VALIDATION REPORT
LLOYDS METALS AND ENGINEERS LIMITED

VALIDATION OF THE
LMEL 25 MW WASTE HEAT BASED CAPTIVE POWER PLANT

REPORT NO. INDIA-VAL/261.49/2012

REVISION NO. 02

BUREAU VERITAS CERTIFICATION

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Client:	Client ref.:
Lloyds Metals and Engineers Limited	Mr. Mukesh R. Gupta

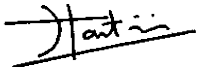
Summary:

Bureau Veritas Certification has made the validation of the "LMEL 25 MW Waste Heat based Captive Power Plant" project of Lloyds Metals and Engineers Limited located in Ghugus village of Chandrapur district in Maharashtra state of India 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 and Corrective Actions Requests (CL and CAR), 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 ACM0012 Version 4 and meets the relevant UNFCCC requirements for the CDM and the relevant host country criteria.

Report No.:	Subject Group:		
INDIA-val/261.49/2012	CDM		**Indexing terms**
Project title:			Work approved by:
LMEL 25 MW Waste Heat based Captive Power Plant			Mr Matthieu Martini 
Work carried out by:			
Mr. Sanjay Patankar – Team Leader Mr. Pramod Kamble – Team Member Mr. T. Ramesh – Team Member CA G.N. Jayaram – Financial Expert			☒ No distribution without permission from the Client or responsible organizational unit
Internal Technical Review carried our by:			
 Mr. H.B. Muralidhar			☐ Limited distribution
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1 INTRODUCTION

Lloyds Metals and Engineers Limited (hereafter referred as “LMEL”) has commissioned Bureau Veritas Certification to validate its CDM project “LMEL 25 MW Waste Heat Based Captive Power Plant” (hereafter called “the project”) at Ghugus village of Chandrapur district in Maharashtra state of India.

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	Mr. Sanjay Patankar	☒ Yes ☐ No	☒ DR ☒ SV ☐ RI
Verifier	Mr. Pramod Kamble	☐ Yes ☒ No	☒ DR ☐ SV ☐ RI
Verifier	Mr. T. Ramesh	☐ Yes ☒ No	☐ DR ☒ SV ☐ RI

Financial Specialist	CA. G.N. Jayaram	☐**Yes** ☒ **No** ☒**DR** ☐**SV** ☐**RI**
Internal Technical Reviewer (ITR)	Mr. H.B. Muralidhar	☒**Yes** ☐ **No** ☒**DR** ☐**SV** ☐**RI**
Final Report Issuance	Mr. Matthieu Martini	☐**Yes** ☒ **No** ☐**DR** ☐**SV** ☒**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 55th 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 LMEL 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, LMEL revised the PDD and resubmitted it on Nov-2012.

The validation findings presented in this report relate to the project as described in the PDD version 09.

2.2 Follow-up Interviews

On 04/01/2010 to 07/01/2010 Bureau Veritas Certification performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of LMEL were interviewed (see References). The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

➢ **Interviewed organization**	➢ **Interview topics**
Lloyds Metals and Engineers Limited	➢ CDM Consideration ➢ Methodology Applicability ➢ Baseline Determination ➢ Additionality ➢ Local stakeholder consultation and resolution of their concerns ➢ Supporting data and documentation ➢ Resolution of CARs and CLs
LOCAL Stakeholder	➢ Views and concerns about the project activity ➢ Confirmation of the local stakeholder meeting conducted by Lloyds Metals and Engineers Limited
Lloyds Steel Industries Ltd.	➢ Monitoring System at site ➢ Metering system at site

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.

The validation team may also use the term Clarification Request (CL), if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

To guarantee the transparency of the verification process, the concerns raised are documented in more detail in the verification 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 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.

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. The validation of the Project resulted in 20 Corrective Action Requests (CARs) and 22 Clarification Requests (CLs).

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

3.1 Approval (49-50)

India is the only party involved in the project activity at this stage and is the host party. Project participant, M/s Lloyds Metals and Engineers Limited, have obtained approval from DNA of India. DOE has received a letter of approval (Ref /7/) from project participant and the following is support documentation:

- Initial application to DNA for Host Country Approval dated 17/01/2007
- Reapplication to DNA for Host Country Approval dated 08/10/2008
- Final application to DNA for Host Country Approval dated 24/10/2009 (Ref /5/)
- Invitation letter from DNA (MoEF) for HCA meeting dated 12/11/2009 (Ref /6/)
- Host country Approval dated 12 January, 2010 (Ref /7/)

The validation team confirmed the authenticity of the approval by verifying the original host country approval letter received by project participant from DNA of India. It is observed that title of the project mentioned on host country approval is matching with the title in webhosted PDD. Hence it is confirmed that HCA accorded by DNA of India is for project activity titled “LMEL 25 MW Waste Heat based Captive Power Plant” as stated in webhosted PDD. The letter of approval with file number 4/20/2009-CCC dated 12 January 2010 clearly states that India has ratified the Kyoto Protocol and the approval is for voluntary participation in CDM project activity. Also, the letter of approval mentions that project contributes to sustainable development. The DNA approval refers to the precise

proposed CDM project activity title in the PDD being submitted for registration. The letter is unconditional with respect to party to the Kyoto Protocol, voluntary participation, contribution to sustainable development. The validation team confirms that this letter is in accordance with paragraphs 45 – 48 of VVM version 1.2.

Bureau Veritas Certification received this letter from the project participants and does not doubt its authenticity since validation team verified the original copy of the HCA approval and also confirmed the authenticity of approval from the website of DNA of India.

3.2 Participation (54)

The participation of project participant has been approved by India, which is a Party to the Kyoto Protocol. This was checked from UNFCCC website http://maindb.unfccc.int/public/country.pl?country=IN.

The validation team also reviewed the Host Country Approval (HCA) (Ref /7/) which describes the participation of Lloyds Metals and Engineers Limited being approved by the Government of India, which is a party to the Kyoto Protocol. The project was webhosted on the UNFCCC site for global stakeholder comments as per CDM requirements from 24th October 2009 to 22nd November 2009. There were no comments received from stakeholders for the project activity during webhosting period.

3.3 Project design document (57)

The validation team hereby confirms that the PDD complies with the latest forms and guidance documents for completion of PDD. The PDD is as per Guidelines for Completing the Project Design Document (CDM-PDD) (EB41 Annex 12) (Ref /39/)

3.4 Changes in the Project Activity

PDD, Version 09 has the following major changes with respect to version 05 which was webhosted.

1. Description in section A.2 on scenario existing prior to the start of the implementation of project activity, project activity scenario and baseline scenario has been modified in line with the PDD completeness guidelines. Sustainable development criteria are defined and modified as per four criteria stated on MoEF website viz., social, economical, environmental and technological well being for sustainable development.

2. The description related to “Project scenario” is modified in section A.2 of the revised PDD to include the detail description of steam requirement from FBC boiler. Steam from FBC boiler is required to maintain the healthy operation of turbine in case steam from WHRBs is not available when sponge iron kilns are in shutdown mode.

3. Section A.4.3 of the PDD is revised in line with the guidelines to complete CDM-PDD to include the description of pre-project scenario, project scenario and baseline scenario incorporating the details about technologies, systems and equipments involved. The equipment list in operation in pre-project scenario is provided with the reference document source. Further LMEL manufacturing facility power consumption and surplus power available from the project activity is provided in tabular format to understand the internal power consumption and surplus power available for sale to third party.

4. Section B.1 is revised with the latest approved versions of methodology ACM0012 version 4 and tools referred by it.

5. Section B.2 of the PDD is modified with the applicability conditions of the revised methodology ACM0012 version 4.

6. Section B.3 of the PDD is revised to include more explanation towards inclusion or exclusion of particular GHG gas in project activity for emission reduction calculations.

7. Section B.4 of the PDD is modified by PP in line with the requirements of revised approved baseline methodology ACM0012 version 4. Accordingly three steps to indentify baseline scenario have been followed to arrive at the most applicable baseline scenario for the project activity instead of four step procedure given in earlier versions. Levelized cost is calculated for most realistic and credible baseline alternatives to arrive at the baseline scenario instead of IRR workings provided in webhosted PDD. The baseline scenario identified for the project is generation of equivalent power from the NEWNE grid.

8. Section B.5 of the PDD is revised by following the latest version of additionality tool viz., version 6.0.0 as contain in EB65, Annex 21. For demonstration of additionality, benchmark analysis is considered in line with the step 2 of the additionality tool in revised PDD instead of comparison analysis provided in webhosted PDD. Selection of benchmark analysis is done in line with paragraph 19 of the guidance on assessment of investment analysis, version 5, EB 62. PP has now calculated equity IRR as appropriate financial indicator for the project activity and compared with the cost of equity (RoE) benchmark.

9. Step 3 i.e. barrier analysis of additionality tool is now removed in response to CARs raised during validation process. The same is optional to demonstrate additionality. The additionality of project activity is now demonstrated with only optional step 2 i.e. investment analysis of the additionality tool among step2 and step 3.

10. Common practise analysis is now modified with the consideration of similar project activities operating at the time of start date of the project. Common practice is explained in line with the paragraph 6 and 47 of the revised additionality tool version 6.0.0.

11. Section B.6 of the PDD is revised to calculate ex-ante emission reductions from the project activity. PDD is modified to discuss and provide explanation of methodological choices to calculate baseline and project emissions from the project activity. Baseline emissions are estimated by following the flowchart provided in revised methodology ACM0012 version 4. Notations of all the equations mentioned in webhosted PDD is corrected through out the PDD in line with the standard notations provided in methodology.

12. Section B.6.2 of the PDD is modified by inclusion of more parameters that are available at the time of validation of the project activity, like "$Q_{BL,product}$" and "$q_{wcm,product}$". Also specific enthalpy of steam and density of waste flue gases are added as parameters in section B.6.2. Section B.6.3 of the PDD is revised with all the steps of latest version of emission factor tool i.e. ver 2.2.1 to calculate emission factor for the project activity. Detail ex-ante calculation of baseline emission along with the data in tabular form is provided to calculate "*fcap*" and "*fwcm*" factors. Justification of PLF to be achieved in project activity is demonstrated based on plant historical data and based on power plant supplier technical data. Further details regarding the auxiliary consumption and other input parameters for emission reduction calculation are described in detail in section B.6.

13. Section B.7 of the PDD is modified by inclusion of additional monitoring parameters in section B.7.1. The new monitoring parameters such as "Quantity of electricity supplied to recipients", "temperature of WECM at WHR boiler inlets" and "fraction of total electricity generated that is supplied to individual recipients" are added as monitoring parameters. All monitoring parameters are clearly described with additional information on monitoring and recording frequency, accuracy class and details of responsible persons for data recording. QA/QC process for individual parameter is described in detail. Estimated data values are provided for each of the monitoring parameters.

14. Section B.7.2 is updated with responsibility of individual professionals for monitoring the project activity parameters. Detail monitoring plan is now provided in Annex 4 to PDD which elaborates the metering system, calibration procedure, procedures for identifying and dealing with uncertainties in monitored data, experience and training of personnel, emergency preparedness plan. Also details about internal CDM audit are included.

15. Section C is modified with correction in project start date and crediting period start date.

16. Local stakeholder's comments were received for the project activity on 09/02/2007. The details about the persons making the comments and summary of comments is described in detail in section E of the revised PDD.

17. Annex-1 of the PDD is updated with new contact details and email ID.

18. Annex-3 of the PDD is updated to provide the calculation of emission factor in detail along with the supporting emission factor data from CEA database version 4 (Ref /44/)

During the course of validation, CAR-1 was raised since the purpose of project activity and pre-project, baseline and project scenario were not clearly described. Also section A.2 contains typographical errors on number of boilers involved in project activity. Same was also highlighted in CL-8. PP modified the description in section A.2 of PDD to include clear description of purpose of project activity, pre-project scenario and project scenario under separate titles. Also brief description of baseline scenario as identified in section B.4 is provided to clearly understand the project activity. Corrections also made in section A.2 to mentions total 5 WHRBs and 1 FBC boiler as a source of steam for power plant. Therefore CAR-1 and CL-8 was closed by validation team.

CL-2 was raised as the description provided in webhosted PDD section B.5 regarding the additional 4 WHR boilers apart from project activity 5 WHR and 1 FBC boiler was not clear. In webhosted PDD, it was stated that *"the additional 4 number WHRB steam will improve the PLF of CPP and a new turbine can be added for use along with existing turbine to increase the electricity generation at a later date."* The statement was not clear as to whether it refers to WHRB's to be added in future or the present WHRB's in project activity. In response to CL raised, PP removed above statement from revised PDD. It was clarified that these are additional 4 WHR boilers which will be installed as a part of future expansion activity in LMEL site. Validation team checked the Board resolution copy which clearly states that the 25 MW generation is from 5 waste heat recovery boilers. The board referred to 4 additional boilers which will be installed when additional 4x100 TPD kilns will be installed in future as planned expansion. Validation team also checked the consent to establish obtained for these kilns which are issued on 20/02/2006, however till date these kilns are not commissioned.
Since the reference to additional 4 boilers is removed from revised PDD, CL-2 was closed by validation team.

CL-4 was raised as project description in section A.2 was stating the contribution of FBC boiler steam as 13.2 TPH however in section B.7.1, the quantity of steam from FBC boiler was mentioned as 20 TPH which is contradictory. In response to CL-4, PP clarified that to operate the 30 MW turbine, steam is required at rated capacity equal to 123 TPH. Out of the total 123 TPH steam requirement, 5 WHR Boilers can generate 103 TPH steam which is capable of generating 25.24 MW electricity. Therefore additional required steam is taken from the 90 TPH FBC boiler. It will be equivalent to 123-103= 20 TPH.

If 5 WHR boilers operate at optimum conditions then they can generate total 109.2 TPH steam which can generate optimum of 26.76MW power. To operate 30 MW design turbine, steam requirement is 122.4 tonnes/hr. Therefore additional 13.2 tonnes steam was arrived from FBC boiler i.e. 122.4-109.2 =13.2 tonnes

The design steam requirement for the power plant is provided in technical data sheets submitted to LMEL by power plant supplier. PP has now revised the PDD; section A.4.3 to mention only higher steam requirement of 20 TPH from FBC boiler which has rated capacity of 90 TPH. Therefore with this justification CL-4 was closed.

Validation team raised CL-6, as power requirement for LMEL sponge iron plant in pre-project scenario and power demand/ supply situation was not clearly described in webhosted PDD. In response to CL raised, PP provided the detail power demand and supply capacity of sponge iron plant in tabular format in section A.4.3 of revised PDD. Power requirement of LMEL facility is 3.5 MW and auxiliary consumption of power plant is 2.5 MW. This will add up to 6 MW of internal power requirement. From project activity effectively 21MW power can be generated considering power generations at 70% load from 30MW captive power plant. Therefore surplus of 15 MW will be available for export. Hence clarification provided by PP is accepted by validation team and CL was closed.

The validation team hereby confirms that the PDD complies with the latest PDD format (Ref /40/) and PDD Completeness Guidelines (Ref /39/) for completion of PDD.

3.5 Project description (64)

The process undertaken to validate the accuracy and completeness of the project description is as follows.

The project activity involves the installation and operation of 30MW Captive power plant by utilising waste heat contained in the waste flue gases released from ABC (After Burning Chamber) of existing 1 x 500 TPD and existing 4 x 100 TPD DRI sponge iron kilns in the manufacturing process of sponge iron facility of LMEL at M/s Lloyds Metals & Engineers Limited at Ghugus Village in Chandrapur district, Maharashtra state, India. Additional supplementary steam to run 30 MW turbine is provided from 90 TPH coal fired FBC boiler. The power generated by the project

activity will be used to meet the captive consumption demand of approximate 3.5 MW of LMEL facility and 2.5 MW auxiliary consumption of power plant. The remaining power will be sold to third party via wheeling the power through regional western grid which is part of NEWNE grid under a firm power purchase agreement (Ref /16/).

The contribution of waste heat based power generation by utilization of waste flue gases coming from 5 DRI kilns is 25 MW. At optimum conditions total of 109.2 TPH steam is supplied by 5 WHRBs which is sufficient to produce the minimum 25 MW power. Additional 20 TPH steam is supplied from coal fired FBC boiler to run 30 MW turbine. In line with the requirement of the methodology "*fwcm*" factor is evaluated which gives the contribution or percentage of power generation from available waste heat only. Therefore emission reductions are evaluated for power generation by using waste heat of flue gases and power generation by FBC boiler steam is avoided effectively in emission reduction calculation.

Project activity is generation of power to the tune of 25 MW by utilization of waste heat available at LMEL facility. Thus, this project will lead to a reduction in GHG emissions that would otherwise have occurred by generating electricity from conventional fossil fuel based sources in the NEWNE grid.

The project is expected to be in line with host-country requirements because:

- it is approved for voluntary participation by DNA of India and fulfils sustainable development criterias.
- it provides direct and indirect employment to the local people
- it provides electricity to the deficient electricity grid of western region which is part of NEWNE grid.
- it leads to reduced fossil fuel consumption.

The validation team validated the accuracy of the project description through a combination of steps consisting of review of the purchase orders (Ref /9/ and /11/) related to the project activity, NOC from MSEDCL for evacuation of power to grid (Ref /12/), site visit and interview of the project participant and their representatives. The confirmation that the surplus electricity generated from the project activity will be exported to third party i.e. Indrajit Power Trading Company Pvt. Ltd. (IPTPL) via wheeling through grid is available by means of PPA (Ref /16/).

Based on site visit, document review and interviews conducted, the validation team hereby confirms that the project description in revised PDD (Ref /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 of methodology are described below.

The proposed Project Activity "LMEL 25MW Waste Heat based Captive Power Plant" uses the approved methodology ACM0012, Version 4 (Ref /41/).

Applicability Condition-1: *The consolidated methodology is applicable to project activities implemented in an existing or Greenfield facility converting waste energy carried in identified WECM stream(s) into useful energy. The WECM stream may be an energy source for:*

- *Generation of electricity;*
- *Cogeneration;*
- *Direct use as process heat source;*
- *Generation of heat in element process;*
- *Generation of mechanical energy; or*
- *Supply of heat of reaction with or without process heating.*

The project activity is implemented in existing facility which is checked from the historical sponge iron production data for existing 1X500 TPH and 4X100 TPH DRI kilns. The WECM stream in project activity is waste flue gases coming from after burning chamber of sponge iron kilns which is used for generation of power by recovering of waste heat. Project activity involves the installation of 5 WHRBs on individual 5 Kilns to generate steam and to operate 30 MW turbine along with additional steam from 90 TPH FBC boiler. Therefore this applicability condition is fulfilled for the project activity.

Applicability Condition-2: *In the absence of the project activity, the WECM stream:*

(a) Would not be recovered and therefore would be flared, released to atmosphere, or remain unutilized in the absence of the project activity at the existing or Greenfield project facility; or

(b) Would be partially recovered, and the unrecovered portion of WECM stream would be flared, vented or remained unutilised at the existing or Greenfield project facility.

