace was given in Sections A.4.3 and C.1.2 of PDD version 2.</p>	<p>The PDD has been revised and it now clarifies that the operational lifetime of the project can be considered indefinite, as long as periodic refurbishments in the blast furnace are carried out and the renewable forests are appropriately replanted when they reach their final productive cycle (last rotation).</p> <p>Periodic refurbishments are conducted to replace some items, (e.g. worn out refractories) and every ten years a major refurbishment shall occur in order to keep the blast furnace operation and extend its lifetime. Four years after a major refurbishment other minor repairing are needed to occur every two years.</p> <p>The validation team has confirmed this based on sectoral expertise and the description in the PDD is correct.</p> <p><u>CL 04 is closed.</u></p>
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## VALIDATION REPORT

CL 05: Clarify whether the forest stocks are in the form of productive forest plantations.	5.b.d.xvii	<p>In response to CAR05 official documents from government body authorizing the reforestation projects to be implemented was sent to the audit team. These authorizations date back to 1974 and, therefore, they evidence that in each project activity's farms there were already existing Eucalyptus plantations long before the project implementation.</p> <p>The text in Section B.2 was rewritten for this applicability in order to make it clearer.</p>	<p>The PDD section B.2 was revised in order to include additional information. The validation team has verified the supporting evidences (for all the 14 farms) submitted.</p> <p>The condition in the methodology, that at "least ten years before the implementation of the project activity, no forest stocks were on the land where the dedicated plantations will be established" is complied with.</p> <p>The answer is accepted by the validation team.</p> <p><u>CL 05 is closed.</u></p>
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## VALIDATION REPORT

<p>CL 06: Provide further explanation that there is no burning of biomass in the establishment of the plantations. The PDD only mentions “forestry management practices”.</p>	<p>Protocol page 151 (AM0082 section II)</p>	<p>The burning of biomass as part of soil preparation for the establishment of forest plantations is NOT a practice conducted by the project proponent.</p> <p>The PP’s forestry Management Plan, with a description of all forestry activities performed by the PP as its forest establishment practices, was sent to the audit team.</p>	<p>The validation team has confirmed, based on document review and onsite visit, that the project participant adopts best practice Forestry Management Plan.</p> <p>The “Plan for Forestry Management Plan” (October 2011) was submitted to the validation team, which confirms that there is no burning of biomass in the establishment of the plantations.</p> <p><u>CL 06 is closed.</u></p>
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## VALIDATION REPORT

<p>CL 07: It is not clear whether the national scenario for iron ore reduction has been assessed, taking into account the use of reducing agents in either solid (pig iron manufacturing) or liquid (hot metal used in steelmaking) forms.</p>	<p>Protocol page 158 (AM0082 section II)</p>	<p>The choice of reducing agents bears no connection to the resulting physical state of the primary iron, whether liquid (hot metal) or solid (pig iron). Some clarifications regarding this difference in the state of matter, and also in the peculiarity of Brazilian iron and steel sector, which is divided into integrated and non-integrated (or independent) companies, were added to the text of Sections A.4.3 and B.4, Step 1b, Sector Level. Footnote 79 was also added to the text of Section B.4, Step 4.</p>	<p>The PDD was revised in order to clarify the circumstances and particularities of the iron and steel sector in Brazil, which is divided between “integrated” and “non-integrated” (independent) companies.</p> <p>Please refer to Section B.4 in the PDD (Step 1b). Section A.4.3 was also revised.</p> <p>The validation team concluded that the national scenario for iron ore reduction has been assessed in line with the requirements, taking into account the use of reducing agents in either solid or liquid forms.</p> <p><u>CL 07 is closed.</u></p>
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## VALIDATION REPORT