At LMEL facility, in absence of project activity the WECM stream i.e. flue gases would not be recovered and therefore would be released to atmosphere. Validation team checked during site visit that waste flue gases were passed through water scrubber for cooling them off and finally sent to atmosphere via ESP. There is no utilization of waste heat in sponge iron manufacturing process. Validation team also verified EIA report 2005 prepared for expansion of existing sponge iron

facilities at LMEL wherein it is confirmed that waste gases were sent to Gas Conditioning Towers (i.e. Water Scrubbers) and released to atmosphere via ESPs. Therefore this applicability conditions is fulfilled for the project activity.

Applicability Condition-3: *Project activities improving the WECM recovery may (i) capture and utilise a larger quantity of WECM stream as compared to the historical situation in existing facility, or capture and utilise a larger quantity of WECM stream as compared to a reference waste energy generating facility.; and/or (ii) apply more energy efficient equipment to replace/modify/expand waste energy recovery equipment, or implement a more energy efficient equipment than the reference waste energy generating facility.*

As stated in above applicability condition number 2, waste gases were sent to Gas Conditioning Tower for cooling and finally released to atmosphere via ESP. Therefore there was no recovery of heat from waste flue gases in pre project scenario and thereby heat was wasted. Hence this applicability condition is not applicable. The project activity is new facility within the premises of LMEL and uses 100% of flue gases coming from 4x100 tpd and 1x500 tpd kilns by providing a separate WHRB for each kiln for power generation.

Applicability Condition-4: *The methodology is applicable under the following conditions:*

- *For project activities which recover waste pressure, the methodology is applicable where waste pressure is used to generate electricity only and the electricity generated from waste pressure is measurable;*
- *Regulations do not require the project facility to recover and/or utilize the waste energy prior to the implementation of the project activity;*
- *The methodology is applicable to both Greenfield and existing waste energy generation facilities. If the production capacity of the project facility is expanded as a result of the project activity, the added production capacity must be treated as a Greenfield facility;*
- *Waste energy that is released under abnormal operation (for example, emergencies, shut down) of the project facility shall not be included in the emission reduction calculations.*

- Project activity uses only waste heat from waste gases to generate electricity. Hence applicability condition under waste pressure recovery is not applicable.

- Regulations do not require LMEL to recover and/or utilise the waste energy prior to the implementation of project activity. Validation team has checked the consent to operate for 500 TPD kiln dated 12/05/1997 and 07/05/2003 along with consent to operate for 4 X 100 TPD kilns dated 20/02/2006 as received from Maharashtra Pollution Control

Board (MPCB). These consents do not mandate to recover the waste heat.

- The sponge iron kilns are in existing facilities which are generating the waste flue gases and operating prior to implementation of project activity. Validation team confirm the same from historical plant operational data, site visit and review of past three years balance sheet of the company. Also consent to operate was verified for both 500 TPD and 100 TPD type kilns. It is confirmed that the production capacity of the project facility remains same in presence of project activity.

- The PDD does not take into consideration any waste gas released under abnormal conditions. Validation team checked the consent to operate dated 20/02/2006 for 100 tpd kilns which mentions the possible abnormal conditions when the flue gases are let into atmosphere through top of ABC. They are
1) Process Disturbance i.e. kilns are shut down
2) Non-Functioning of kiln off gas system i.e. Failure of boilers
In this case no steam generation will be possible from associated WHRB on affected kiln. The other abnormal condition of kiln shut down will result into no flow of waste flue gases and WHR boiler will get shut down.

Therefore project activity fulfils the applicability condition number 4 above.

Applicability Condition-5: *If multiple waste gas streams are available in the project facility and can be used interchangeably for various applications as part of the energy sources in the facility, the recovery of any waste gas stream, which would be totally or partially recovered in the absence of the project activity, shall not be reduced due to the implementation of CDM project activity. For such situations, the guidance provided in Annex 3 shall be followed.*

During site visit, validation team checked that each kiln produces single stream of WECM i.e. flue gases and was using water scrubber where the temperature was brought down by water which is then put in drain and then gases released to atmosphere for each stream. Hence waste heat was being released to atmosphere. Therefore there is no recovery of any heat before the project activity. In the project activity separate dedicated WHRBs are provided for each kiln for total recovery of waste heat. Since there was no total or partial recovery of waste flue gases in absence of project activity, therefore this applicability condition is not applicable for project activity.

Applicability Condition-6: *The methodology is **not** applicable to the cases where a WECM stream is partially recovered in the absence of the CDM project activity to supply the heat of reaction, and the recovery of this WECM stream is increased under the project activity to replace fossil fuels used for the purpose of supplying heat of reaction.*

This applicability condition is not applicable for the project activity as in pre-project scenario LMEL facility generating waste gases were using water scrubber where the temperature was brought down by water and then put in drain. There was no recovery of any heat from waste flue gases before the project activity.

Applicability Condition-7: *This methodology is also **not** applicable to project activities where the waste gas/heat recovery project is implemented in a single-cycle power plant (e.g. gas turbine or diesel generator) to generate power. However, the projects recovering waste energy from single cycle and/or combined cycle power plants for the purpose of generation of heat only can apply this methodology.*

Not applicable to project activity as steam is generated by recovering heat from WECM and steam is used in turbine to generate electricity. In pre-project scenario there was no single cycle power plant operating at project facility to meet the energy requirement. This is checked during validation site visit at LMEL facility.

Applicability Condition-8: *The emission reduction credits can be claimed up to the end of the lifetime of the waste energy generation equipment. The remaining lifetime of the equipment should be determined using the latest version of the Tool to determine the remaining lifetime of equipment.*

The emission reductions are calculated for ten years. The life time given by manufacturers of boilers and turbine is 15 years and the project activity is a new project commissioned in 2011 after receipt of consent to operate from MPCB for operation of power plant BO/APAE/EIC No.CH-0214-10 & CH-0226-10/R/CC-299 dated 28/12/2010. Validation team verified all above reference sources and found correct. Therefore this applicability condition is fulfilled.

Applicability Condition-9: *The extent of use of waste energy from the waste energy generation facilities in the absence of the CDM project activity will be determined in accordance with the procedures provided in Annex 1 (for Greenfield project facilities) and in Annex 2 (for existing project facilities) to this methodology.*

Since the LMEL is existing facility, the extent of use of waste energy from 500 TPD kiln and 4x100 TPD kilns is determined in accordance with Annex 2 of the methodology.

Validation team during site visit checked that no equipment for waste heat recovery and use has been installed prior to the implementation of the CDM project activity. Same is also mentioned in EIA Report of June 2005 for expansion of LMEL sponge iron generation facility. In the absence of project activity the waste gases were passed through water scrubber and then released into atmosphere. The waste heat was not used for any purpose as water from scrubber was put into drain.
Validation team also checked the electricity bills which demonstrate that all energy required for the process has been procured from grid. The bills are part of audited balance sheets audited by competent authorities. This also confirmed from annual reports 2004-05, 2005-2006, 2006-07 mandatory Form –A disclosure of LMEL. Therefore this applicability condition is fulfilled.

CAR-2 was raised by validation team since the justification for all the applicability conditions was not discussed in line with latest version of methodology. Also the version of the emission factor tool used was subsequently no more valid. Project Participant revised the PDD to adequately describe the justification for all the applicability conditions in line with latest approved version 4 of ACM0012 methodology and latest version of emission factor tool Version 2.2.1. Hence the CAR was closed.

Validation team raised CL-1 as for demonstration of use of waste energy in the absence of CDM project activity, EIA report was provided to DOE dated Mar 2007. However validation team also received the EIA report dated June 2005 as mentioned in PDD. In response to CL raised, PP clarified that EIA report of 2005 was prepared for planned expansion of sponge iron facility wherein additional 4x100 TPD kilns were installed. This report is referred as proof that water scrubbers were used for cooling flue gases. However EIA report of May-2007 was prepared specifically for project activity 30 MW power plant. Hence clarification request was closed.

CL-11 was raised by validation team as justification offered against abnormal conditions that could occur causing unintended release of waste energy in project activity were not described. Further applicability condition pertaining to constraints on fossil fuel use lacks clarity. In response to CL raised, PP modified the description in PDD and provided the abnormal conditions as per legal consent to operate the kilns. Also it was confirmed from consent to operate that there is no constraint to PP on usage of coal prior to project activity. Therefore CL-11 was closed.

The DOE hereby confirms that the selected baseline and monitoring methodology, ACM0012, Version 4 and other methodology component (Ref /41/) is previously approved by the CDM Executive Board, and is applicable to the project activity, which, complies with all the applicability conditions therein.

The DOE hereby also confirms that the project activity being power generation through recovery of waste heat, is free from any greenhouse gas (GHG) emissions as a result of its implementation and hence, 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.

3.6.2 Project boundary (80)

The DOE validated the project boundary in the following manner:

The physical boundary of the project activity covers.

1. The industrial facility where waste energy is taken into 5 WHR boilers setup for individual kilns i.e. 1x500 TPD and 4x100 TPD sponge iron DRI kilns;

2. The facility where process heat in the element process (steam) is generated i.e. 5 WHR boilers and steam turbine generator where the heat content of the waste energy will be utilized for generation of steam and subsequently power. This will also include the auxiliary equipments of the power plant; and

3. The facility where the electrical energy is consumed i.e. for captive consumption of Lloyds Metals & Engineers Limited plant and power exported to third party i.e. Indrajit Power Trading Company Pvt. Ltd. via wheeling through NEWNE grid where the electricity will be consumed. The project boundary has been validated through documentation review of site layout of the power plant, interviews with the operational staff and field survey. The validation team confirmed that the identified project boundary, selected sources and gases were justified for the project activity and meets the requirements of the approved methodology.

Since the electricity is also exported to third party via wheeling it through NEWNE grid, the spatial extent of the project boundary is assessed through the description in the PDD and the grid structure in India as known from the official data available from the Central Electricity Authority (CEA) (Ref /44/). The project activity boundary therefore includes the project power plant and all power plants connected physically to the NEWNE electricity grid of India that the CDM project power plant is itself connected to. The consideration of only CO_2 gas for the baseline emissions is conservative and in line with the methodology and hence appropriate. The electricity imported by the project activity is accounted for in the net electricity exported by the project activity. There are no other sources of project emissions. Hence, the project emissions are

considered to be zero. Also as per methodology no leakage is accountable to the project activity.

The following issues were raised by the validation team and addressed by the PP through the validation process.

Though the LMEL facility is included within the project boundary who is one of the recipient facility, other recipient facility i.e. IPTPL to which power is wheeled through grid is not included in project boundary. IPTPL in turns sell the power to unidentified consumers via trading in spot market and it is assumed that power purchasers mainly rely on grid power. Validation team raised CAR-8 as power consumers in the grid were not included in project boundary. In response CAR, PP responded that in the project boundary grid is only shown as connected to project activity however physical representation of grid connected power consumers within the project boundary is not practically possible. Further the exported power is sold in spot market by IPTPL who is power trading company and hence it is not possible to identify the end users of exported electricity and physically not possible to include in project boundary. Therefore justification provided by PP was accepted by validation team and CAR-8 was closed.

The validation team confirms that the only greenhouse gas relevant to the project activity is CO_2. This GHG gas is addressed by the applied methodology. Based on the above assessment, the validation team 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:

Step 1. *Define the most plausible baseline scenario for the generation of heat and electricity using the baseline options and combinations as prescribed in the approved methodology*.

Evaluation of potential alternatives for use of waste energy:

Baseline Alternatives Identified	Elimi nated	Reason for Elimination	Explanation
W1 (WECM is directly vented to atmosphere	Y	Waste gases at high temperatures can not be directly	Waste flue gases contain only waste heat. No incineration is possible. LMEL who generate waste gases in pre-project scenario were using water

without incineration.)		released to atmosphere without cooling.	scrubber where the temperature is brought down by water by evaporative cooling and then gases released to atmosphere via ESP. Hence waste heat is not being released directly to atmosphere. Validation team confirmed the same from EIA report 2005 for the expansion activity of 4x100 TPD kilns wherein it is stated that waste heat from flue gases were absorbed in Gas conditioning tower or water scrubber before releasing it to atmosphere.
W2 (WECM is released to the atmosphere (for example after incineration) or waste heat is released (or vented) to atmosphere or waste gas pressure energy is not utilized.)	N		In absence of the project activity, the project proponent would have followed the pre-project scenario practice (i.e. waste gases from kilns would be cooled in water scrubber where the temperature is brought down by evaporative cooling and then gases released to atmosphere via ESP). In such a situation, the entire heat energy content of the waste gas would have been lost. This alternative is in compliance with all the legal and regulatory requirements and can be a part of the baseline. Therefore this alternative is considered further for determination of baseline scenario for the project activity under consideration.
W3 (Waste energy is sold as an energy source.)	Y	No demand for such waste heat in-house and in neighbouring industry. Further transportation of gases to longer	Waste flue gases containing waste heat are generated in manufacturing process of sponge iron and have low pressure and hence can not be transported long distance to different premises. The waste heat utilisation has to be immediately after the exit from kiln ABC i.e. after burning chamber. There is

		distance is not possible due to low pressure.	no demand for such waste heat in house and in neighbouring industry and hence waste gases were cooled in a gas cooler before letting out into atmosphere. The same was verified during the site visit and through interviews conducted with project proponent. Validation team also reviewed the technical specification provided by power plant supplier i.e. ERK Eckrohrkessel GmbH data sheets which indicate the low flue gas pressure. EIA Report dated June 2005 was also reviewed for confirming the cooling of waste flue gas. From these evidences it is confirmed that waste gas was not sold in absence of project activity. Therefore this alternative can not be considered as a realistic and credible alternative for the project proponent in absence of the project activity.
W4 (Waste energy is used for meeting energy demand at the recipient facility.)	Y	LMEL does not have any demand for waste heat in sponge iron facility.	LMEL does not have any use of waste heat in their sponge iron manufacturing process. In the absence of project activity waste energy would not have been used in any form to meet any sort of energy demand. As stated above validation team verified the same during the site visit and through interviews conducted with project proponent.
W5 (A portion of the quantity or energy of WECM is recovered for generation of electricity energy, while rest of the	Y	Partial utilization of waste flue gases coming from DRI kilns for generation of electricity would have faced similar	Utilization of the waste flue gases from DRI kilns for power generation is exposed to all the investment risks as the project activity is facing. Therefore partial utilization of waste flue gas for generation of captive electricity can not be considered as a realistic and credible

waste energy produced at the project facility is flared/released to atmosphere/ unutilised.)		investment risks as of the project activity.	alternative for the project activity under consideration. In project activity 100% waste heat from waste flue gas is used.
W6 (All the waste energy produced at the industrial facility is captured and used for export electricity generation.)	Y	Project activity involves captive Electricity generation and surplus electricity generated is sold to third party via wheeling it through grid.	The amount of waste flue gas generated through the DRI kilns would have been completely utilized for power generation to meet the in-house captive demand and surplus electricity would be available with PP for export to grid. Partial recovery of gases would be faced with same set of investment barrier as listed in PDD. LMEL captive requirement is 3.5 MW which was earlier fulfilled via import from grid. The same is verified from the power requirement for LMEL sponge iron plant considering the connected loads and past electricity bills. In absence of project activity grid power would be imported to meet captive demand. However, producing power for export only will not be first choice of PP since the cost price of generated electricity is lower i.e. 2.8 Rs/unit than the power import price from the grid i.e. 3.77 Rs/unit in the event of export. Therefore first captive consumption will be given preference and rest will be exported. Validation team also reviewed the Power purchase agreement with IPTPL wherein power sell to third party is agreed on 2.96 Rs/unit. Therefore this alternative can not be considered as a realistic and credible alternative for the project

			activity under consideration

Evaluation of potential alternatives for power generation:

Baseline alternatives identified	Eliminated	Reason for elimination	Explanation
P1 (Proposed project activity not undertaken as a CDM project activity)	N		In absence of the project activity, the project proponent could have utilized the heat content of the waste flue gas from DRI kilns for generation of power albeit this scenario would have pursued without CDM benefits. Therefore alternative P1 has been considered for further evaluation.
P2 (On-site or off-site existing fossil fuel fired cogeneration plant)	Y	No steam requirement at the project site	The project proponent does not have any requirement for steam. The same was verified during the site visit. Therefore alternative P2 is not a realistic and credible alternative for the project proponent.
P3 (On-site or off-site Greenfield fossil fuel fired cogeneration plant)	Y	No steam requirement at the project site	The project proponent does not have any requirement for steam. Therefore alternative P3 is not a realistic and credible alternative for the project proponent.
P4 (On-site or off-site existing renewable energy based cogeneration plant)	Y	No steam requirement at the project site	The project proponent does not have any requirement for steam. Therefore alternative P4 is not a realistic and credible alternative for the project proponent.
P5 (On-site or off-site Greenfield	Y	No steam requirement at the project site	The project proponent does not have any requirement for steam. Therefore alternative P5 is not a realistic and credible alternative

renewable energy based cogeneration plant)			for the project proponent.
P6 (On-site or off-site existing fossil fuel based existing identified captive power plant)	Y	No existing captive power plant at LMEL facility in pre-project scenario.	Project activity is existing facility to manufacture the sponge iron and was meeting power requirement for the plant through grid. There is no existing on-site or off-site fossil fuel based captive power plant at LMEL facility. In project activity LMEL is producing power by recovery of waste heat from waste flue gases to generate power. Therefore this alternative is not considered as a realistic and credible alternative for the project activity.
P7 (On-site or off-site existing identified renewable energy or other waste energy based captive power Plant)	Y	No existing captive power plant is at LMEL facility in pre-project scenario.	LMEL does not have the existing on-site or off-site identified renewable energy or other waste energy based captive power plant. Although energy demand of the facility can be met through this alternative wherein new wind, hydro and solar energy based captive power plant can be considered. However this cannot meet the continuous energy requirements of the plant due to their seasonal nature. Given the constraints of Biomass availability, operation of the biomass power plant to deliver consistent and stable power supply is not assured. Moreover renewable resource based power generating stations typically used for peak load services and not for base load services which are important for iron and steel industry. Therefore alternative P7 cannot be considered as a realistic and credible alternative for the project activity.

P8 (On-site or off-site Greenfield fossil fuel based captive plant)	N		In absence of the project activity, the PP could have installed a new fossil fuel based captive power plant. Indian regulations do not constrain the use of fossil fuel for captive power generation purpose. Hence, the alternative P8 may be a potential baseline and therefore has been considered for further evaluation.
P9 (On-site or off-site Greenfield renewable energy or other waste energy based captive plant)	Y	LMEL being existing facility, no Greenfield power plant is possible.	Project activity is existing facility to manufacture the sponge iron. Waste heat generated during the process in DRI kilns is utilized for power generation. Therefore Greenfield power plant can not be set up in existing facility and not applicable to project activity. This alternative is not considered further for identification of potential baseline scenario.
P10 (Sourced from grid-connected power plants)	N		Currently, LMEL is importing electricity from the NEWNE grid system through Maharashtra State Electricity Board (MSEB). In absence of the project activity, the project proponent could have chosen not to generate any power. Under such a situation, electrical energy equivalent to that generated in the project activity would have been imported from MSEB which is part of the thermal power dominated NEWNE grid and therefore would have been generated at power plants connected to the grid. Validation team validated the same through document review of the electricity bills and the electricity consumption during the pre-project scenario.

P11 (Existing captive electricity generation using waste energy (if the project activity is captive generation using waste energy, this scenario represents captive generation with lower efficiency or lower recovery than the project activity)	Y	No existing power generation equipment at project site	There is no existing power generating equipment available with LMEL. Validation team confirmed the same during the site visit and interviews conducted with the plant employees of Lloyds Metals & Engineers Limited.
P12 (Existing cogeneration using waste energy, but at a lower efficiency or lower recovery)	Y	No existing power generation equipment at project site	There is no existing power generating equipment available with LMEL. Validation team confirmed the same during the site visit and interviews conducted with the plant employees of Lloyds Metals & Engineers Limited.

Therefore, the plausible baseline alternatives for the project activity are as below:

Alternative 1: W2 and P1 wherein Waste Energy Carrying Medium (WECM) i.e. waste flue gas from DRI kilns is released to the atmosphere after cooling in water scrubber and the electricity is sourced from waste heat recovery power plant without seeking CDM benefits

Alternative 2: W2 and P8 wherein Waste Energy Carrying Medium (WECM) i.e. waste flue gas from DRI kilns is released to the atmosphere after cooling in water scrubber and the electricity is sourced from new fossil fuel based captive power plant

Alternative 3: W2 and P10 wherein Waste Energy Carrying Medium (WECM) i.e. waste flue gas from DRI kilns is released to the atmosphere after cooling in water scrubber and the electricity is sourced from grid-connected power plants. i.e. pre-project scenario.

Step 2. *Step 2 and/or Step 3 of the latest approved version of the "Tool for the demonstration and assessment of additionality".*

Simple cost analysis cannot be applied as there are multiple revenue sources for alternatives 1 and 2 which generate financial benefit by sell of surplus power to third party and by displacing purchase of costlier grid power. Alternative 3 i.e. power sourced from grid does not provide any financial benefit hence only per unit cost of power is calculated based on historical electricity bills before decision date. Therefore for evaluation of baseline scenario, investment comparison analysis is found suitable wherein investment in alternative 1, 2 and 3 is compared. Therefore PP has used the Levelized cost of electricity production in accordance with sub-step 2b of the "Tool for the demonstration and assessment of additionality" version 06.0.0.

The validation team confirmed the input values with their reference sources and the calculations of Levelized cost for alternative 1 and 2. The following table provides validation of input figures used for calculation of the Levelized cost of captive coal based power plant in Alternative 2 and calculation of cost of import power from grid. The input values for Levelized cost for alternative 1 is provided in section 3.7.3 as a part of investment analysis for evaluation of equity IRR.

Sr. No.	Parameter	Value Used	Means of Validation
1	Power Generation	189 Million Units	Coal based captive power plant is considered of same capacity i.e. 25MW as of project activity waste heat based captive power plant. Operating days are considered as 350 days based on regular industrial practise and 15 days annual shutdown for maintenance. PLF for coal based power plant is taken as 90% which is possible to achieve in standard operating conditions. Validation team referred to MERC tariff order dated 07/09/2006, page number 54 which provides the PLF of 85.37% for thermal power plant of Parli. Hence PLF of 90% for coal based power plant is possible to achieve in new unit and same is accepted by validation team. Therefore based on

			above information power generation from coal based captive power plant worked out to 189 Million units as compared to 132 Million units from project activity waste heat recovery power plant. Justification for 132 million units from WHR power plant is provided in next sections of the report.
2	Project cost i.e. Comprising of FBC boiler and Plant & machinery cost	801 Million Rs.	Plant and machinery cost is checked from the power plant supplier offer CPP/VVS/LMEL/R1/200 Dated 15/10/2006 for WHR power plant. This gives the 90 TPH FBC cost = 195 Million Rs. Total steam required for running 25 MW power plant is 103 TPH. Therefore offer document was referred as reference source for cost of 100 TPH coal fired boiler. Validation team find this suitable approach because boiler equipments have always overdesigned capacity of 10-15%. Hence 90 TPH boiler can produce 100 to 103 TPH steam at overload capacity. Same offer letter also provides the cost towards the connected balance equipments of power plant as 606 million Rs. Therefore total plant and machinery cost is worked out equal to 801 million Rs. Validation team accepted this as these cost are taken from same reference source i.e. offer letter as that considered for project activity waste heat recovery power plant. Therefore costs considered are appropriate.
3	Capital Cost of Project	946 Million Rs.	Total capital cost of project comprises of Land & site development cost, Building cost, FBC boiler cost, Plant & Machinery cost, Spare parts, Transmission line cost and Engineering and consultancy fees. All above cost is checked from the power plant supplier offer CPP/VVS/LMEL/R1/200 Dated 15/10/2006 for WHR power plant. Only transmission line cost for power evacuation is taken as follows 1) CERC order of 09/05/2006 on petition 133/2005

			and available on http://cercind.gov.in/050606/133-05a.pdf. This order provides the cost of installation of power transmission line as 7.66 Million Rs/Km as evaluated below. (225.7/29.47)= 7.66 Million Rs Wherein, for installation of 29.47 km transmission line the expenditure incurred is mentioned as 225.7 million Rs. Therefore cost per km evaluated is equal to 7.66 Million Rs. 2) The data referred from above CERC order is for 2003 period, therefore inflation of 4% for three year i.e. from 2003 to 2006 as provided by CERC order is considered in transmission line cost. Therefore in case of project activity, for installation of 7 Km transmission line 60.04 Million Rs is required. Hence total capital cost of the project is justified as 946 Million Rs.
4	Total cost of project	1156 Million Rs.	Total cost of project is addition of Capital Cost i.e. 946 Million Rs and other cost categories as follows. 1) Preliminary Expenses 2) Contingencies 3) Interest During Construction 4) Margin money for working capital Preliminary expenses are considered as 37.5 Million Rs. Validation team reviewed the detail split up of preliminary & Pre-operative expenses under various categories incurred for waste heat based power plant as estimated at the time of decision making for the project activity. They are considered applicable for coal based power plant as same expenses would be incurred in both the cases. Contingencies are considered as 10% of total capital cost of project and Preliminary & preoperative expenses which validation team considers as

			reasonable. Hence accepted. Interest during construction is taken as 59 Million Rs which is evaluated based on 14.5% interest rate considered based on letter from M/s Nariman Point Finance limited. Margin money for working capital is taken as 15.98 Million Rs which is calculated as difference of Net current assets and working capital loan. Validation team checked all above reference sources and confirm that they are applicable at the time of decision making for the project activity. The estimated project cost is reasonable and correct.
5	Selling price of power to third party With annual escalation of 1%	3.00 Rs/kWh	Validation team checked the cost of power sold to third party from Power Purchase Agreement between LMEL and IPTPL (Ref /16/) which mentioned that M/s Indrajit Power shall ensure power trading at 3.00 Rs/kWh on trading margin (commission) of 0.04 Rs/kWh. The validity of PPA is stated as 3 years. Therefore even though escalation clause is not provided in PPA, escalation of 1% is considered in external sales price by PP as a conservative approach. Escalation of 1% is arrived based on Escalation of 1% is considered in internal sales price based on the escalation of grid electricity import price by LMEL between 1996-2006 which is referred from grid electricity bills. Validation team find this as sufficiently conservative approach and accepted the cost considered in analysis.
6	Assumed selling price of power for internal consumption	3.77 Rs/kWh	Due to project activity, power will be available for meeting captive requirement first and surplus will be sold to third party. Therefore net revenue is generated by avoiding the purchase of costlier grid power for captive requirement. Hence cost

			of power consumed for captive purpose is considered as Rs 3.77 Rs/kWh which is cost of imported power from grid by LMEL. The cost of import power is evaluated based on average cost of power for each month for the period February 2006 to September 2006 i.e. before the investment decision date of 28/10/2006. Electricity bill between Feb-2006 to Sep-2006 are referred because all the 4x100 TPD kilns was commissioned by Feb-2006, hence total power requirement of sponge iron plant is available from which unit cost of power is calculated. Validation team have referred the electricity bills for above period and values and calculation provided in Levelized cost sheet is found correct. Escalation of 1% is considered in internal sales price by PP based on the escalation of grid electricity import price by LMEL for period 1996-2006 which is referred from grid electricity bills. Validation team find this as sufficiently conservative approach and accepted the cost considered in analysis.
6	Transmission line loss	4.85%	Transmission line loss is considered as 4.85% as provided in MERC tariff order dated 29/09/2006 (Ref /26/). Validation team accepts the transmission line loss considered as same is taken from tariff order for the Maharashtra state and available at the time of investment decision.
7	O&M cost	0.148 Rs/kWh	O&M cost is evaluated for per unit of power generation. Total power generation from coal based power plant is 189 Million units as stated above. O&M cost is taken from MERC tariff order dated 07/09/2006 (Ref /27/), page 41 wherein O&M expenses considered as Rs 11.25 lacs/MW. Based on this O&M expenses for 25MW power plant and 189 Million units generation is evaluated which calculates equal to 0.148 Rs/unit. Validation team

			accepts the reference source used as same was available at the time of decision making for project activity.
8	Water cost	0.03 Rs/kWh	Water requirement for power plant operation and associated cost was referred for other power plants in the region by PP by referring to their balance sheets. Therefore same is assumed to be applicable for the project. Validation team accepts the same as it is reasonable assumption at the time of decision making for the project and supported with audited balance sheet data for other power plant in the region.
9	Cost for power consumption required during start-up of power plant.	0.00478 Rs/kWh	Start-up power cost is evaluated based on auxiliary power requirement of 2.5MW requiring the consumption for 4 days duration in a year. Cost of grid power is taken as 3.77 Rs/unit as validated above.
10	Demand Charges	0.05873 Rs/kWh per month	MERC tariff order dated 20/10/2006 (Ref /28/) provides the demand charges as Rs 370/kVA per month. Therefore for 2500 kVA and 12 months demand charges worked out to 0.05873 Rs/kWh considering generation of 189 million units.
11	Insurance Commission	0.01603 Rs/kWh	Insurance commission is considered as 0.5% of plant and machinery cost. This assumption is based on normal insurance cost incurred in industry
12	Power selling expenses	0.04 Rs/kWh	Validation team checked the cost of power sold to third party from Power Purchase Agreement between LMEL and IPTPL (Ref /16/) which mentioned that M/s Indrajit Power shall ensure power trading at 3.00 Rs/kWh on trading margin (commission) of 0.04 Rs/kWh. Therefore validation team accepted the power selling expenses of 0.04 Rs/unit.
13	Power Transmission Cost	0.15 Rs/kWh	As per MERC tariff order case no.31 of 2006 dated 29/09/2006 (Ref /26/) transmission charges are stated as 3623 Rs/MW/day. Therefore for 25 MW power plant transmission charges evaluates equal to 0.15 Rs/kWh. Validation team

			accepts the values taken from MERC tariff order for transmission charges as same were applicable at the time of investment decision.
14	Fuel Cost per unit	0.64 Rs/kWh	Cost of coal per unit is evaluated as follows by PP. As per MERC tariff order, Case No.48 of 2005 dated 07/09/2006 (Ref /27/), page 60, cost of coal for chandrapur power station is provided as Rs 1194/MT. This location is close to the project activity. Hence landed cost of coal is considered as 1.194 Rs/kg. Station heat rate is referred from same tariff order on page number 57, wherein average station heat rate is evaluated as 2727.5 Kcal/kWh from the range of SHR of 2500 to 2955 provided on page no.57. LMEL during sponge iron production generates the char in the kilns which can provide at least 25% of heat. Therefore fresh coal requirement is for providing heat of 0.75X2727.5=2045.6 Kcal/kWh. Calorific value of coal=3800 Kcal/kg. Hence coal required per kWh generation =2045.6/3800=0.538 Kg. Therefore fuel cost per kWh is calculated as 0.538 x 1.194 =0.64 Rs/kWh.
15	Waste handling cost	0.0345 Rs/kWh	PP has provided the budget estimate of waste (fly ash) handling cost for waste generated in WHRB power plant to validation team on a letterhead of company. Power plant will generate approximately 48000 tonnes/year waste. The estimated cost per tone of waste generated is 135.89 Rs/tone as provided in the letter dated 18/10/2006 (Ref /32/). Based on above figures for 189 million unit generated in coal based power plant, waste handling cost is evaluated as 0.0345 Rs/kWh. Validation team accepted the waste handling cost considered for the project activity as it is based on conservative assumption of less quantity of waste generation. In actual case, coal

			based power plant will generate more than 48,000 tone/yr of waste.
16	Internal power consumption	24.43 Million units	For internal power consumption requirement balance sheets of LMEL for year 2007-08, 2008-09 and 2009-10 were referred. Accordingly internal power consumption for year 2007-08 is taken as it is highest among the three year values. Therefore for year 2007-08 internal power consumption is 24433877 kWh i.e. 24.43 Million units is taken which is accepted by validation team as conservative approach.

All other parameters were considered same as that in the project activity. The validation team confirms that the cost of electricity from the grid is 3.77 Rs/kWh which is more than the levelized cost of electricity from either coal based power plant (2.21 Rs/kWh) or from the waste heat recovery based power plant i.e. project activity (2.80 Rs/kWh).

Step 3. *If more than one credible and plausible alternative scenario remain, the alternative with the lowest baseline emissions shall be considered as the baseline scenario.*

Economic analysis is carried out for alternative 1 and alternative 2 as explained above in step 2. It is found that Levelized cost of coal based power plant is lowest among all three alternatives. Hence coal based power plant can be considered as most appropriate baseline scenario. However power equivalent to project activity produced from the alternative 2 will be displacing the captive power requirement of approximately 3.5 MW of LMEL and approximately 15 MW exported power to third party who mainly relies on grid power. Since out of total 25 MW power 86% of the power is supplied to third party consumers who mainly rely on grid power hence this option can not be directly selected as baseline scenario. Whereas alternative 3 i.e. power sourced from grid connected power plants is pre-project scenario of LMEL as well as pre-project scenario for other power consumers to whom power is supplied from project activity. Hence any of the alternative 2 or alternative 3 can not be ruled out only based on the Levelized costs in step 2 above. Therefore, as per step 3, the alternative with the lowest baseline emissions among the two alternatives is selected as the baseline. Emission factor of coal based captive power generation is 1.04 tCO_2/MWh as verified from CEA database version 4 dated October 2008 and Emission factor of grid is 0.8032 tCO_2/MWh as calculated in section B.6.3 of PDD. Hence as emission factor of grid is lowest which will conservatively give lowest baseline emission, therefore **alternative 3 is selected as the baseline** for the 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 of the VVM are described below:

As per ACM0012, version 4, baseline emissions are calculated by the algorithm $BE_y = BE_{En,y} + BE_{flst,y}$

Where,

BE_y = the total Baseline Emissions during the year y in tCO_2

$BE_{En,y}$ = The baseline emissions from energy generated by the project activity during the year y in tCO_2

$BE_{flst,y}$ = Baseline emissions from fossil fuel combustion, if any, either directly for flaring of waste gas or for steam generation that would have been used for flaring the waste gas in the absence of the project activity(tCO_2), calculated as per equation 26 of the methodology. This is relevant for those project activities where in the baseline steam is used to flare the waste gas.

Project proponent did not use any fossil fuel for treatment of waste flue gases generated in DRI kilns. Waste flue gases were passed through water scrubber for cooling and released to atmosphere. Therefore baseline emissions from fossil fuel consumption for flaring of waste gases are not applicable. Hence $BE_{flst,y}$ is Nil.

Therefore, $BEy = BE_{En,y}$

The baseline emission from energy generated by the project activity during the year y in tCO_2 was determined by the algorithm as per equation 2 of the methodology:

$BE_{Eny} = BE_{Elec,y} + BE_{Ther,y}$

Where,

$BE_{Elec,y}$ = Baseline emissions from electricity during the year y in tCO_2

$BE_{Ther,y}$= Baseline emissions from thermal energy (due to heat generation by elemental processes) during the year y(tCO_2).
This is not applicable as project activity is only for power generation and no thermal energy requirement is met by project activity in LMEL plant.

Baseline emissions from electricity during the year y in tCO_2 was estimated by the algorithm given in the equation 3 of the methodology

$$BE_{Elec,y} = f_{cap} * f_{wcm} * \sum_{j} \sum_{i} (EG_{i,j,y} * EF_{Elec,i,j,y})$$

Where,

$BE_{elec,y}$ = Baseline emissions due to displacement of electricity during the year y (tCO_2)

$EG_{i,j,y}$ = The quantity of electricity supplied to the recipient j by generator, which in the absence of the project activity would have been sourced from source i (the grid or an identified source) during the year y in MWh

$EF_{elec,i,j,y}$ = The CO_2 emission factor for the electricity source i (gr for the grid, and is for an identified source), displaced due to the project activity, during the year y (tCO_2/MWh)

f_{wcm} = Fraction of total electricity generated by the project activity using waste energy. This fraction is 1 if the electricity generation is purely from use of waste energy.

f_{cap} = Factor that determines the energy that would have been produced in project year y using waste energy generated at a historical level, expressed as a fraction of the total energy produced using waste source in year y.

$EG_{i,j,y}$ i.e. quantity of electricity supplied to the recipient plants by generator is monitored and calculated as a difference of EG_{gross} and $EG_{auxiliary}$.

f_{cap} is calculated by using equation 38 of the methodology

$$f_{cap} = \frac{Q_{WCM,BL}}{Q_{WCM,y}}$$

Wherein "$Q_{WCM,BL}$" is calculated using following equation no. 39 as given in methodology.

$$Q_{WCM,BL} = Q_{BL,product} \times q_{wcm,product}$$

Where,

$Q_{WCM,BL}$ = Quantity of waste energy generated prior to the start of the project activity (kg or m3 at NTP or TJ or MWh of WECM or other relevant unit)

$Q_{WCM,y}$ = Quantity of WECM used for energy generation during year y (kg or m3 at NTP or TJ or MWh of WECM or other relevant unit)

$Q_{BL,product}$ = Production associated with the relevant waste energy generation as it occurs in the baseline scenario. The minimum of the following two figures should be used: (1) average annual historical production data from start-up of the facility, if the facility's operational history is less than three years, or (2) the most relevant manufacture's data for normal operating conditions. In the case of Greenfield facilities or where data is not available, the manufacture's data for normal operating conditions shall be used (Units for product can be in no. of pieces, tons, m3 or other appropriate unit)

$q_{wcm,product}$ = Amount of waste energy per unit of product generated by the process (that generates waste energy) in the facility (Units in kg or m3 at NTP/unit product, MWh/unit product or TJ/unit product or other appropriate unit)

f_{WCM} is calculated by using equation 34 of the methodology

$$f_{WCM} = \frac{ST_{whr,y}}{ST_{whr,y} + ST_{other,y}}$$

Where,

$ST_{whr,y}$ = Energy content of the steam generated in waste heat recovery boiler fed to turbine via common steam header (TJ)

$ST_{other,y}$ = Energy content of steam generated in other boilers fed to turbine via common steam header (TJ)

The Emission Factor has been calculated in a transparent and conservative manner as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the emission factor for an electricity system', version 02.2.1 (Ref /42/). As per step 3 of the tool, the ex-ante emissions factor is to be determined once at the validation stage based on the most recent data available at the time of submission of CDM-PDD to the DOE for validation.