<p>CL 08: Clarify Figure 18 in the PDD (page 46). It is not clear what are the reducing agents used in each of these new projects (to be established by 2012).</p>	<p>Protocol page 158 (AM0082 section II)</p>	<p>Figure 18 consists only of a picture of the trends of the integrated steel sector in Brazil.</p> <p>The source of the table in Figure 18 (SILVA, 2011) does not specify the reducing agent used by each company listed. However, a research in the Brazil Steel Institute (IABr) and the companies' websites show that the majority use coal coke as a reducing agent in their production.</p> <p>The text in Section B.4 of PDD version 2 was altered in order to clarify this issue.</p>	<p>The PDD has been revised and since the source of data used in Figure 18 (SILVA, 2011) does not specify the reducing agent used by each company listed, the validation team has crosschecked that information with the website from the "Brazil Steel Institute" .</p> <p>This is also confirmed through common practice analysis. The use of coal coke is the current practice in the sector.</p> <p><u>CL 08 is closed.</u></p>
<p>CL 09: Clarify what does the following statement in the PDD mean: "The percentage of carbon in the hot metal in the project situation was conservatively considered as 0." (PDD page 57)</p>	<p>Protocol page 166 (AM0082 section II, page 17)</p>	<p>To clarify this subject the word "conservatively" was deleted from this sentence in PDD version 2.</p>	<p>The answer has been accepted and the formula (i.e. the percentage of carbon in the hot metal in the project situation") is in line with the methodology.</p> <p><u>CL 09 is closed.</u></p>



## VALIDATION REPORT

CL 10: The PDD does not clearly present the refurbishments required in the blast furnace, when the project start date was defined.	6.a.a.d	<p>The items refurbished are listed in Section A.2 of PDD version 2.</p> <p>An internal document for the refurbishment project was sent to the audit team.</p>	<p>The PDD was revised in order to clarify the refurbishments required in the blast furnace.</p> <p>The evidence "SID-0103" was submitted and verified by the validation team. The scope of work is in line with the project description in the PDD.</p> <p><u>CL 09 is closed.</u></p>
CL 11: Clarify whether periodical refurbishments are envisaged during the project's implementation.	6.a.a.d	<p>Every 10 years a major refurbishment shall occur in order to keep the blast furnace functioning and extend its lifetime. Four years after a major refurbishment other minor repairing are needed to occur every two years.</p> <p>This information was inserted in PDD version 2, Sections A.4.3 and C.1.2.</p>	<p>The answer has been accepted by the validation team.</p> <p><u>CL 11 is closed.</u></p>



## VALIDATION REPORT

<p>CL 12: Why is it considered that the contract with “Geoconsult” is related to CDM Activities? Provide further explanation and evidences in order to confirm that real and continuing actions were taken to secure the CDM status in parallel with the project's implementation.</p>	<p>6.h.iii.a</p>	<p>Geoconsult Consultorias Especializadas provides institutional and technical consultancy related to climate change and carbon credit projects. Evidence was already sent to the audit team.</p> <p>Further explanation on the items in Section B.5 and their relation to continuing actions to secure CDM status were added in PDD version 2.</p>	<p>The contract with “Geoconsult” was submitted to the validation team and is dated 17/01/2005. The first payment was done one 20/01/2005.</p> <p>The PDD was revised and it now provides more information on the nature of contracts signed with the consultant, which was confirmed by the validation team through document and website (<a href="http://www.gconsult.com.br/servicos.html">http://www.gconsult.com.br/servicos.html</a>) review.</p> <p><u>CL 12 is closed.</u></p>
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## VALIDATION REPORT

<p>CL 13: Clarify what does the following date and action refer to:          “- 27/07/2009: issuance of duplicate of the Operation License 066/2009/SUPRAM CM;”</p>	6.h.iii.h	<p>This date refers to the Operation License for the Barreiro industry. The duplicate of the original Operation License was issued due to some changes in the conditions (“condicionantes”) applied.</p> <p>However, this item was deleted from Section B.5 as it bears no direct relation to CDM actions.</p>	<p>The PDD was revised and the reference was deleted as it does not refer to CDM related action.</p> <p>The answer is accepted by the validation team.</p> <p><u>CL 13 is closed.</u></p>
<p>CL 14: Provide the evidence of calibration for the monitored equipments/instruments</p>	7.h	<p>The calibration certificate of the steel production scale, responsible to weigh the hot metal, was sent to the audit team. The data on this scale was corrected in PDD version 2, Section B.7.1.</p>	<p>The evidence for calibration certificate of the steel production scale (Serial Number 4041) was verified by the validation team and the information contained in the PDD is correct.</p> <p><u>CL 14 is closed.</u></p>