Project participant has used the official published data from the Central Electricity Authority on operating and build margin emission factors (Ref /44/). The version of the data used is Version 4, which was available on the start date of validation viz; webhosting date of the PDD. This data is published by Central Electricity Authority (CEA), which is the sole authority for the publication of such data in India. The project participant has applied weight factors for the OM and BM (50% & 50% respectively) as specified in the tool to arrive at the emission factor for the combined margin. The years considered for OM are 2005-06, 2006-07 and 2007-08 and for the BM it is 2007-08. Accordingly, the combined margin emission factor is calculated as 0.8032 tCO_2/MWh. The Version 4.0 of CEA database has used "Tool to calculate the emission factor for an electricity system", Version 01.1.0. The Validation Team compared the latest version of tool (EB 63, Annex 19 - Version 02.2.1) with the version 01.1.0.

The validation team has the following observations:

1. Version 2.2.1 of the tool has extended the procedure for the identification of sample groups of power units relevant to build margin calculation. However, the validation team checked and confirmed that the value of OM & BM does not change across successive versions of the CEA database viz., v4, 5, 6 & 7.

2. The paragraph 2 under Step-1 of the Tool states: "If a connected electricity system is located partially or totally in Annex-I countries, then the emission factor of that connected electricity system should be considered zero".
   The project activity is connected to the NEWNE Grid which is part of the Indian Regional Grid (electricity system) and this electricity /grid system is not located partially / totally in any Annex I country.

3. The revised version v2.2.1 provides the Project participant the option to include off-grid power plants in the computation of the grid emission factor.
   The Project participant has chosen not to include off-grid power plants in the computation. Hence, this revision has no effect on the overall computation of the OM & BM and hence, the grid emission factor also.

Hence, the approach to determine the OM, BM and CM remains similar to that in the previous versions of the tool. The CEA database version 4.0, though based on a previous version of the tool, can still be regarded as appropriate for the purpose of computation of the grid emission factor.
Validation team agrees to this emission factor since it is based on the official background data published by CEA. The Central Electricity Authority is a statutory Body in India, constituted under the erstwhile Electricity (Supply) Act, 1948, that was subsequently replaced by the Electricity Act 2003 and is under the Ministry of Power, Government of India.

The data published by the CEA is an official publication of the Government of India and can definitely be regarded as a reliable and authentic source of data for the determination of CDM baselines. The validation team further notes that the emission factor is not provided by the DNA of the host party, but by a credible and competent authority of the Government of India. The provisions of paragraph 64 of EB 43 in this regard therefore are not applicable.

A Corrective action request, CAR-2 was raised by validation team as latest version of emission factor tool was not used. Also corrective action request CAR-4 and CAR-17 was raised as calculation of emission factor was incorrect. PDD also did not provide justification towards PLF and auxiliary consumption considered in section B.6.3 of the PDD for arriving at baseline emissions. In response to the CAR, the project participant updated the PDD by adding description regarding the estimation of PLF and auxiliary consumption and applied latest version of emission factor tool i.e. version 2.2.1. Therefore validation team accepted the method and reference documents for arriving at emission factor for the project activity.

Project participant demonstrated the PLF by three alternative methods in PDD. Actual plant operation data for past three years for 500TPD kiln and 1 year data for 4x100 TPD kiln were used for evaluating the PLF of the project activity. Validation team have checked the historical plant operation data before implementation of project activity and verified the calculation of PLF in excel sheet provided to DOE. The ratio of actual average flue gas generation to Design average flue gas generation for installed capacity gives the PLF equal to 69.31%. Validation team verified the calculation and historical data; hence by method 1, PLF is evaluated equal to 69.31%.

As per Method 2, design parameters of power plant were used as provided by equipment supplier. Accordingly achievable PLF is evaluated equal to 62.64%. Project participant provided the design steam generation data to validation team which is provided by licensor M/s ERK Eckrolessel (Ref /33/). Validation team reviewed the design parameters from ERK data sheets and found the calculation of PLF correct. Method 3 of PLF assessment was used wherein actual sponge iron produced for last 11 year before decision date on the project activity is taken to evaluate PLF. Ratio of sponge iron produced during the year in tonnes to designed installed sponge iron production capacity gives the PLF. It is seen that for most of the years production of sponge iron was around 70% and was varying in between 60% to 80%. Therefore PP has selected PLF as 70% during first year and 80% from next year onwards to be on conservative side. Validation team accepts the approach taken by PP.

As a response to CAR raised above, section B.6.3 provides the justification for auxiliary consumption of 9%. All the equipments installed as a part of project activity and consuming auxiliary power with the capacity is provided in tabular format. Validation team reviewed the connected load list in the power plant from equipment supplier (Ref /10/). Therefore all raised issues as a part of CAR raised were satisfactorily responded and CAR-2 and CAR-4 & 17 were closed.

A corrective action request, CAR-9 was raised as notation used in the equations under section B.6.1 were not matching with those in the methodology. In response to CAR raised, PP has corrected the equations along with actual notations and nomenclature as per methodology ACM0012 version 4 throughout the PDD. Therefore CAR-9 was closed.

CAR-10 was raised by validation team as it was not explained how the value of parameter "$Q_{WCM,BL}$", was arrived in relation to the pre-existing production levels of the DRI kilns of LMEL plant, (i.e. before the start of the project activity). The value applied for this parameter in webhosted PDD was 210,000 Nm3/hr (in section B.6.2) is sourced from process data sheets of M/s. ERK Germany; however, how this value is also related to the pre-existing production level was not explained. In response to CAR raised, PP corrected the PDD in section B.6.3 and provided the calculation of "$Q_{WCM,BL}$" by using available production data of LMEL facility for three years prior to project start date i.e. 15/03/2007. Therefore "$Q_{WCM,BL}$" is calculated equal to 1.068 X 10^9 Nm^3/yr. Validation team verified the specific WECM generation per unit of product based on manufacture's supplied data as per operational manual.

The calculation of "$Q_{WCM,BL}$" is therefore found appropriate.

Validation team also checked the three year historical data of DRI kiln operation in LMEL plant before the start date of project activity from the log book records. Annual production figures for three years from audited balance sheets were also reviewed which provided the actual sponge iron production figures for individual years. The correctness of calculation is checked as provided in B.6.3 and it is confirmed that average quantity of WECM i.e waste gas released in atmosphere over three years prior to start of project activity i.e. "$Q_{WCM,BL}$" is equal to 1.068 x 10^9 Nm3/yr. Therefore CAR-10 was closed.

PP assessed the applicability of project emissions in line with equation number 41 of methodology as stated below.

$$PE_y = PE_{AF,y} + PE_{EL,y}$$

In project activity, there is no consumption of auxiliary fuel to supplement waste gas/ heat. Also project activity does not involve the gas cleaning before being used for generation of energy hence there is no electricity consumption required as well as no other supplementary electricity consumption is involved in project activity. Therefore in line with requirement of methodology project emissions are not applicable for the project activity.
In addition no leakage emissions are applicable in accordance with the relevant guidance provided in the applied methodology ACM 0012, version 04.

The algorithm to calculate the emission reductions from the project activity is described as; $ER_y = BE_y – PE_y$. Where,
ER_y = Emission Reduction in tCO_2/year
BE_y = Baseline emission in tCO_2/year
PE_y = Project emissions in tCO_2/year

Validation team assessed the calculations of estimated CERs as provided by project participant in the emission reduction spreadsheet (Ref /24/). The assumptions considered for the emission reduction calculations in the spreadsheet were validated as follows -

Parameter/Value	**Source of information**	**Validation justification**
Quantity of tail gas generated prior to the start of the project activity-, $Q_{WCM,BL,}$ 1.068 X 10^9 Nm^3/yr.	Calculated based on the average of three year sponge Iron production data and the design flue gas generation values based on manufacturer's operating manual.	The parameter "$Q_{wcm,BL}$" is calculated based on design flue gas generation data for 100 TPD kiln and 500 TPD kiln. Also as per manufacturer's specification historical average annual sponge iron production data is checked which is used to evaluate above parameter. Validation team have reviewed above reference documents and CER excel sheet where detail calculation of "$Q_{wcm,BL}$ is provided which is found correct.
Quantity of tail gas used for energy generation annually, $Q_{WCM,Y,}$	Plant log Book and flow meter readings mentioned in log book.	This is a monitoring parameter. The data will be recorded daily by an operator. The data from the flue gas flow meter will also be archived daily. For estimation of emission reduction value of "f_{cap}" is taken as 1. However, this

		parameter will be monitored and "f_{cap}" will be estimated to check whether flue gas generation crosses the baseline value of $Q_{WCM,BL}$ so that same can be capped at maximum of 1.
Energy that would have been produced in project year y using waste gas generated in base year expressed as a fraction of total energy produced using waste gas in year y, $f_{cap,}$ =1	Calculated value	This is a monitoring parameter. The value will be determined by using the formula f_{cap} = $(Q_{wcm,BL})/(Q_{wcm,y})$ as discussed above.
The total quantity of electricity generated from the identified WECM stream(s) during the year y –EG_{gross}, 181,440 MWh	Calculated based on 30 MW design plant capacity and 80% PLF over 315 day plant operation.	The Gross Annual Generation has been calculated based on rated capacity, Plant load factor as explained in above sections and operating hours. Gross electricity generation will be monitored during the monitoring period from which net electricity export to recipient facilities will be calculated.
Fraction of Total Electricity Generated by the project activity that is supplied to recipient j in year y-, $F_{j,y,}$ for LMEL = 15.47% For Power trading company = 75.94%	Evaluated based on actual consumption requirement of LMEL facility i.e. 24.45 million units calculated over average of three year period after deduction of 14 million units as auxiliary consumption. Surplus of 120 Million units exported to third party.	Validation team checked the calculation provided in PDD and excel sheet. Internal power consumption of LMEL is approximately 3.5 MW whereas auxiliary requirement is 2.5 MW. Accordingly LMEL will consume 14 million units which are 15.47% of total export after taking account of auxiliary consumption. LMEL have signed contract with third party for export of surplus power to the tune of 15MW as validated from PPA (Ref /15/). Therefore

		surplus 120 Million units will be exported to grid. This is 75.94% of total power available to recipient facilities.
Fraction of total electricity generated by the project activity using waste gas, $f_{wcm,}$ = 0.837398	Evaluated based on ratio of enthalpy of steam calculated for WHR boiler and fossil fuel coal fired FBC boiler.	The value of this parameter is estimated based on ration of enthalpy of steam from WHR source to total steam enthalpy from all sources which includes steam from fossil fuel boilers i.e. coal in project case. This is in line with the requirement of methodology and taken in to calculation of baseline emissions.
Quantity of electricity supplied to the recipient facilities by generator. $EG_{i,j,y}$ = 172,972.8 MWh	It is the difference of EG_{gross} and $EG_{auxiliary}$	$EG_{i,j,y}$ is calculated as the difference of gross electricity generated from 30 MW project activity and auxiliary consumption of 9%. It is the total power available to be exported to LMEL facility and surplus export to third party.
CO_2 emission for the electricity source i (i.e. the NEWNE Regional Grid), displaced due to the project activity during the year y, $EF_{elec,i,j,y,}$ 0.8032 tCO_2/MWh	CEA database version 4 (Ref /44/)	CEA database is an official source of data published by Central Electricity Authority of India and hence acceptable.

Based on above information the estimated annual average emission reduction over the 10 year fixed crediting period is evaluated equal to 109,660 tCO_2e. The validation team confirms that the estimates of baseline emissions can be replicated using the information provided in the PDD and emission reduction spreadsheet being submitted for registration. The validation team further confirms that assumptions have been consistently applied in both emission reduction calculations and investment analysis spreadsheet.

Based on the above assessment, the Validation team 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 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 by the validation team to assess the additionality of the Project activity include review of documents indicated in the assumptions in equity IRR spreadsheet (Ref /21/) and review of Benchmark calculation excel sheet (Ref /22/) i.e. Cost of equity calculated based on CAPM model. The steps taken and sources of information used, to cross-check the information contained in the PDD on this matter are described in Sections 3.7.1 through 3.7.5 below:

3.7.1 Prior consideration of the clean development mechanism (104)

The validation team validated the project activity start date provided in the PDD as follows:

Start date in section C.1.1 of webhosted PDD was stated as 28/10/2006 which is board resolution date for the project activity. CAR-7 was raised by validation team as the start date of project activity was not in line with the definition of start date given in EB41, Para 67 of the meeting report.
As per definition of start date, it is the earliest of the date on which the implementation or construction or real action of project activity begins/has begun. Therefore in response to CAR, PP modified the start date of the project as 15/03/2007 which is the purchase order date for power plant and signifies the investment commitment made by project participant towards project activity. Therefore correction done in PDD is accepted by validation team and CAR-7 was closed.

Since the project start date is before the 2nd August 2008, this project activity is categories as old project activity as per guidelines on the demonstration and assessment of prior consideration of the CDM, EB62, Annex 13 (Ref /46/).

Therefore project participant has provided the detail chronological order of events for demonstration of serious consideration of CDM in the decision to implement the project activity. Validation team reviewed the chronology of events and assessed the serious consideration of CDM in line with paragraph 6(a) of the EB62, Annex13.

Webhosted PDD was not clearly explaining about prior awareness of CDM before investment decision for project activity. Validation team raised CL-18 for demonstration of CDM awareness prior to decision date. In response to CL raised, PP clarified that Board got awareness about the possible CDM revenue during meeting with Llyods Steel Industries Limited (LSIL) representative who made presentation for setting up waste heat recovery based power plant to meet captive demand, as grid power was not continuously available for smooth operation of sponge iron plant. Project participant submitted the copy of presentation made by LSIL representatives to validation team from which it was clear that CDM revenue were considered necessary before proceeding with project activity. Therefore CL-18 was closed.

The continuing and real actions taken to secure CDM status for the project in parallel with its implementation were assessed as per paragraph 6(b) of EB62, Annex13. Accordingly validation team reviewed the time gap between the events for CDM actions in parallel with project implementation events as follows.

Board resolution for the project activity took place on 28/10/2006. PP appointed the CDM consultant on 15/01/2007. Application for host country approval for project activity was made on 17/01/2007 while the DOE was also appointed on same date i.e. 17/01/2007. Initially PDD was webhosted on 25/01/2007 with then applicable methodology ACM0004. However re-webhosting of PDD was made with revised applied methodology ACM0012 on 24/07/2008. PP also initiated project implementation actions in parallel with CDM actions. Initial purchase order was released on 15/03/2007 for design, engineering, manufacture, supply and commissioning of 30 MW power plant. Turbine order was separately released on 15/05/2007 (Ref /11/) whereas electrical equipment order was released on 19/10/2007. All these actions were found within one year gap of each other.

PP re-applied for host country approval on 08/10/2008 as environmental clearance from government of India and state government was delayed due to the procedural issues. The historical events for environmental clearance are provided in section B.5 of the PDD. Validation team have verified all the events and corresponding reference documents. LMEL received the environmental clearance on 12/10/2009 vide letter no. J-13012/123/07-IA-II.

Therefore after submission of these clearances HCA was accorded for project activity on 12/01/2010. Project activity was finally constructed and mechanical completion took place on October 2010 while project was commissioned on Dec-2010. PP received the consent to operate for the project activity by Maharashtra pollution control board (MPCB) on 28/12/2010. Therefore from above set of events validation team confirmed that PP took the parallel action for securing CDM revenue in line with project implementation. Validation team observed that the gap between the two consecutive events pertaining to project cycle and CDM cycle is less than two years. Documentary evidence in support of all the events mentioned is given to the validation team and PP modified the PDD section B.5 to provide the detail time line of events with their justification and referenced document source. Validation team validated and reviewed all documents and found them correct and authentic. Based on the above assessment, the validation team hereby confirms that the proposed CDM project activity complies with the requirements of EB 62 Annex 13 on 'Guidelines for demonstration and assessment of Prior consideration of the CDM'.

3.7.1.1 Historical information on project timeline

There is no historical information on project timeline applicable to the project activity with respect to any real action prior to start date of project activity. The historical background of this project has already been explained in the section above.

3.7.1.2 Identification of alternatives (107)

Project participant has provided the steps for identification of the alternative scenario in section B.5 of the PDD. It is stated in Para 105 of VVM manual ver. 1.2, that the PDD shall identify credible alternatives to the project activity in order to determine the most realistic baseline scenario, unless the approved methodology that is selected by the proposed CDM project activity prescribes the baseline scenario and no further analysis is required. ACM0012 version 04 has listed alternatives for use of Waste energy, Power generation, Heat generation and Mechanical energy. Out of these alternatives, the project participant has selected the baseline scenario as combination of W2 and P10 which is prescribed in the Table 2 of the methodology. The baseline of the project activity is the pre-project scenario wherein waste flue gas generated in DRI kiln would have been passed thorough water scrubbers or Gas conditioning Tower (as referred alternatively) for cooling and released to atmosphere via ESP. The captive power requirement of LMEL would have been fulfilled by grid import whereas the balance surplus electricity equivalent to that generated from project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid. This has been discussed in the section 3.6.3 of this report.

CAR-3 was raised by validation team, as in webhosted PDD; option P1 which is project activity without CDM revenue was eliminated at beginning of assessment of realistic and credible alternatives for the project activity. In response to CAR, PP included the alternative P1 in list of alternatives to be assessed and later eliminated with giving justification towards applicable investment barrier as listed in section B.5 of PDD. Therefore CAR was closed.

A Clarification request CL-12 and CL-13 was raised as elimination of options P4, P5, P6 and P7 was not appropriately justified in webhosted PDD. Clarification was also sought to provide the evidence that installation of WHRB to produce the power in sponge iron industry is not a mandatory requirement by state government. Evidence was also sought to confirm that there are no restriction on setting up of coal based captive power plant for LMEL.

In response to CL raised, PP justified all the options for power generation in section B.4 of revised PDD (Ref /2/) which is found appropriate and same is justified in validation report in above sections. For compliance with legal requirements PP clarified that, MPCB recommends setting up WHRB for more than 100 tpd kiln size but it is not compulsory as there is no mandatory regulation applicable at the moment. Validation team reviewed the consent to operate for 100 TPD kiln dated 20/02/2006 (Ref /19/) and confirm that no such mandatory regulation was applicable.

Validation team also reviewed the consent to operate for 500 TPD kiln operating at LMEL since 1997 vide serial no. BO/Wardha/RONR/R/C-388 Dated 12/5/1997 which also does not have any recommendation. The same was renewed by letter BO/RONK/CHANDRAPUR-23/R/21-03/CC-89 Dated 7/5/2003 for the period up to 31/12/2007.

Again it was noted that WHRB based CDM project activity decision was taken by board of directors on 28/10/2006 and start date of project is 15/03/2007 with placement of order for power plant. During this period WHRB recommendation was not mentioned in consent to operate. Therefore it was confirmed that at the time of board resolution and start date of project activity there was no mandatory requirement to set up the WHRB for power generation by MPCB. Further no mandatory regulation exists for providing WHRB even today for more than 100 TPD kilns as it is only recommendation. Therefore CL-12 and 13 raised was closed.

CL-15 was raised, as justification for alternatives P9 and P11 for power generation were not appropriately worded in webhosted PDD and does not fully explained the reasons why these alternatives are not considered to be plausible. In response to CL raised, PP justified both the options with further information. In case of option P9, LMEL does not have any renewable captive power plant and there are no plans to install the renewable captive power plant in future. LMEL had only grid connection in the past. Hence option P9 is not feasible for PP. In case of option P11, it is about installation of waste heat based captive power plant which is less efficient than the project activity power plant based on waste heat. LMEL is taking maximum heat from waste gases for power generation and releasing gases above 169 deg cent. Hence low efficiency plant will not be feasible as then high temperature gases will have to be released in atmosphere which is not good for ESP as well as it is not acceptable as per norms of MPCB. Validation team accepts the justification provided by PP and therefore CL-15 was closed.

The validation team is of the opinion that requirement of identification of alternatives is met as per VVM version 1.2.

3.7.2 Investment analysis (114)

The project participant has demonstrated the additionality of the project activity using the investment analysis. The proposed CDM project activity involves installation of 30 MW waste heat based captive power plant supplemented with steam from FBC boiler to generate electricity, which after meeting the auxiliary and captive plant requirements shall be exported to the third party via wheeling it through NEWNE Grid. PP has signed PPA with third party IPTPL for sale of maximum 15MW surplus power (Ref /16/) from project activity. Therefore the project activity will earn revenue by sale of electricity apart from the revenues from the sale of CERs. Hence, simple cost analysis is not appropriate.
The project participant has selected benchmark analysis for the demonstration of additionality as per guidance 19 of the 'Guidelines for Investment analysis', version 05 (Ref /45/) which states that "If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate". Since the power generated from the project activity will be exported to grid after meeting the auxiliary and captive plant requirements, which would have been supplied by grid connected power plants and addition of new generation sources into the grid. Therefore, the validation team confirms that the benchmark analysis approach adopted by the project participant for the demonstration of the additionality of the project is correct and the same is in conformity with the guidance for investment analysis published by the CDM Executive Board.

The project participant has selected the equity IRR as a financial indicator for investment analysis. The financial indicator is compared with the cost of equity as a benchmark which is calculated by using CAPM model and using the stock market data. Risk free rate is taken as interest rates on central and state government dated securities as published on Reserve Bank of India's website. PP has selected risk free rate of 7.34% available for the year 2005-06[1] which is the latest risk free rate available at the time of decision making. Market return is calculated based on BSE Sensex values over the period from start of the Sensex in Apr-1979 till project decision date on Oct-2006. Market return is evaluated equal to 19.21%. Thus, the validation team confirms that both the benchmark and the indicator have been appropriately selected by the project participant.

Hence, the validation team has concluded that the Benchmark analysis selected by the project participant is the most appropriate method of demonstrating the additionality of the project activity and is also in conformity with the Guidance (19) of Annex 5 of EB-62, Tool for the assessment and demonstration of additionality (Ref /47/) and Paragraph 109 of VVM, Version 1.2 (Ref /43/).

Investment Analysis: Input Parameters

During the document review of IRR calculation spreadsheet, version 01, the validation team observed that, source of the input values used in IRR calculation was not justified transparently as per Guidance on Investment analysis, version 5 as contain in EB62, Annex 5. Further, the documentary evidence of all the assumptions and its source of data used in calculating the equity IRR in the section B.5 of the webhosted PDD and IRR calculation spreadsheet, version 01 (Ref /20/) were not provided to the validation team.
Accordingly, clarification request CL-16 was raised to cover all the issues. In response to the raised CL, the project participant revised the IRR calculations and submitted the equity IRR spreadsheet, version 02 (Ref /21/) along with revised PDD, version 08 (Ref /2/) incorporating all the changes in section B.5. The validation team validated the assumptions in the investment analysis as follows:

Parameter, Value	Source of information	Validation justification
Project Capacity, 30 MW out of which 25 MW power	Offer letter for 30 MW Captive power plant dated	The total project capacity is confirmed during actual validation site visit and cross check through the purchase order raised for design, engineering, manufacture and supply including commissioning of 1x30 MW

[1] http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/80303.pdf

Parameter, Value	Source of information	Validation justification
generation by contribution of waste heat from flue gases.	15/10/2006 (Ref /10/) and Board Resolution for the project activity dated 28/10/2006 (Ref /8/).	Power plant at Sponge Iron complex at Ghugus, Chandrapur dated 15th March 2007 (Ref /9/). However, the waste gases generated from the 1x500 TPD kiln and 4x100 TPD kilns can generate steam equivalent to 103 TPH from total 5 independent WHRBs setup on each kiln. This quantity of steam will produce power equivalent to 25MW. Hence, project capacity is considered as 25 MW and is accepted by the validation team.
Total Project Cost, 1477 Million Rs	1) Offer letter for 30 MW captive power plant dated 15/10/2006 (Ref /10/) 2) CERC order of 09/05/2006 on petition 133/2005 available at http://cercind.gov.in/050606/133-05a.pdf.	The total capital cost is confirmed from the offer letter of the proposed project activity dated 15/10/2006 which was available during the decision making. The total capital cost as per quotations received for all equipments and services is **1115** Million INR. Apart from this main cost, there are following additional costs which make total project cost equal to 1477 Million INR for the project activity. Additional cost is stated for spares which are taken as 2.5% of WHRBs cost and plant & machinery cost. This is calculated equal to **25** Million INR and is in accordance with proposal. Land and site development cost is taken as **25** Million Rs as stated in proposal. LMEL has to set up the 7 Km, 220 KV transmission line for evacuation of power to NEWNE grid. For estimation of this cost CERC order of 09/05/2006 on petition 133/2005 was referred which is available at the time of decision making. This order provides the transmission line cost as 225.7 million Rs for 29.47 Km. Accordingly per km cost is estimated as 7.658 Million Rs. Since the cost of putting the transmission line was available during the period of 2003, LMEL has assumed the 4% inflation rate in transmission line cost which is in accordance with CERC order. Accordingly transmission line cost worked out equal to **60** Million Rs

Parameter, Value	Source of information	Validation justification
		Other costs include in total project cost are 1) Preliminary expense of **37.5** Million Rs. 2) Contingency of **126.26** Million Rs. 3) Interest during construction as **74.97** Million Rs. 4) And margin money for working capital as **12.92** Million Rs. Therefore total project cost is addition of all the above costs in bold numbers, which is added to 1477 Million INR and accepted by validation team.
Plant Load Factor (PLF), 70% in first year and 80% from second year onwards.	Calculated based on historical sponge iron and flue gas production data and based on power plant design data as provided by manufacturer (Ref /10/).	PLF has been estimated based on following three methods. 1) Method-1 : *Based on actual sponge iron and flue gas produced* PLF by method-1 is calculated as ratio of actual flue gas generated from all kilns to the design flue gas generation from all kilns. Design data for flue gas generation and sponge iron production is given by power plant supplier. Validation team confirmed the design values from design data sheets of M/s ERK (Ref /33/). The PLF worked out by this method equal to 69.31%. Calculation of PLF is provided in section B.6.3 of revised PDD in tabular format. Method-2 : *Based on design steam generation data as provided to Boiler Manufacturer by licensor M/s ERK Eckrokessel, Germany* PLF by method-2 is calculated as ratio of minimum capacity of steam from WHR boilers as provided by licensor, Tonnes/hr to rated capacity of steam from WHR boilers in Tonnes/hr. Validation team cross checked the technical design data submitted in proposal dated 15/10/2006 (Ref /10/) and found that the PLF estimated by design steam parameters is appropriate. PLF worked out by second method is 62.64%

Parameter, Value	Source of information	Validation justification
		Method-3 : *Based on Sponge iron production data of the industrial facility from the start date* PLF by method-3 is calculated as ratio of actual sponge iron produced from all the kilns to the design sponge iron production capacity of kilns. Project participant have calculated the ratio for 500 TPD kiln from its operation year 1996 till decision date in year 2006. One year data of 4x100 TPD kiln is used as these kilns came into operation one year prior to decision date of project activity. Based on the calculation it is observed that kilns were loaded 60% to 80% over approximately last 10 year period. Therefore based on assessment of PLF by above 3 methods, PLF of 70% is taken for first year while from second year onwards, PLF of 80% is selected which is possible to be achieved during actual operation of power plant. Data used to evaluate PLF for the project is available before the decision data and PLF selected for the project activity is confirmed to be conservative based on assessment of above three methods. As per paragraph 6 of Guidelines on the Assessment of Investment Analysis, EB 62 Annex 5, the value of the PLF has been consistently applied by the project participant in the investment analysis calculations. Hence, the same has been accepted by the validation team.
Auxiliary Power consumption, 9%	1) Based on Offer letter 15/10/2006 and 2) MERC tariff order dated 07/09/2006 (Ref /27/)	The auxiliary power consumption has been taken from offer letter provided by supplier to LEML wherein tentative list of auxiliary equipments to be installed as a part of project activity is provided. LMEL has provided detail split up all the auxiliary equipments along with their capacities in section B.6.3 of PDD. Auxiliary consumption for all the equipments added to 2.924 MW which is approximately 9.74% of 30 MW

Parameter, Value	Source of information	Validation justification
		power plant capacity. Validation team also cross-checked auxiliary consumption from the MERC tariff order dated 07/09/2006 (Ref /27/) wherein auxiliary consumption is approved as approximately 9% for various power plants. Hence, 9% Auxiliary Power consumption is accepted by the validation team.
Captive Power consumption, 3.5 MW	Records of electricity consumption as per balance sheet showing 24.45 Million units captive consumption.	The captive power consumption has been considered as 3.5 MW based on annual captive power consumption of 24.45 Million units. Validation team verified the electricity consumed for operation of LMEL facility from past three years balance sheets i.e. 2007-08, 2008-09 and 2009-10 (Ref /14/) which gives total captive power requirement as all the 5 kilns and sponge iron plant. It was observed that for 2007-08 maximum power was imported from grid which is equivalent to the tune of 24.45 million units among above three years. Hence, the same has been accepted by the validation team.
Power Plant Operational Days, 315 days	Consent to Operate No. BO/RONK/CHANDRAPUR-23/R/21-03/CC-89 dated 07/05/03.	Validation team checked the Consent to Operate issued by MPCB for sponge iron plant operation wherein maximum sponge iron production for the 500 TPD kiln is stated as 150,000 Tonnes/annum. Considering 500 Tones per day production capacity maximum operational days of kilns works out only 300 days. Validation team also checked the kiln shut down history for 500 TPD kilns and 100 TPD kilns. It is observed that in both the cases, kilns have not operated for more than 300 days. Assumption worksheet in IRR spreadsheet provides the shut down period and number of shutdown days for both 500TPD and 100 TPD kilns. Therefore power plant operation will rely on kilns operation. Hence power plant can be operated for 300 days in normal circumstances. However, for a conservative approach

Parameter, Value	Source of information	Validation justification
		maximum 315 working days is selected which may be possible to achieve in a year as confirmed by project participants.
Interest rates on Term Loan, 14.5%	Minutes of meeting between Nariman Point Finance Ltd and LMEL (Ref /34/)	Project participant applied for financing the project activity to M/s Nariman Point Finance Ltd. Based on the discussion between LMEL and Nariman Point Finance Ltd, interest rate for the loan was agreed as minimum of 14.5% along with other conditions. Validation team has reviewed the minutes of meeting between LMEL and Nariman point dated 21/10/2006. Interest rates also cross checked from actual consent letter for financing of project activity as submitted by Nariman Point finance to LMEL dated 03/01/2007. Therefore interest rate of 14.5% is accepted by validation team.
Transmission and Distribution Loss (T & D loss), 4.85%	MERC Tariff order, case no.31 of 2006, dated 29/09/2006 (Ref /26/)	Validation team referred to MERC tariff order, case no.31 of 2006, and dated 29/09/2006 for determination of Transmission Tariff for Intra-State Transmission System (InSTS). As per tariff order, transmission line loss is considered as 4.85%. Validation team accepts the transmission line loss considered by PP as same is taken from tariff order for the Maharashtra state which is available at the time of investment decision.
Technical lifetime of the project activity, 15 years	Life time of boiler and turbine generator set as provided by Manufacturer (Ref /35/)	The value of Technical lifetime of the project activity has been taken from Manufacturer letter vide letter dated 12/01/2010 and 13/01/2010 towards life of Turbo generator set and WHR and FBC boilers. Hence, the same has been accepted by the validation team.
Power Tariff for sell to third party,	Power purchase agreement between	Validation team checked the cost of power sold to third party from Power Purchase Agreement between LMEL and IPTPL (Ref /16/) which mentioned that M/s Indrajit

Parameter, Value	Source of information	Validation justification
3.00 Rs/kWh;	LMEL and Indrajit Power Trading Co.Pvt. Ltd. (Ref /16/)	Power shall ensure power trading at 3.00 Rs/kWh on trading margin (commission) of 0.04 Rs/kWh. The validity of PPA is stated as 3 years. Therefore even though escalation clause is not provided in PPA, escalation of 1% is considered in external sales price by PP as a conservative approach. Escalation of 1% is arrived based on escalation of 1% in grid electricity import price by LMEL over 1996-2006 periods which is referred from grid electricity bills. Validation team find this as sufficiently conservative approach and accepted the cost considered in analysis.
Power Tariff for internal sell 3.77 Rs/kWh	Evaluated as average value of grid import cost from electricity bills (Ref /36/) for period Feb-2006 to Sep-2006	Due to project activity, power will be available for meeting captive requirement first and surplus will be sold to third party. Therefore net revenue is generated by avoiding the purchase of costlier grid power for captive requirement. Hence cost of power consumed for captive purpose is considered as Rs 3.77 Rs/kWh which is cost of imported power from grid by LMEL. The cost of import power is evaluated based on average cost of power for each month for the period February 2006 to September 2006 i.e. before the investment decision date of 28/10/2006. Electricity bill between Feb-2006 to Sep-2006 are referred because all the 4x100 TPD kilns was commissioned by Feb-2006, hence total power requirement of sponge iron plant is available from which unit cost of power is calculated. Validation team have referred the electricity bills for above period and values and calculation provided in Levelized cost sheet is found correct. Escalation of 1% is considered in internal sales price by PP based on the escalation of grid electricity import price by LMEL for period 1996-2006 which is referred from grid electricity bills. Validation team find this as sufficiently conservative approach and accepted the cost considered in

Parameter, Value	Source of information	Validation justification
		analysis.
O&M cost, 0.78 Rs/kWh	MERC Tariff order, case no.48 of 2005 dated 07/09/2006 (Ref /27/)	LMEL do not have experience in installation and operation of power plant. Hence for O&M expenses, tariff petition of MPGCL and MERC tariff order dated 07/09/2006, Case No.48 of 2005 has been used. Accordingly O&M expense of 7% of GFA is considered as stated on page no 6 of tariff order. O&M cost of 0.78 Rs/kWh is evaluated by considering the 132 million units generation from waste heat recovery power plant and gross fixed asset of 1477 Million Rs. PP has provided calculation of O&M cost in IRR sheet. Validation team checked the values from tariff order and calculation of O&M cost was found correct.
Water cost, 0.03 Rs/kWh	Assumption based on water cost in surrounding region power plants.	Water requirement for power plant operation and associated cost was referred for other power plants in the region by PP by referring to their balance sheets. Therefore same is assumed to be applicable for the project. Validation team accepts the same as it is reasonable assumption at the time of decision making for the project and supported with audited balance sheet data for other power plant in the region.
Cost for power consumption required during start-up of power plant. 0.0136 Rs/kWh		Start-up power cost is evaluated based on auxiliary power requirement of 2.5MW requiring the 2 startup in year of 4 days duration each. Hence cost of grid power consumption is evaluated as 2.5 x 24 x 2 x 4= 480,000 units. Grid power import cost is taken as 3.77 Rs/unit as validated above. Therefore for 132 million units generation for project activity power plant, cost of startup power consumption is worked out equal to 0.0136 Rs/kWh.
Demand Charges,	MERC tariff order dated 20/10/2006	MERC tariff order dated 20/10/2006 provides the demand charges as Rs 370/kVA per month. Therefore for 6500 kVA

Parameter, Value	Source of information	Validation justification
0.218 Rs/kWh	vide case no.54 of 2005 (Ref /28/)	demand load for 12 months demand charges worked out to 0.218 Rs/kWh considering generation of 132 million units.
Insurance Commission, 0.0410 Rs/kWh	Assumption based on normal insurance cost incurred in industry.	Insurance commission is considered as 0.5% of plant and machinery cost. This assumption is based on normal insurance cost incurred in industry. 0.0410 Rs/kWh insurance cost is estimated as 0.5% of total plant and machinery cost i.e. 1086 million Rs which is addition of cost of WHR boilers, other plant and machinery, 7km transmission line and spare parts.
Power trading company (IPTL) charges/unit, 0.04 Rs/kWh	Power purchase agreement between LMEL and IPTPL (Ref /16/)	Validation team checked the cost of power sold to third party from Power Purchase Agreement between LMEL and IPTPL which mentioned that M/s Indrajit Power shall ensure power trading at 3.00 Rs/kWh on trading margin (commission) of 0.04 Rs/kWh. Therefore validation team accepted the power selling expenses of 0.04 Rs/unit.
Power Transmission Cost, 0.15 Rs/unit	MERC tariff order case no.31 of 2006 dated 29/09/2006 (Ref /26/)	As per MERC tariff order case no.31 of 2006 dated 29/09/2006 transmission charges are stated as 3623 Rs/MW/day. Therefore for 25 MW power plant transmission charges evaluates equal to 0.15 Rs/kWh. Validation team accepts the values taken from MERC tariff order for transmission charges as same were applicable at the time of investment decision.
Mandatory Spares, 0.0453 Rs/kWh		Approximate cost of mandatory spares required for monitoring of project activity parameters is 6 million Rs. Therefore for 132 million units generation, per unit spares cost is worked out 0.0453 Rs/kWh.
Welfare Cost, 0.00604 Rs/kWh		Welfare cost is evaluated based on 40 Million Rs expected CDM revenue out of which 2% of the revenue is planned to spend on welfare activities. Therefore for 132 million unit power generation per unit walfare cost is calculated equal to 0.00604 Rs/kWh.
Waste	Letter from	PP has provided the budget estimate of

Parameter, Value	Source of information	Validation justification
handling cost, 0.0493 Rs/kWh	LEML for generation of 48000 tons of fly ash from waste heat based power plant.	waste (fly ash) handling cost for waste generated in WHRB power plant to validation team on a letterhead of company. Power plant will generate approximately 48000 tonnes/year waste. The estimated waste handling cost is Rs 135.89 per tone of fly ash as provided in the letter dated 18/10/2006 (Ref /32/). Therefore per unit cost for waste handling is evaluated as 0.0493 Rs/kWh for 132 million units generation from WHR boiler.
Sundry Expenses, 0.14 Rs/kWh		Sundry expenses are assumed as 10% of all the power production expenses as elaborated above. Therefore total power production expenses per unit of power are 1.38 Rs/kWh. 10% of these power production expenses i.e. 0.14 Rs/kWh is taken as sundry expense which validation team found reasonable.
Salvage Value, 10% of the project cost	CERC tariff order dated 26/03/2004 (Ref /29/)	The Salvage Value has been taken from CERC tariff regulation having reference no. L-7/25(5)/2003-CERC dated 26/03/2004 which was available during the decision making. PP has taken 10% of total project cost and margin money for working capital is added to calculate salvage value. This is in line with CERC tariff order; hence the same has been accepted by the validation team.
Debt :equity ratio, 70:30	CERC tariff regulation having reference no. L-7/25(5)/2003-CERC dated 26/03/2004	The Debt: Equity ratio has been sourced from the Tariff Policy dated 6th Jan 2006, published by Ministry of Power which was available during the decision making. Hence the same has been accepted by the validation team.
Corporate Tax, 33.99% and MAT, 11.33%	Income tax act prevailing in the host country (India)	Income tax has been considered at 33.99% and MAT has been taken at 11.33% as per the Income tax Act prevailing in the host country (India). The validation team therefore confirms that the project participants have applied all the taxes as per the valid rules of host country (India) and hence it is acceptable.
Baseline	CEA	CEA database is an official source of data

Parameter, Value	Source of information	Validation justification
Emission Factor, 0.8032 tCO2/MWh for NEWNE Grid	database version 4, dated October 2008 (Ref /44/)	and version 4 of CEA database is used to arrive at emission factor of the grid for the project activity. Emission factor is calculated by using the Operating margin emission factor as provided in CEA database for year 2005-06, 2006-07 and 2007-08 which was the latest three year data available at the start of validation viz; webhosting of the PDD for global stakeholder comments. For calculation of weighted average operating margin emission factor, net generation in operating margin for the respective years is selected from CEA database. Accordingly weighted average operating margin emission factor is calculated equal to 1.0086 tCO_2/MWh. Build margin emission factor is taken as 0.60 tCO2/MWh for year 2007-08. Therefore as per emission factor tool, default weights of 50% for OM and 50% of BM are considered and emission factor is evaluates equal to 0.8032 tCO_2/MWh.