## VALIDATION REPORT

CL 15: The PP is requested to provide information regarding the environmental licensing in the PDD and the environmental impact studies.	10.a	Further information on the environmental licensing process and impacts were added to Section D of PDD version 2.	<p>The PDD was revised and it now contains the information regarding the environmental licensing and impact studies.</p> <p>The revision was checked and accepted by the validation team. The processes are well described in the PDD and represent the actual situation of the implementation of the proposed project activity.</p> <p>This has been confirmed onsite and through documents review.</p> <p><u>CL 15 is closed.</u></p>
FAR 01 – During project implementation, the DOE responsible for the verification of monitored ERs shall confirm the validity period of the operation license (which expires every four years) from V&M Florestal.	10.a	The validity of the referred license shall be presented to the DOE during the first verification.	





## VALIDATION REPORT

**TABLE 3: SUMMARY OF FINDINGS AFTER ITR**

Draft report clarifications and corrective action requests by validation team	Ref. to section in the PDD	Summary of project owner response	Validation team conclusion
CL 16: PDD at the Page 6 refers to the existence of “long-term contract” to renewable charcoal supply, in disagree with the other information provided, that the supply is only with dedicated plantations.	A.4.3	<p>This information is incorrect and was rectified.</p> <p><u>Second response:</u></p> <p>Due to the use of a template from a different PDD of another project activity, this information was undetected and not appropriately deleted in PDD version 2. This information was deleted in PDD version 3.</p>	<p>PP is requested to provide more details in its response and to mention the version of the PDD in which the information has been corrected.</p> <p>Once changes have been made in the PDD, its version and date shall be updated.</p> <p>CL 16 remains open.</p> <p><u>Second analysis:</u></p> <p>The response was accepted by the validation team.</p> <p><u>CL 16 is closed.</u></p>



## VALIDATION REPORT

<p>CL 17: The Section A.4.1.4. refers to the cities “Brasilândia de Minas” and “Morada Nova de Minas”, not identified in the Farms maps at the Annex 5. The PDD shall clarify which farms are located in more than one municipality.</p>	<p>A.4.1.4</p>	<p>The maps in Annex 5 were changed for farms Brejão (municipality of Brasilândia de Minas), Galheiros (municipalities of Paineiras and Morada Nova de Minas) and Meleiro (municipalities of Curvelo and Felixlandia).</p> <p>A column was inserted in Table 1, in order to clarify which farms are located in more than one municipality.</p> <p><u>Second response:</u></p> <p>Table 1 and the maps in Annex 5 were changed, as per described above, in PDD version 3.</p>	<p>Please mention in which PDD version the information and the table have been inserted.</p> <p>CL 17 remains open.</p> <p><u>Second analysis:</u></p> <p>The answer has been accepted.</p> <p><u>CL 17 is closed.</u></p>
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## VALIDATION REPORT

<p>CL 18: The applicability condition in the methodology, whether blast furnace gas is recovered and used outside of the project boundary for electricity and/or heat generation in the baseline situation, is not clear in the PDD. Further clarification is needed.</p>	<p>B.2</p>	<p>The PP has a CDM small scale project activity registered as Project 0143 for its blast furnace gas recovery for generating electricity/heat.</p> <p>However, all the energy generated and monitored through Project 0143 is used within the Barreiro plant, that is, within this project activity boundary. Therefore, there is no use of blast furnace gas recovery outside this project activity boundary.</p> <p>This clarification was inserted in Section B.2.</p> <p><u>Second response:</u></p> <p>The clarification mentioned above was added to PDD version 3.</p>	<p>Please refer in which version of the PDD it is applicable.</p> <p>CL 18 remains open.</p> <p><u>Second analysis:</u></p> <p>The response has been accepted.</p> <p><u>CL 18 is closed.</u></p>
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## VALIDATION REPORT