The validation team has verified the assumptions as above and observed that they are correct and based on conservative values that are applicable at the time of investment decision making. All the input assumptions verified above are applicable at the time of investment decision as per the paragraph 6 of Guidelines on the assessment of Investment Analysis, EB 62 Annex 5.

The financial expert has verified the IRR calculations and observed them to be in order. The project participant has calculated depreciation using Straight Line Method (SLM) by taking depreciation rate of 5.28% on capitalized project cost as per schedule XIV of Company's Act 1956. WDV depreciation as per income tax act is calculated at the rate of 10% for buildings, 80% for waste heat recovery boilers and transmission line and 15% on other plant and machinery. The validation team hereby confirms that the project participant has applied all the statutory levies and taxes as per the then valid rules. CL-16 has been closed.

Validation team raised CAR-12 as all the possible revenue sources were not included in financial model like expected savings accrued because of avoidance of cash outflow for purchase of grid power. In response to CAR, PP has included the revenue in financial model due to cash outflow saved on purchase of grid power. Cash inflow is calculated for 24.45

million units of equivalent power from grid which is required for captive consumption of LMEL facility. PP has conservatively selected the internal sell of power at the rate of 3.77 Rs/kWh which is calculated as average of grid import power cost for the period from Feb-2006 to Sep-2006. Validation team has reviewed the corresponding month electricity bills and calculation of average grid power cost as provided in IRR sheet. Therefore CAR was closed by validation team.

It is ensured that salvage value of project power plant is included in the end of assessment year in financial model. Project has life of 15 years; therefore 10% of total project cost excluding margin money for working capital is included in last year as cash inflow. Also margin money for working capital is added separately as cash inflow in the final year. IRR sheet has provision to calculate the IRR with CDM benefits and without CDM benefits. PP has considered the CDM revenue in financial model based on price of 328 Rs/CER. Also CDM expenses are included and considered as 6% of CDM revenue. Validation team accepted the CDM costs and revenue as approximate assumption at the time of decision making by project participant. Based on above input parameters equity IRR is calculated as **7.39%** without CDM benefits.

Benchmark

The project participant has selected equity IRR as financial indicator for investment analysis. As per para 12 of guidance on investment analysis, version 5, required/expected return on equity are considered as appropriate benchmarks for equity IRR. Therefore, PP has selected Return on Equity or Cost of equity as benchmark for project activity. Validation team accepted the selection of benchmark as it is in accordance with guidelines on investment analysis version 5, EB62, Annex 5.

Webhosted PDD did not consider the benchmark analysis and additionality was presented based on Levelized cost of power generation from three alternatives identified in section 3.6.3 above. However, additionality is now demonstrated by selection of benchmark analysis and for benchmark evaluation, cost of equity is calculated by CAPM model. The RoE is mathematically represented as,

RoE = {Risk Free Rate + Beta which shows the risk x (Market Return – Risk free rate)}

This method is in accordance with the additionality tool, as benchmark is based on official, publicly available financial data source (based on parameters that are standard in market) and hence the above approach for calculating benchmark was accepted.

For evaluation of market returns PP has chosen market index as BSE Sensex in benchmark RoE sheet, (Ref /22/). The BSE sensex is considered appropriate because; it represents the data since its launch,

i.e. 01/04/1979 till project decision date on 28/10/2006 which gives the sufficient range of data to arrive at market return. The validation team considers this as appropriate, since market return from 1979 till 2006 can be compared with the project activity having total lifetime of 15 years. The data for 15+ years is publicly available on BSE website which is sufficient period of data for analysis of market returns. Therefore validation team considers this as a sufficient period to determine the realistic market return. Market returns over the period of Apr-1979 till Oct-2006 worked out equal to 19.21%.

Risk free rate has been sourced from the weighted average interest rate for the year 2005-06 on central government securities published by Reserve Bank of India, Government of India. Risk free rate is taken as 7.34% which is weighted average interest rate on central and state government dated securities and applicable at the time of decision making (i.e.28/10/2006)[2]. Since this is an official source of data, publicly available prior to decision making date, is accepted by the validation team.

The beta value for the project type is based on Beta values of power generating companies in India, listed on the stock exchange at the time of investment decision. The equity beta values were directly taken from CAPITALINE database for each of the six companies based on market data for five previous years i.e. from 01/04/2000 till 15/10/2006. PP has provided the actual screen shots of CAPITALINE software (Ref /37/) wherein beta values for each company for above period is provided to validation team and same is found reliable. The minimum of equity beta among six companies was selected to arrive at the cost of equity. In case of project activity, out of six companies the minimum beta value was observed of M/s CESC i.e. 0.9142. Therefore selected beta value of 0.9142 for evaluation of benchmark for the project activity found justified.

Incorporating the above values, the Return on equity works out to be:

Return on equity = 7.34% + {(19.21% - 7.34%) x 0.9142} = **18.20%**

The validation team verified the correctness and authenticity of the data used for the RoE calculation in Benchmark sheet, version 01 (Ref /22/) and found them to be correct and publicly available. This is also in line with the guidelines for benchmark selection stipulated in the Guidance on the Assessment of Investment Analysis, EB 62 Annex 5 and hence accepted by the validation team.

From the above description and financial spreadsheets worked out by the PP, it can be deduced that the Equity IRR works out to be 7.39% and the

[2] http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/80303.pdf

RoE (benchmark) works out to be 18.20%. Hence the Equity IRR is lower than the benchmark. This demonstrates that the project is additional.

Sensitivity Analysis

In order to demonstrate the robustness of the conclusion arrived at above, viz., that the project is additional, the project participant had performed sensitivity analysis. The section B.5 of the webhosted PDD had subjected the parameters "export electricity sales tariff", Plant & Machinery cost, "Operating/Production Cost", "Operating days" and "PLF" to Sensitivity. PP had applied the different percentage of sensitivity to above parameters therefore validation team raised CL-20 to clarify and to provide the justification for the variation range selected. In response to CL, PP revised the percentage variation applied to each of the parameter for sensitivity analysis and generalized +/- 10% variation is applied for each of the parameter in line with para 21 of investment analysis. Moreover PP also provided the justification for applicable sensitivity variations for the parameters and sensitivity is now presented in open ended manner to check at what percentage project will cross benchmark for each of the parameter. The project participant has thus subjected the five critical parameters as stated above to +/-10% variation and has presented the calculations which are reproducible. The validation team cross checked the correctness of the computation and found them to be correct. Hence it has been accepted by the validation team and subsequently CL raised was closed.

The results of the sensitivity analysis are as follows:

Sensitivity Parameters	**Values**	**-10%**	**Base value IRR**	**+10%**
PLF	70% for first year and 80% from second year onwards	-0.30%	7.39%	14.77%
Production Cost	Per unit total production cost for WHR power plant is 1.51 Rs/kWh	12.41%	7.39%	2.23%
Plant & Machinery Cost	1001 Million Rs	10.50%	7.39%	4.74%
Export Tariff Rate	3.00 Rs/kWh with assumed annual escalation of 1%.	0.44%	7.39%	14.06%

Operating Days	315 days.	-0.30%	7.39%	14.77%

The above analysis indicates that the resultant Equity IRR is below the benchmark of 18.20% in each of the likely scenarios presented. In the above background, the validation team concurs with the project participant that the project activity is financially not viable without the benefits from CDM.

The validation team observed that there is a commitment on the part of the Project Participant to supply 15 MW of power to the grid. This is borne out by the fact that there is a Power Purchase Agreement (Ref /16/) signed for the sale of 15 MW surplus power, which the Project Participant has entered into with a third party. The waste heat recovery from the DRI kilns in the project activity is of the quantum that permits such a surplus for sale, as the requirement of LMEL's own steel manufacturing facility itself is very small; only 3.5 MW and considering the auxiliary power plant consumption of 2.5 MW total internal requirements is 6 MW. However, to be able to meet the surplus sale obligation as per the PPA and also for the uninterrupted and healthy operation of the captive power plant, it is necessary for a coal fired boiler also to be installed which would supply the steam required to run the captive power plant. The team had requested a clarification CL-8 from the Project Participant on the details of the FBC coal fired boiler that would be installed in the project activity. From the response of the PP to the CL-8, it was concluded by the team that the boiler capacity required for this purpose was 90 TPH.

The baseline analysis in the section B.4 of the PDD indicates that levelised cost of power generation is the lowest for a coal based power plant (INR 2.21 per kWh). In the absence of the project activity, the coal based plant would be able to serve the power needs of LMEL's own manufacturing facility. However, the baseline analysis has also taken into consideration how the other recipients of the power generated by the project activity (supplied through the grid) would have met their power requirements in the absence of the project activity. As this would be through the supply of grid based power, both coal based plant as well as the grid would be likely baseline scenarios.

However, Step 3 on page 9 of the methodology has stated that in cases where more than one alternative could be the baseline, the alternative with the lowest emissions should be considered as the baseline scenario. The Project Participant has therefore taken "Grid" as the baseline for the project activity.

The validation team notes, therefore, that the project activity is not only the setting up of waste heat recovery equipment and generation turbine

but also involves the installation of coal based boiler of 90 TPH capacity. The coal based boiler (though not of the same capacity), would have been a part of the baseline scenario as well. The Project Participant, in setting up the project activity has therefore incurred the investment not only of the project activity but also an additional burden of investment of the baseline coal based boiler. The 90TPH FBC coal fired boiler capacity is envisaged by project proponent as during the operation of power plant the shortage of steam to the tune of 86.4 TPH might occur if 1x500 and 1x100 TPD kilns undergo shutdown simultaneously. Also the validation team noted that as per power purchase agreement, the PP has an obligation to supply the power up to 15 MW to the buyer. Therefore the validation team accepts that the operation of coal fired boiler is required to supply quality steam with design pressure and temperature conditions so that 30 MW turbine generator can be operated healthily. Hence, validation team accepts the justification provided by PP for installation of 90 TPH coal fired boiler for complementing any shortage of power generation due to unavailability of steam from WHR boilers to the turbine.

The IRR calculated from the investment analysis is lower than the benchmark. However, the IRR worked out has conservatively not considered the investment in the coal based boiler. Only the investment in waste heat recovery boilers is considered. If the investment in the coal based boiler were to be considered, the IRR would be even lower.

The validation team, based on the above assessment confirm that the underlying assumptions are appropriate, the financial calculations has been checked by financial expert and are found to be correct. Therefore the project is additional.

3.7.3 Barrier analysis (118)

The steps taken to assess the relevant information contained in the PDD against each barrier are described below.
Project participant had claimed in the web hosted PDD that the project activity faced the following barriers:

1. Investment barrier
2. Technological barrier
3. Barrier due to prevailing practice

The validation team however, did not agree with the project participant's claim and raised a number of CARs CAR-13, CAR-14, CAR-15, CAR-16 and clarification CL-17 in this regard. The project participant's responses could not substantiate the barriers claimed. All the three barriers were subsequently removed by the project participant in the revised version of the PDD.

The additionality tool version 6.0 allows the project participant with an option to use either step 2 (Investment analysis) or step 3 (Barrier analysis) of the tool to demonstrate additionality. In the revised PDD, therefore, the PP has excluded barrier analysis and additionality of the project activity is described only with Step-2 i.e. Investment Analysis.

The DOE hereby confirms that the barrier analysis performed is not credible and hence is not considered further for demonstration of additionality.

3.7.4 Common practice analysis (121)

The project participant has demonstrated the common practice analysis in section B.5 of the webhosted PDD. Accordingly step 4, paragraph 47 of tool for "Demonstration and assessment of additionality", version 06, EB 65, annex 21 (Ref /47/) is followed in revised PDD, version 08. Project participant has selected the entire host country as geographical area which is as per applied additionality tool. Project activity is new installation of waste heat recovery based captive power plant generation and surplus power is exported to grid, it displace grid power which would have been generated by operation of mainly fossil fuel i.e. coal based power plants in the grid. Hence project activity falls under measures presented in paragraph 6(a) of additionality tool version 6. Following are the measures stated as per para 6 of additionality tool.

a) *Fuel and feedstock switch*: Project activity does not have power generation facility in pre-project scenario. Power was imported from the grid. As the baseline for the project activity is grid based power generation, it is implied that project activity involves indirect fuel switch from fossil fuel based coal power plants in the baseline to waste heat power plant in project activity. Therefore there is fuel and feedstock switch and this measure is applicable.
b) Switch of technology with or without change of energy source (Including energy efficiency improvements as well as use of renewable energies): This measure is not applicable as there is no switch of technology. Project activity involves new installation of waste heat recovery power plant.
c) Methane Destruction: Not Applicable. Project activity does not generate any methane and no destruction is involved in project activity.
d) Methane Formation Avoidance: Not Applicable. Project activity does not generate any methane and no destruction is involved in project activity.

Therefore validation team confirms that common practice for the project activity can be demonstrated based on steps 4, paragraph 47 of additionality tool.

Project participants has provided the following key information and common practice is followed as per steps provided in paragraph 47 of additionality tool –

Step-1: *"Calculate applicable output range as +/- 50% of the design output or capacity of the proposed project activity."*

Since the project activity involves 25 MW power generation based on waste heat utilization of flue gases from sponge iron kilns, PP has calculated applicable out put range of +/-50% that of project activity size i.e. Output range from 12.5MW to 37.5MW is selected for common practise analysis. Validation team agrees with the approach selected by PP as the project activity is only for 25MW power generation based on waste heat utilization from the flue gases. Hence the power generation range is selected across 25 MW only.

Step-2: *"In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. Note their number N_{all}. Registered CDM project activities and projects activities undergoing validation shall not be included in this step."*

Start date of the project activity is 15/03/2007 on which purchase order was placed by PP. Therefore PP has identified all the power plants in sponge iron industries in the range of 12.5MW to 37.5MW and which are operating in the selected geographical area i.e. India. Since the project activity is in sponge iron industry utilizing the waste heat for power generation, the common practice analysis is limited to only sponge iron industries and only power plants operating in sponge iron industries at the time of start date of project activity are considered for common practice analysis. Validation team accepts the selection of power plants from sponge iron industries only as per paragraph 6 of guidelines on common practice Ver. 2 (EB69, Annex 08). According to paragraph 6 validation team confirms that the power plants in step 2 are selected from sponge iron industry as these are located in applicable geographical area i.e. Host country India. These projects apply the same measures i.e. waste heat based power generation in sponge iron industry as that of project activity. These projects use the same energy source i.e. waste heat from waste flue gases for power generation as that of project activity. These power plants are implemented in sponge iron industries only having the common final product. The capacity or the output of selected power plants is within the above stated power generation range as calculated in step1 and all these power plants were in operation prior to start date of project activity. Hence validation team confirms that PP has selected power plant in step2 correctly. Total identified sponge iron manufacturing plants are 118 out of which only 16 power plants were having the captive power

generation facility. Validation team checked the corresponding web links provided in PDD and found the information is correct. Out of total 16 plants only 8 power plants falls in the power generation range of 12.5 MW to 37.5 MW. Further 6 power plants from these 8 power plants are already in CDM process. Validation team have checked all the UNFCCC reference number for 6 projects and they are also mentioned in the PDD. Therefore N_{all} selected for the project activity are 8 – 6 = 2 power plants.

Step 3: *"Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the proposed project activity. Note their number N_{diff}".*

PP has identified 2 power plants as a "N_{all}" having total captive power plant size of 12.8 MW and 32 MW respectively (Please refer PDD). However both the plants were having only 2 x 100 TPD kilns which are capable of generating maximum of 2 MW waste heat based power. Hence rest of the power is generated by addition of steam from coal based boilers. Hence it can be said that both the plants are predominantly dependent on coal based steam generation to produce the power. Whereas project activity involves the 25MW waste heat recovery based power generation. Validation team have checked the corresponding web links mentioned in the PDD and confirms the information provided is correct.

Therefore Number of units that are technologically different from that of proposed project activity is N_{diff}: 2

Step 4: *"Calculate factor $F=1-N_{diff}/N_{all}$ representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity."*

$$F = 1- 2/2 = 1-1 = 0$$

The proposed project activity is a common practice within the sector in the applicable geographical area if the factor F is greater than 0.2 and N_{all} - N_{diff} is greater than 3
F for the project activity is 0 which is lesser than 0.2 and N_{all} - N_{diff} = 2 – 2 = 0 is lesser than 3.
Therefore from above analysis validation team accepts that project activity is not a common practice.
The project participants has demonstrated additionality by investment analysis and supplemented with common practice analysis. The equity IRR without CDM revenues is less than the benchmark. It can be observed that even with increased generation, increased tariff and decreased project cost the equity IRR is below the benchmark of 18.20%. Thus, the project without CDM revenues is not financially viable. Also as

demonstrated above, the project is not a common practice in the region. Thus, the validation team is of the opinion that the project is additional.

3.8 Monitoring plan (124)

The Project activity uses the approved consolidated monitoring methodology ACM0012 Version 4. Please refer discussions on the applicability of the methodology at section 3.6.1 above.