CL 19: The PDD shall clarify (in a summarized manner) and “in an objective way how the CDM alleviates each of the identified barriers to a level that the project is not prevented anymore from occurring by any of the barriers”, as per EB 50 Annex 13, Guideline 2). This information shall be included in section B.5 in the PDD.	B.4	<p>A new paragraph was inserted in Section B.5 in order to address this clarification request.</p> <p><u>Second response:</u></p> <p>The new paragraph mentioned above was inserted in PDD version 3.</p>	<p>PP is requested to mention in which PDD version the information has been included.</p> <p>CL 19 remains open.</p> <p><u>Second analysis:</u></p> <p>The first paragraph in section B.5 in the PDD has presented in an objective way how the CDM alleviates the identified barriers.</p> <p><u>CL 19 is closed.</u></p>
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## VALIDATION REPORT

<p>CL 20: In order to clarify the estimated hot metal production level (650,000 ton/year), further information shall be included in the PDD regarding this assumption.</p>	<p>B.6.1</p>	<p>650,000 tonnes of hot metal/year is the rated capacity of VMB two blast furnaces. This was attested by a technical report made by RS Consultants, experts in iron and steel production (sent to the audit team).</p> <p>A sentence clarifying this issue was inserted in Section B.6.1.</p> <p><u>Second response:</u></p> <p>The sentence mentioned above was inserted in PDD version 3.</p> <p>The information in VMB website refers to the company's production of 550,000 tonnes of <u>steel tubes</u> per year.</p> <p>The figure 650,000 refers to the rated capacity of both VMB blast furnaces to produce <u>hot metal</u> (primary iron) in tonnes per year (650,000 tonnes hot metal/year).</p>	<p>In accordance to the VMB website (<a href="http://www.vmtubes.com.br/vmbInternet/calandra.nsf/0/0EA9B139206CC24B032572FA007EF9C8?OpenDocument&amp;pub=T&amp;proj=Internet">http://www.vmtubes.com.br/vmbInternet/calandra.nsf/0/0EA9B139206CC24B032572FA007EF9C8?OpenDocument&amp;pub=T&amp;proj=Internet</a>) the capacity/ year is 550,000 tonnes. Please explain.</p> <p>CL 20 remains open.</p> <p><u>Second analysis:</u></p> <p>The answer has been accepted by the validation team.</p> <p><u>CL 20 is closed.</u></p>
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## VALIDATION REPORT

<p>CL 21: Local Stakeholder consultation: It is not identified the letters sent to:</p> <ul style="list-style-type: none"> <li>- Abaeté: Municipal environmental body</li> <li>- Curvelo: Public prosecutor</li> <li>- Felixlandia: Public prosecutor</li> <li>- João Pinheiro: Public prosecutor</li> <li>- Lagoa Grande: Public prosecutor</li> </ul> <p>Moreover:</p> <ul style="list-style-type: none"> <li>- to community associations, only is identified the letters sent to João Pinheiro and Curvelo.</li> <li>- Identify in which Municipality, the entity is: "Centro de Educação Infantil Arca da Aliança – children school"</li> </ul>	E.1	<p>The clarifications are as follows:</p> <p>-The letter to the municipal environmental body is identified in version 2 of the PDD as "CODEMA - Conselho Municipal de Conservação e Defesa do Meio Ambiente/ Secretariat – Abaeté – municipal environmental body"</p> <p>No change was needed in PDD version 3 due to this observation.</p> <p>- Curvelo and Felixlandia's Public Prosecutor is the same. Felixlandia is part of the Judicial District of Curvelo. The information was inserted in the stakeholder's table in the PDD Section E.</p> <p>- João Pinheiro and Brasilândia de Minas' Public Prosecutor is the same. Brasilândia is part of the Judicial District of João Pinheiro. The information was inserted in the stakeholder's table in the PDD Section E.</p> <p>- Lagoa Grande is part of the Judicial District of Presidente Olegário. This information was inserted in the PDD. (Do note, however, that Presidente Olegário municipality is NOT within this project activity boundary).</p> <p>The respective delivery receipts were sent to the audit team as evidence.</p> <p>-The identification of the communities' municipalities was rectified in the stakeholders table in Section E of the PDD. The delivery receipts of all the communities were sent to the audit team.</p> <p>- Centro de Educação Infantil Arca da Aliança – children school is located in Belo Horizonte. The delivery receipt was sent to the audit team.</p> <p>Second response:</p> <p>All the information mentioned in the bullet points above were inserted in Section E of PDD version 3.</p>	