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

Validation team considers the monitoring plan to be complying with the requirements of the methodology for the following reasons –

1. The monitoring plan is documented according to the applied methodology. It provides for the collection and archiving of all relevant data as listed in ACM0012. The measurement equipment and the measurement methods are described in the section B.7.1 of the PDD Version 9. The monitoring plan presented in the PDD complies with the requirements of the methodology. The validation team has checked all the parameters presented in the monitoring plan against the requirements of the methodology; no deviations relevant for the project activity have been found in the plan. As a part of validation, validation team has conducted document review and interviewed the project participants to ascertain the feasibility of the proposed monitoring plan. The quality assurance and quality control procedures adopted are deemed appropriate.

   a) Quantity of the waste flue gas utilized in the project activity for generation of electricity in year y ($Q_{WCM,y}$) would be monitored continuously after the exit from WHR boiler and before passing through ESP with help of continuous electronic flow meter.
   b) Temperature of waste flue gas ($t_{wcm,h}$) and temperature of WHR steam along with temperature of steam coming from FBC boiler ($t_{whrsteam}$ / $t_{othersteam}$) will be monitored on continuous basis by smart temperature transmitter with signal going to DCS system.
   c) Amount of steam generation (i) from 5 WHRB boilers on 4x100 TPD and 1x500 TPD kilns and (ii) Steam generation from coal based FBC boiler will be monitored continuously with independent steam flow meter having smart transmitter and single is attached to DCS system for easy recording.
   d) Steam pressure for (i) Steam generation from 5 WHR boilers and (ii) Steam generation from 1 coal based FBC boiler will be monitored on continuous basis. Smart transmitter analogue signal is provided to DCS system for easy recording.

e) Energy content of steam monitored from WHR boilers and Energy content of steam generated from coal based FBC boiler will be calculated based on steam table available online or engineering handbook will be referred.
f) Electricity generated (gross), power plant auxiliary electricity consumption and net electricity supply to recipient facilities will be measured on continuous basis with help of electronic meters

2. The measuring equipments mainly flow meters and energy meters will be subjected to annual calibration. The manager of power plant will be responsible for the same. The procedure for maintenance of monitoring equipment is duly elaborated in the revised PDD version 9.0, in Annex-4. Also details regarding metering system at site along with arrangement of spares meters is explained which will be required in case of emergencies. In response to CAR-20, PP modified the PDD, annex-4 which now elaborates data adjustment procedures for identifying and dealing with uncertainties. Validation team found it complete and sufficient with respect to monitoring in project activity and CAR was closed.

3. Annex-4 of the PDD also provides the details regarding the experience and training for all shift engineers, operators and technical staff. Emergency preparedness plan will be maintained. Internal audit will be carried out by CDM officer every month as per internal audit plan and he will prepare all necessary CDM related documentation.

Validation team considers that the monitoring plan is in compliance with the requirements of the methodology and the project participants are able to implement the monitoring plan.

However, the following issue was raised during validation and subsequently closed,

CAR-5 was raised as section B.7 of webhosted PDD did not provide detailed data archiving procedure and responsibility and procedure for archiving was not described. CAR-6 was raised as section B.7.1 did not include monitoring of auxiliary power consumption, import and export to facilities. PP submitted revised PDD detailing the archiving procedures and clarified the responsibilities of persons monitoring and archiving data in section B.7 and Annex-4 of the PDD. Further section B.7.2 also provided with the monitoring arrangement in project activity with inclusion of schematic line diagram of metering arrangement. Hence CAR-5 and CAR-6 was closed.

Validation team raised CAR-18 and CAR-19 as various inconsistencies were observed in included monitoring parameters which were not complete with respect to monitoring methodology ACM0012 version4. In

response to CAR raised PP clarified the inclusion of monitoring parameters and consistency with that of monitoring methodology maintained. Therefore CAR-18 and 19 was closed.

Validation team raised CL-20 and CL-21 as monitoring of net electricity supplied to recipient facilities was not clear also point of exact measurement of flue gas and steam parameters was not clear. PP provided the detail description in revised PDD version 9 and clarified monitoring of electricity supply to recipient facilities and monitoring of waste flue gases and steam transparently. Therefore CL raised was closed.

The validation team also interacted with the operating team of project participant and found that they are experienced in the operation and maintenance of Power Plants. The Validation team hereby confirms that the project participant is capable of implementing the monitoring plan in accordance with the applied monitoring methodology.

3.9 Sustainable development (127)

The host Party's DNA confirmed the contribution of the project to the sustainable development of the host Party. Refer to item 3.1 of this report. The project participant has described contribution to sustainable developed as per four indicators of sustainable development stipulated by Ministry of Environment & Forests (DNA for India). The validation team is of the opinion that the description is adequate as the project will lead to sustainable development through employment generation, generation of clean energy, infrastructure development in and around the area and reducing the electricity supply-demand gap. The project provides employment to local people as was confirmed by meeting with stakeholders during site visit. The host Party's DNA (India) confirmed the contribution of the project to the sustainable development in India. Project participant has provided a copy of this letter having reference no. 4/20/2009-CCC dated 12/01/2010 (Ref /7/) to the validation team. The validation team confirmed the authenticity of the approval from the website of DNA of India (http://cdmindia.in/). The letter of approval of DNA of India clearly states that India has ratified the Kyoto Protocol and the approval is for voluntary participation in CDM project activity. Also, the letter of approval of DNA of India states and confirms that project activity contributes to sustainable development in India.

3.10 Local stakeholder consultation (130)

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

Local stakeholder consultation meeting to discuss stakeholder concerns on the Project Activity was conducted by the Project Participant on

09/02/2007 (Ref /38/). The stakeholder meeting took place in Ghugus Village of Chandrapur district, in Maharashtra state which is nearby to LMEL plant. The method of invitation to the local stakeholders was through personal invitations and also through verbal means. The local governing authority of village is called as “Grampanchayat” who is headed by person named as “Sarpanch”. Project participant met the representatives of gram panchayat and appraise the details of project activity in personal meeting.
Based on this initial meeting PP decided to conduct the stakeholder meeting after fortnight on 09/02/2007. The invitation letters was sent to village Sarpanch and other villagers were informed by grampanchayat for stakeholder’s meet. The validation team feels that the time provided [15 days] to the local stakeholders for providing comments on the Project Activity is adequate. The same was verified by the validation team through interaction with local stakeholders and minutes of meeting submitted to validation team (Ref /38/).

The list of participants, no objection certificates issued by Sarpanch of village and NOC letter from MLA and communication with interested local stakeholders, and minutes of the stakeholder meeting were verified by the validation team. The stakeholders viewed this project as contributing to local environmental benefits and socio-economy. Overall, there was agreement that the project activity was a beneficial project in terms of local sustainable development.

During the validation site visit, the validation team also interviewed few of the local stakeholders for their views about the project activity. The villagers and Sarpanch of Ghughus village confirmed that the stakeholder consultation meeting was held at the project activity site, Ghughus village. The villagers expressed satisfaction over the waste heat based power generation project activity in the region and confirmed that the project activity gives employment opportunity to the local public and thus contributes to the economical growth of the region.

The DOE hereby confirms that the process of local stakeholder consultation is observed to be adequate.

3.11 Environmental impacts (133)

The project participant has carried an environmental impact assessment study in accordance with the host country environmental regulations. The environmental impacts from the project activity have been identified and an environmental management plan has been designed to address the same. During the site visit the environmental impact assessment report was made available for validation which confirmed that the study was carried out in compliance with all the environmental regulations of the state and of host country.

The environmental impacts of the project have also been discussed in detail in the PDD. The project is not likely to create any adverse environmental impacts as well as trans-boundary impacts. As required by the EIA notification of 2006[3] a public consultation had already been conducted for the project activity. PP applied for environmental clearance on 22/05/2007 and the State level Environmental Impact Assessment Authority of Maharashtra granted the environmental clearance on 12/10/2009. Also LMEL has obtained the Consent to Operate dated 28/12/2010 (Ref /18/) by Maharashtra Pollution Control Board.

Validation team raised CL-1 as project participants submitted EIA report dated March-2007 for the project activity which was not matching with EIA report dated June-2005 mentioned in webhosted PDD. Project participant clarified that EIA report June-2005 was prepared for expansion of sponge iron facility by addition of 4x100 TPD kilns, whereas the EIA report of March-2007 was prepared for 25 MW project activity power plant. Therefore validation team closed the CL-1.

The project participants have undertaken analysis of environmental impacts mainly with respect to various environmental aspects such as land, Air and water and socio- economic environment etc. A well conceived environment management plan has been prepared to mitigate the environmental impacts of project activity. The validation team is of the opinion that environmental impacts due to project activity are sufficiently addressed in EIA report.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

According to the modalities for the Validation of CDM projects, the DOE shall make publicly available the project design document and receive, within 30 days comments from Parties, stakeholders and UNFCCC accredited non-governmental organizations and make them publicly available.
Bureau Veritas Certification published the project design document on the UNFCCC CDM website (http://cdm.unfccc.int) for the period from 24/10/2009 till 22/11/2009 and invited comments by Parties, stakeholders and non-governmental organizations.
Project activity received no comments during webhosting period.

5 VALIDATION OPINION

Bureau Veritas Certification has performed a validation of the "*LMEL 25 MW Waste Heat based Captive Power Plant*" Project in India. The validation was performed on the basis of UNFCCC criteria and host

[3] http://envfor.nic.in/legis/eia/so1533.pdf

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.

Project participant/s used the latest tool for demonstration of the additionality. In line with this tool, the PDD provides investment analysis to determine that the project activity itself is not the baseline scenario.

By synthetic description of the project, the project is likely to result in reductions of GHG emissions. An analysis of the investment barriers demonstrates that the proposed project activity is not a likely 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 annual average emission reductions, viz., 109,660 tCO_2 per annum.

The review of the project design documentation version 9 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 '*LMEL 25 MW Waste Heat based Captive Power Plant*' as CDM project activity.

6 REFERENCES

Category 1 Documents:
Documents provided by LMEL that relates directly to the GHG components of the project.

/1/ Webhosted PDD, Version 05, dated 14/10/2009
/2/ Revised PDD, Version 09, dated 10/05/2013.
/3/ Initial application letter for host country approval to NCDMA of India on 17/01/2007.
/4/ Second application letter for host country approval to NCDMA of India on 08/10/2008.
/5/ Final application letter for host country approval to NCDMA of India on 24/10/2009.
/6/ Invitation letter from NCDMA for HCA meeting at MoEF office dated 12/11/2009
/7/ Host Country Approval accorded by NCDMA of India for project activity having reference no. 4/20/2009-CCC dated 12th January

2010.

/8/ Extract of Minutes of Meeting of Board of directors dated 28/10/2006.

/9/ Purchase order for design, engineering, manufacture and supply including commissioning of 1x30 MW Power plant at Sponge Iron Complex at Ghughus, Chandrapur vide Sr. No. LMEL/PO/LSIL/03/07 dated 15/03/2007.

/10/ Offer letter for supply of 30 MW power plant by M/s Lloyds Steel Industries Ltd dated 15/10/2006.

/11/ Supply Agreement for turbine for the 30 MW project activity dated 15/05/2007.

/12/ Standing clearance or no objection certification from Maharashtra State Electricity Distribution Company Ltd (MSEDCL) for evacuation of power to grid dated 01/01/2011.

/13/ Annual Report of M/s LMEL for the financial years 2003-04, 04-05, 05-06 and 06-07.

/14/ Annual Report of M/s LMEL for the financial years 2007-08, 2008-09 and 2009-10.

/15/ Electricity Bill of LMEL for the month of February 2006 till September 2006.

/16/ Power Purchase Agreement or MoU signed between M/s Lloyds Metals & Engineers Limited and M/s Indrajit Power Technology Private Limited for sell of surplus 15 MW power dated 06/08/2007.

/17/ Consent to establish for the 30 MW captive power plant dated 17/10/2006

/18/ Consent to operate for the 30 MW captive power plant and the manufacturing unit of LMEL dated 28/12/2010.

/19/ Consent to Operate for 4x100 TPD kilns dated 20/02/2006 vide reference number BO/PCI-II/RONG/EIC No.NG-0475-05/O/CC-138.

/20/ Equity IRR spreadsheet, version 01

/21/ Equity IRR spreadsheet, version 02

/22/ Benchmark return on equity, Version 01.

/23/ IRR Certificate by the financial expert

/24/ Emission reduction calculation sheet containing the calculation of PLF, fraction of steam from WHR boilers i.e. fwcm and fcap calculations.

/25/ Letters by stakeholders to the Project Participant giving their feedback on the project activity.

/26/ MERC Tariff order, Case no.31 of 2006 for determination of transmission tariff for Intra-State Transmission System (InSTS) dated 29/09/2006

/27/ MERC Tariff order, Case no.48 of 2005 for Approval of MSPGCL's annual revenue requirements and determination of tariff for FY2006-07 dated 07/09/2006.

/28/ MERC Tariff order, Case no.54 of 2005 for Approval of MSEDCL's

annual revenue requirements and determination of tariff for FY2006-07 dated 20/10/2006.

/29/ CERC tariff regulations vide reference no. L-7/25(5)/2003-CERC dated 26/03/2004.

/30/ Boiler specification for the 30 MW captive power plant

/31/ Turbine and Generator specification for the 30 MW captive power plant

/32/ Letter from LMEL management regarding budget estimate for waste fly ash handling for WHR power plant dated 18/10/2006

/33/ Design steam generation data and flue gas generation data from the kilns by licensor M/s ERK Eckrolessel for design of power plant

/34/ Minutes of meeting between M/s Nariman Point Finance Ltd and LMEL for granting the loan at mutually agreed interest rates of 14.5% dated 21/10/2006.

/35/ Life time of the project activity comprising the turbine and boiler set of 15 years as provided by manufacturer LSIL vide their letter dated 12/01/2010 and 13/01/2010.

/36/ MSEDCL electricity import bills for import of grid electricity from Feb-2006 to Sep-2006 by LMEL facility.

/37/ Screenshots of beta values of power sector companies evaluated based on Sensex data by CAPITALINE software.

/38/ Minutes of meeting of Local stakeholder consultation held on 09/02/2007 for CDM project activity of LMEL at Grampanchayat of Village Ghugus, Chandrapur district of Maharashtra state.

Category 2 Documents:
Background documents related to the design and/or methodologies employed in the design or other reference documents.

/39/ PDD completion guidance - Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM), version 07

/40/ Project design document form (CDM PDD)- Version 03, in effect as of 28 July 2006.

/41/ ACM0012, Version 04.0.0 -Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects, valid from 15 April 2011 onwards.

/42/ Emission Factor tool - Tool to calculate the emission factor for an electricity system, version 02.2.1

/43/ Validation and Verification Manual, version 1.2, EB 55; [VVM]

/44/ CEA baseline database published by Central Electricity Authority for baseline grid emission factors for NEWNE and southern grid for India, version 04 dated October 2008.

/45/ Guidance on the Assessment of Investment Analysis, Version 05, EB 62

/46/ Guidelines on the Demonstration and Assessment of Prior

Consideration of the CDM, Version 04, EB 62
/47/ Demonstration and assessment of additionality, EB 65 Annex 21
/48/ Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion, Version 02, EB 41, Annex 11
/49/ Tool to determine the remaining lifetime of equipment, version 01, EB 50, Annex 15
/50/ Glossary of CDM terms, version 06, EB 66, Annex 63

Persons interviewed:

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

/1/ Mr. R. M. Alegavi, Vice President -Technology
/2/ Mr. Mukesh Gupta, Chairman
/3/ Mr. Mohammad Shabbir Ahmed, President- Works
/4/ Mr. K.S. Ramgopal, Vice President (H.R.)
/5/ Mr. R. K. Shukla, General Manager – Power Plant
/6/ Mr. Ratan Jangra, (AGM –Electricals)
/7/ Mr. V.K. Jindal, (AGM –Operations)
/8/ Mrs Shobha Thakare – Sarpanch, Ghughus Village grampanchayat
/9/ Mr. Gajanan Sakharkar, Press Reporter –Lokmat Newspaper
/10/ Mrs. Mamata Khaire, Grampanchayat Member, Ghughus Village
/11/ Mrs. Neela Chivhade, Grampanchayat Member, Ghughus Village

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7 CURRICULA VITAE OF THE DOE'S VALIDATION TEAM MEMBERS

Mr. Sanjay Patankar, Bureau Veritas Certification, Lead Verifier, (Team Leader)
Educational qualifications: B.E. (Mech.) M.E. (Mech.)
He has over 20 years of experience in engineering manufacturing industry covering various functions like enterprise management, product design, engineering, tool & die design, improvements in the production shop, quality assurance & control and systems planning and implementation, including ISO 9001 based quality management systems. Working for the last 2 years in Bureau Veritas Certification (India) Private Ltd. as Lead Auditor for ISO 9001, 14001 and OHSAS 18001 standards/specifications. Has undergone training related to Clean Development Mechanism and is currently involved in validation and verification of CDM project activities.

Mr. Pramod Kamble, Bureau Veritas Certification, Verifier, (Team Member)
Graduate in Chemical Engineering from Mumbai University (UICT). He has prior experience in CDM, VCS and CCX projects development. He has undergone intensive training on Clean Development Mechanism and completed CDM Verifier/Lead Verifier training course. He has hands on experience in carrying out energy audits for energy industries and buildings. At present he is involved in the Validation/verification of CDM and VCS projects.

Mr. T. Ramesh, Bureau Veritas Certification, Verifier, (Team Member)
Educational qualifications: B.E. (Mech.) M.Tech. (Energy & Management)
He has over 8 years of experience and worked in various consultancy firms for development of DPRs and projects technical assessment studies. He has also worked as energy auditor in various firms involving identification, assessment and implementation of energy conservation measures. His work also involves carrying out energy management studies, project feasibility and financial assessment. He has total 3 years of experience as consultant for development of CDM projects. He is employed in Bureau Veritas Certification (India) Private Ltd as verifier for validation and verification activities of carbon credit projects.

Jayaram & Karthikeyan Associates, Financial Expert
Services from Jayaram & Karthikeyan Associates were delivered by Mr. Jayaram, who is a Chartered Accountant. He possesses in depth understanding and experience in Assurance services relating to financial appraisals & analyses, those specially related to CDM projects. He is empanelled with other DOE's for scrutinizing the financial additionality aspects of the CDM projects handled by them and expressing opinions on the financials of the project participant. He has appraised over 50 CDM projects for financial additionality on behalf of CDM validators of repute.