## VALIDATION REPORT

CAR 7: The PDD at the Section A.2 didn't explain how the proposed project activity reduces greenhouse gas emissions making reference to the scenarios, emission sources and gases described in sections. Refer to EB 41, Annex 12.	A.2	<p>A new paragraph was added to Section A.2 to better explain the emission reductions proposed by the project activity, considering information in Sections A.4.3 and B.3 (EB41, Annex 12).</p> <p><u>Second response:</u> The new paragraph was added to PDD version 3.</p>	<p>Please confirm in which version of the PDD this information has been added.</p> <p>CAR 7 remains open.</p> <p><u>Second analysis:</u> The response was checked and accepted.</p> <p><u>CAR 7 is closed.</u></p>
CAR 8: Section A.4.4: The text after the table is not applicable and shall be removed from the PDD.	A.4.4	<p>The text was removed as requested.</p> <p><u>Second response:</u> The text was removed from PDD version 3.</p>	<p>Please confirm in which version of the PDD the text has been removed.</p> <p>CAR 8 remains open.</p> <p><u>Second analysis:</u> The response was accepted.</p> <p><u>CAR 8 is closed.</u></p>



## VALIDATION REPORT

<p>CAR 9: The Table 2, in its left column, only has a letter "A". It should be "Project Activity". Moreover, correct "Transportation of reducing agents" x "Reducing agents transportation" and "Production of reducing agents" x "Reducing agents production"</p>	<p>B.3</p>	<p>Table 2 is marked "allow row to break across pages" (a Word2007 function for tables). This is the reason why it only shows the letter "A", a contraction of "Project Activity", due to the row breaking across pages. Table 2 was better positioned in the page to avoid the contraction of words.</p> <p>The other corrections were made accordingly.</p> <p><u>Second response:</u></p> <p>All corrections mentioned above were made in PDD version 3.</p>	<p>Please confirm in which version of the PDD the correction has been made.</p> <p>CAR 9 remains open.</p> <p><u>Second analysis:</u></p> <p>The answer has been accepted.</p> <p><u>CAR 9 is closed.</u></p>
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## VALIDATION REPORT

<p>CAR 10: In line with EB 41, Annex 12, section B.5, the PDD shall provide more information regarding the implementation timeline (e.g. actions or events) related to the implementation of the dedicated plantations and charcoal production. Furthermore, provide more information regarding the second blast furnace used in the project activity and any refurbishment of it.</p>	<p>B.5</p>	<p>Regarding more information on the implementation timeline, it was inserted in Section B.5 the dates of the first plantings of the dedicated plantations under the new iron ore reduction system in each of the project activity's farms (evidence was sent to the audit team). As for the charcoal production information, all charcoal produced with wood from the project activity's dedicated plantations are entirely directed to VMB's primary iron production. To clarify this point, the Mission of VMFL, the charcoal supplier, was copied to Section B.5. Also, the starting date of monitoring the carbonization procedures according to the AM0041 provisions was inserted in the same Section (evidence was sent to the audit team).</p> <p>It was also inserted information regarding the refurbishment of Blast Furnace 2 (the refurbishment contract was sent to the audit team).</p> <p><u>Second response:</u></p> <p>The information on the implementation timeline was inserted in Section B.5 of PDD version 3.</p>	<p>Dates and information are clear but PP is requested to clearly mention for which version of the PDD it is applied.</p> <p>CAR 10 remains open.</p> <p><u>Second analysis</u></p> <p>The response was accepted.</p> <p><u>CAR 10 is closed.</u></p>
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## VALIDATION REPORT

<p>CAR 11:</p> <ul style="list-style-type: none"> <li>- <math>P_{PJ,y}</math>: Source of data: "Project entity records: calibration certificates" is not correct. It should be "Iron reduction facility operation".</li> <li>- <math>F_{PJ,charcoal}</math>: Monitoring frequency: it should be "Monitored daily, calculated annually", and is informed as "Monthly".</li> <li>- <math>AVD_{i,PJ,y}</math>- correct KM x km</li> <li>- "Values" applied should not be presented in section B.7.1 as per they will be determined during the verification process.</li> </ul>	B.7.1	<p>The information was rectified accordingly.</p> <p><u>Second response:</u></p> <ul style="list-style-type: none"> <li>-The information was rectified, as per above, in PDD version 3.</li> <li>-All "km" in PDD version 3 are corrected as requested.</li> <li>-The tables in Section B.7.1 of PDD version 3 follow the model prescribed by AM0082 version 1, which is slightest different from the model presented in the Guidelines EB41 Annex 12. In the tables presented in EB41 Annex 12, page 16, there is a row for "<i>Value of data applied for the purpose of calculating expected emission reductions in section B.5</i>".</li> <li>As the tables prescribed in AM0082 version 1 do not have a row for values of expected emission reductions, the PP, in order to offer the information, added "<i>Value applied</i>" to each table in Section B.7.1 of PDD version 3, in the row "<i>Measurement procedures (if any)</i>".</li> </ul>	<p>PP is required to review all the data mentioned in this CAR and confirm in which version of the PDD it was included.</p> <p>CAR 11 remains open.</p> <p><u>Second analysis:</u></p> <p>The response has been accepted. The "value applied" row is in line with the template table presented in EB 41, Annex 12. Whereas the table in the methodology does not follow precisely the table contained in the guidelines, the DOE considers it appropriate to mention the applied value for the purpose of <i>ex-ante</i> calculations in this section in the PDD. It does not affect the calculations of monitoring plan procedures.</p> <p><u>CAR 11 is closed.</u></p>
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## VALIDATION REPORT

CAR 12: Regarding the start date of the Crediting Period, correct the text: "The project activity will start on the date of project registration."	C.2.1.1	<p>The sentence was rectified accordingly.</p> <p><u>Second response:</u> The sentence was rectified in PDD version 3.</p>	<p>PP is required to clarify in which version of the PDD the sentence has been rectified.</p> <p>CAR 12 remains open.</p> <p><u>Second analysis:</u> The response has been accepted.</p> <p><u>CAR 12 is closed.</u></p>
CAR 13: PDD version 2 section B.2: the introductory discussion (2 first paragraphs) does not follow the guidelines for completing PDD (EB 41 Annex 12) which states: "Please justify the choice of methodology by showing that the proposed project activity meets each of the applicability conditions of the methodology. Explain documentation that has been used and provide the references to the document or include the documentation in Annex 3"	B.2	<p>The introductory discussion (2 first paragraphs) was deleted from Section B.2 of PDD version 3.</p>	<p>The response has been verified and accepted.</p> <p><u>CAR 13 is closed.</u></p>



## VALIDATION REPORT

<p>CAR14: The steps 1a and 1b used in the PDD do not match with the ones in the Combined tool to identify the baseline scenario and demonstrate additionality v4.</p>	<p>B.4</p>	<p>According to AM0082 version 1 page 10, Step 1 is "<i>Identification of alternative scenarios</i>", followed by "<i>Sub-step 1a Compliance with actual laws and regulations</i>" and "<i>Sub-step 1b Assessment of supply and demand of reducing agents</i>".</p> <p>The Combined tool EB66 Annex48 presents "Step 1: Identification of alternative scenarios", "Step 1a: Define alternative scenarios to the proposed CDM project activity" and "Step 1b: Consistency with mandatory applicable laws and regulations". In fact, the steps prescribed by AM0082 version 1 offer the exact same information as the ones in EB66 Annex48, plus a very specific step, which is "<i>Sub-step 1b: Assessment of supply and demand of reducing agents</i>".</p> <p>As a methodology always takes precedence over the tools, the steps determined by AM0082 version 1 were used in PDD version 3.</p>	<p>The response was checked and accepted by the validation team, which confirms that the steps prescribed by AM0082 version 1 offer the exact same information as the ones in EB66 Annex48, plus a very specific step, which is "<i>Sub-step 1b: Assessment of supply and demand of reducing agents</i>".</p> <p><u>CAR 14 is closed.</u></p>
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