Mr. H B Muralidhar, Bureau Veritas Certification, Internal Technical Reviewer
Lead auditor in Bureau Veritas Certification for Environment Management System, Quality Management System and Occupational Health and Safety Management System. Graduate in Electrical engineering with 25 years of experience in power generation and distribution related fields as well as in management system auditing. He is the Lead auditor for Environmental Management System, Quality Management system and Occupational Health and Safety Management System. He has undergone intensive training on Clean Development Mechanism. He is the technical expert & conducted Validation / Verification for more than 50 CDM Projects

VALIDATION PROTOCOL

Table 1 Validation requirements based on the Clean Development Mechanism Validation and Verification Manual (Version 01.2) and methodology ACM0012 (Version 4.0) - "Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects"

CHECKLIST QUESTION	Ref.	§	COMMENTS		Draft Concl	Final Concl
1. Approval			*COUNTRY A (India)*	*COUNTRY B (insert the country name)*		
a. Have all Parties involved approved the project activity?	VVM	44	Project activity involved only LMEL as a private entity and India (Host Country) has approved the project activity on 12 January 2010.	Annex-1 country participating in the project activity is not identified at validation stage.	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 participatn or directly from the DNA)	VVM	45	DNA, (MoEF) India, has approved the proposed CDM project activity. The reference number of HCA letter is **No.4/20/2009-CCC** Letter was received by DOE directly from the project participant.	Annex 1 country is not identified at validation stage.	OK	OK
c. Does the letter of approval from DNA of each Party involved:	VVM	45				

CHECKLIST QUESTION	Ref.	§	COMMENTS		Draft Concl	Final Concl
i. confirm that the Party is a Party of the Kyoto Protocol?	VVM	45.a	Yes		OK	OK
ii. confirm that participation is voluntary?	VVM	45.b	Yes		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	Yes		OK	OK
iv. refers to the precise proposed CDM project activity title in the PDD being submitted for registration?	VVM	45.d	Yes		OK	OK
d. Is(are) the letter(s) of approval unconditional with respect to (i) to (iv) above?	VVM	46	Yes		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	Yes		OK	OK
f. Is there doubt with respect to the authenticity of the letter of approval?	VVM	48	Letter of Approval is issued by Ministry of Environment and Forest (MoEF) which acts as NCDMA on behalf of Host Country India. Therefore there is no doubt with respect to point (e) above.		OK	OK
g. If yes, was verified with the DNA that the letter of approval is authentic?	VVM	48	NA	NA	OK	OK
2. Participation						
a. Have all project participants been listed in a consistent manner in the project documentation?	VVM	51	Yes	Not Identified	OK	OK

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	Yes	-	OK	OK
c. Are the project participants listed in tabular form in section A.3 of the PDD?	VVM	52	Yes	-	OK	OK
d. Is the information in section A.3 consistent with the contact details provided in annex 1 of the PDD?	VVM	52	Yes	-	OK	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	Yes, Please refer 1.b above	-	OK	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	Yes	-	OK	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	NA	-	OK	OK
3. Project design document						
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		OK	OK
b. Is the PDD in accordance with the applicable	VVM	56	Yes		OK	OK

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	Title of the project is provided as “LMEL 25 MW Waste Heat based Captive Power Plant.”	OK	OK
ii. Current version number and date of document	EB 41	Ann 12	Current PDD version number is provided as 05 with the date of document as 14/10/2009.	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 of project, present scenario and baseline scenario	EB 41	Ann 12	The section A.2 of the PDD requires corrections to be made in respect of the following : a. The purpose of the project activity, pre-project scenario, project activity and baseline scenario is not clearly described in section A.2 under separate titles to understand the nature of project activity. b. In section A.2, it is stated that steam from other sources is taken to the common header. There are only two sources of steam viz; WHRB’s (5 nos.) and the FBC boiler (1 no.). These are already mentioned in the description and therefore, there are no other sources involved c. Under the paragraph captioned “social benefit to state”, only 4 WHRB’s have been stated, instead of the actual number, viz., 5	**CAR-1**	
ii. Explanation on how the GHG emission	EB	Ann	Yes. It is stated that project activity results in	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
reductions are effected	41	12	emission reductions from replacement / displacement of an equivalent amount of electricity to the extent of electricity generated from 25 MW waste heat recovery based power generation project activity.		
iii. The PP's views on the contribution of project activity to sustainable development	EB 41	Ann 12	PP's views on contribution of project activity to sustainable development are provided in section A.2 of PDD. This is in line with the four sustainable development criteria provided on MoEF (i.e. NCDMA) website of government of India.	OK	OK
iv. Are there any changes/modifications compared to the webhosted PDD?	EB 41	Ann 12	There will be changes/ modification compared to the webhosted PDD subjected to CAR raised in section A.2.	OK	OK
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	OK	OK
ii. Identification of Host Party			Yes	OK	OK
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	Section A.4.1 of the PDD is providing the technical description, location, host party and address of the project activity.	OK	OK
ii. Detailed physical location with unique identification of the project activity (eg. Longitude/latitude) – not to exceed one page	EB 41	Ann 12	Latitude and longitude of project activity are provided in section A.4.1	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
iii. Are there any changes/modifications compared to the webhosted PDD?	EB 41	Ann 12	There are no changes compared to the webhosted PDD.	OK	OK
g. In CDM-PDD section A.4.2 is the list of categoreis of project activities provided?	EB 41	Ann 12	Yes	OK	OK
h. In CDM-PDD section A.4.3 are following provided?	EB 41	Ann 12			
i. A description of how environmentally safe and sound technology, and know-how, is transferred to the Host Party(ies)	EB 41	Ann 12	PDD is describing that WHRBs are based on licenser designs of ERK Eckrohrkessel GmbH, Germany. License to manufacture these boilers is with Lloyds Steel Industries Limited, Engineering division.	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	PDD section A.4.3 provides the scenario existing prior to the start of the project activity. Plant was operating 500 TPD kiln from May 1997 and 4 x 100 TPD kiln from Feb 2006. The waste gases from the kiln were sent to atmosphere by passing through water scrubber and lowering the temperature of the gases. In project scenario, PP has installed 5 WHRBs on each kiln and one AFBC based coal fired boiler to produce the steam and run the 30 MW turbine to produce the power. Out of 30 MW, waste heat recovery based power accounts to 25 MW. Whereas remaining 5 MW power will be generated from coal fired AFBC boiler steam. Baseline scenario identified is P6 i.e. grid electricity as indentified in line with the procedure	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			described in methodology.		
iii. List and arrangement of the main manufacturing/production technologies, systems and equipments involved	EB 41	Ann 12	List and arrangement of the main manufacturing/ production technologies is provided in section A.4.3 with technical details of boilers, turbine and kilns with rated capacities. Also operational parameters are provided in PDD.	OK	OK
iv. The emissions sources and GHGs involved	EB 41	Ann 12	Yes	OK	OK
v. Are there any changes/modifications compared to the webhosted PDD?	EB 41	Ann 12	There may be changes/ modification compared to the webhosted PDD due to CAR raised above.	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	OK	OK
j. In CDM-PDD section A.4.5 is Information regarding Public funding provided?	EB 41	Ann 12	PDD states that No public funding is involved in project activity.	OK	OK
k. In CDM-PDD section B.1 are following provided?	EB 41	Ann 12			
i. The approved methodology and version number	EB 41	Ann 12	1. The version of methodology ACM 0012 referred in the PDD is not the latest version. Thereby justification for all the applicability conditions is not discussed in line with latest version of methodology. 2. The latest version of “Tool to calculate emission factor“ is not referred in section B.6.3.	**CAR-2**	
ii. Any methodologies or tools which the above approved methodology draws upon and their version noumber	EB 41	Ann 12	Section B.1 is providing the reference of the tools referred by the methodology with their version number.	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
l. In CDM-PDD section B.2 are following provided?	EB 41	Ann 12			
i. Justification to the choice of methodology that the project activity meets each of the applicability conditions	EB 41	Ann 12	PDD is providing the justification of each of the applicability conditions of the methodology.	OK	OK
ii. Documentations with references that had been used. This can be provided in Annex 3 instead	EB 41	Ann 12	No further documentation is mentioned in Annex - 3 in support of applicability conditions of the methodology.	OK	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	Description of all sources and gases included in project boundary is provided in tabular format.	OK	OK
ii. A flow diagram of the project boundary physically delineating the project activity	EB 41	Ann 12	Flow diagram physically delineating project boundary is provided in B.3 of PDD.	OK	OK
iii. The flow diagram with all equipments, systems and flows of mass and energy etc	EB 41	Ann 12	Flow diagram with all equipment, systems and flows of mass and energy is provided.	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	Baseline scenario is identified in accordance with the procedure defined in baseline methodology ACM0012. Baseline is indicated in section B.4	OK	OK
ii. Justification of key assumptions and rationales	EB 41	Ann 12	For demonstration of use of waste energy in the absence of CDM project activity, EIA report is provided to DOE having Mar 2007 date. PP needs to clarify the date of the report as it is not matching with June 2005 mentioned in the PDD.	**CL-1**	
iii. Transparent illustration of all data used to determine the baseline scenario (variables, parameters, data sources, etc.)	EB 41	Ann 12	1) The baseline discussion on power options in the absence of the project activity (“how the power demand would be met in the absence of the	**CAR-3**	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			project activity"), rules out the option P1. However, P1 is the project activity itself, albeit without CDM benefits; and is therefore a realistic and credible option which can not be ruled out right in the beginning itself. 2) Provide the expansion of abbreviation "BIFR" in section B.4.		
iv. A transparent and detailed 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 project activity	EB 41	Ann 12	Provided	OK	OK
v. Are there any changes/modifications compared to the webhosted PDD?	EB 41	Ann 12	There may be changes/ modification compared to the webhosted PDD.	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	Yes. Additionality is demonstrated by comparing the Levelized cost of power generation from listed alternatives. Also IRR values from each of the options are considered to arrive at project additionality.	OK	OK
ii. Justification of key assumptions and rationales	EB 41	Ann 12	Yes	OK	OK
iii. Transparent illustration of all data used to determine the baseline scenario (variables, parameters, data sources etc)	EB 41	Ann 12	Refer CAR-3 above in 3-n-(iii).	-	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
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	In section B.5 of PDD following statement needs to be clarified further. "…The additional 4 number WHRB steam will improve the PLF of CPP and a new turbine can be added for use along with existing turbine to increase the electricity generation at a later date…" The statement is not clear as to whether it refers to WHRB's to be added in future or the present WHRB's?	**CL-2**	
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	It is stated in the PDD that LMEL exports surplus power to Power trading company which supplies power to consumers not identifiable but normally uses grid power. However it is not clear whether all the consumers use grid power only. In such case, each such end user of the emission free electricity generated as a surplus by LMEL and exported (wheeled) through grid/Indrajit would have their own respective baselines. Each of such baselines has to be taken into account for Emission Reduction calculation. Please Explain.	**CL-3**	
ii. Equations used in calculating emission redutions	EB 41	Ann 12	Provided	OK	OK
iii. Explanation and justification for all relevant methodological choices, including different scenarios or cases, options and default values	EB 41	Ann 12	Provided	OK	OK
q. In CDM-PDD section B.6.2 are following	EB	Ann			

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
provided?	41	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	Data and parameters that are available at validation is provided in section B.6.2 of PDD	OK	OK
ii. The actual value applied	EB 41	Ann 12	Provided	OK	OK
iii. Explanation and justification for the choice of the source of data	EB 41	Ann 12	Provided	OK	OK
iv. Clear and transparent references or additional documentation in Annex 3	EB 41	Ann 12	Provided	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	Provided	OK	OK
r. In CDM-PDD section B.6.3 are following provided?	EB 41	Ann 12			
i. A transparent *ex ante* 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	Ex-ante Baseline emission calculations are provided in the PDD. The project emissions are Nil as the power plant is based on waste heat recovery from waste flue gases with no auxiliary fuel being used. No leakage is applicable under ACM0012.	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. Documentation how each equation is applied, in a manner that enables the reader to reproduce the calculation	EB 41	Ann 12	1) Calculation of weighted average simple operating margin emission factor in section B.6.3 is incorrect. Simple operating margin emission factor values are wrongly written in formula; however answer is calculated correctly to 1.0167 tCO2/MWh. 2) The PDD needs to provide supporting references for the sources of values considered such as PLF, auxiliary consumption that have been considered in section B.6.3	**CAR-4**	
iii. Additional background information and or data in Annex 3, including relevant electronic files (i.e. spreadsheets)	EB 41	Ann 12	Additional background information and data is provided in section B.6.3	OK	OK
s. In CDM-PDD section B.6.4 are the results of the *ex ante* estimation of emission reductions for all years of the crediting period, provided in a tabular format?	EB 41	Ann 12	Section B.6.4 have provided the results of ex-ante estimation of emission reductions for all years of the crediting period in tabular format	OK	OK
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	Specific information is provided on data and parameters that will be monitored during monitoring of the project activity.	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	EB	Ann	Project description in the section A.2 shows that	**CL-4**	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
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.	41	12	FBC boiler will supply 13.2 TPH steam, however in section B.7.1, the quantity of steam from FBC boiler is mentioned to be 20,000 kg/hr (i.e. 20 TPH) which is contradictory. Please clarify rated capacity of FBC boiler and provide technical details in section A.4.3 of PDD.		
b. Where data or parameters are supposed tobe 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 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.	EB 41	Ann 12	PDD have described methods and procedures for measurement or metering of data or parameters. Also calibration frequency and data measurement intervals are provided. QA/QC procedure is described for each parameter.	OK	OK
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	Provided	OK	OK
ii. The operational and management structure that	EB	Ann	Provided	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
the project operator will implement in order to monitor emission reductions and any leakage effects generated by the project activity	41	12			
iii. The responsibilities for and institutional arrangements for data collection and archiving	EB 41	Ann 12	As per methodology ACM0012, all data collected as per monitoring plan should be archived electronically. Though the archiving of records is stated in section B.7.1, no details about the same (i.e. responsibility, procedures, etc.) are given either in section B.7.2 or in Annex 4.	**CAR-5**	
iv. Indication that the monitoring plan reflect good monitoring practice appropriate to the type of project activity	EB 41	Ann 12	The monitoring plan needs to include the following as separate monitoring parameters in the monitoring plan in section B.7.1, as it was seen during the site visit to LMEL's plant that there are individual meters to monitor these parameters. - electricity imports from the grid - electricity imports from DG set generation - auxiliary electricity consumed by the project activity - electricity supplied to the recipient plant (LMEL plant-DRI kilns and other manufacturing processes) - electricity exported to the third party via grid	**CAR-6**	
v. Relevant further background information in Annex 4	EB 41	Ann 12	Provided	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	EB	Ann	Date is provided in DD/MM/YYYY format.	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
methodology to the project activity study in DD/MM/YYYY	41	12			
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	Contact information of person responsible for application of baseline and monitoring methodology to the project activity is provided in section B.8	OK	OK
iii. Indication if the person/entity is also a project participant listed in Annex 1	EB 41	Ann 12	It is indicated that person /entity is not a project participant.	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	Starting date of the CDM project activity is not in line with the definition of start date given in EB41, Para 67 report.	**CAR-7**	
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	Provided	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	Provided	OK	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	Expected operational lifetime of the project activity is provided as 15 years and 0 months.	OK	OK
y. In CDM-PDD section C.2 is it stated whether the project activity will use a renewable or a fixed	EB 41	Ann 12	It is stated that project activity uses the fixed crediting period.	OK	OK

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crediting period and is C.2.1 or C.2.2 completed accordingly?					
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	Not Applicable	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	Not Applicable	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	Not Applicable	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	Fixed crediting period of 10 years is provided.	OK	OK
dd. In CDM-PDD section C.2.2.1are the dates provided in the following format: (DD/MM/YYYY)?	EB 41	Ann 12	Yes. Dates are provided in DD/MM/YYYY format.	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	Length of the crediting period is provided as 10 years and 0 months.	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 or the Host, provided?	EB 41	Ann 12	Conclusions and all references to support documentation of an EIA undertaken in accordance with the procedures as required by host party India is provided in section D.2	OK	OK
gg. In CDM-PDD section E.1 are the following	EB	Ann			

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provided?	41	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 facilities comments to be received from local stakeholders and allows for a reasonable time for comments to be submitted.	EB 41	Ann 12	Process by which comments by local stakeholders have been invited is described in PDD.	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 modalities and procedures.	EB 41	Ann 12	Clarify how the project activity was described to all stakeholders so that they could understand it and provide their comments.	**CL-5**	
iii. The local stakeholder process has been completed before submitting the proposed project activity to the DOE for validation.	EB 41	Ann 12	Yes	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	Provided	OK	OK
ii. A summary of this comments.	EB 41	Ann 12	Provided	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	Provided	OK	OK
jj. In CDM-PDD Annex 1 are the following provided?	EB 41	Ann 12			
i. Contact information of project participants	EB	Ann	Contact information of project participant is	OK	OK

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	41	12	provided in Annex 1 of the PDD.		
ii. For each organisation 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. All required fields are provided with address and contact details.	OK	OK
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	No Public funding is involved in the project activity.	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	Provided	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	Provided	OK	OK
4. Project description					
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	a) Project participant to explain the Power requirement for the LMEL sponge iron plant in pre-project scenario and how that power requirement was being met. b) The project participant is also requested to provide full details of the Power demand Vs Supply and export in the project scenario	**CL-6**	

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			The gross electricity generation estimation has been made on the basis of the installed capacity of the WHRB power generation stated as 25 MW (section B.6.3). It is to be noted, however, that the project activity involves setting up not only the 5 nos. of WHRB's but also 1 no. FBC boiler and the capacity of the combined power plant (in the project activity scenario) is 30 MW (as also seen from the Technical Concept Profile prepared by M/s. HIQ Power Associates Pvt. Ltd.). Therefore, the gross generation estimate is required to be in relation to 30 MW and not 25 MW. Project participant is requested to clarify.	**CL-7**	
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	1) The details of FBC coal fired boiler are not specified in the project activity description in A.2. Whether it was pre-existing before proposed project activity or would be installed new as a part of project activity, is not clear from the description. 2) The total number of WHRBs installed in the project activity is not apparent from the description in the PDD in section A.2. Is it 5 or 9? The Board resolution letter also does not clarify the same. 3) The pre-project description does not include the 2 nos. diesel generating sets within the LMEL	**CL-8**	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			plant, which come into play during situations of power outage of the grid, etc.		
ii. acurate?	VVM	59	1) Licensed capacity of the LMEL plant is stated as 390000 tonnes per year (Refer paragraph "Background of the Company"-section A.2). However, the consents to operate issued by the State Pollution Control Regulator, are for a total of 12000 + 15000 =27000 tonnes per month only. This would come to only 324000 tonnes per year. Please clarify the actual operating capacity that is permitted under the statutory requirements.	**CL-9**	
iii. providing the reader with a clear understanding of the nature of the proposed CDM project activity?	VVM	59	1) Project participant to clarify how much power is exported (wheeled) via grid to consumers of the third party (i.e. Indrajit Power technology Pvt. Ltd) 2) The project participant needs to clarify how many consumers are beneficiaries of the power supplied by 3rd party. Names of these consumers may be provided. It is not clear how the contract between LMEL and Indrajit Power technology Pvt. Ltd. also binds each of such consumers. 3) It is stated that consumers of the 3rd party Indrajit Power Technology were users of the grid power. The validation team requests evidence of	**CL-10**	

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			the same from the project participant.		
iv. Are there any changes/modifications compared to the webhosted PDD?	VVM	59	There may be some changes/ modification compared to the webhosted PDD with respect to CAR raised in this section.	OK	OK
c. Is the proposed CDM project activity in existing facilities or or utilizing existing equipments?	VVM	60	Yes. Proposed project activity is in existing facilities.	OK	OK
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		
iii. Bundled small scale projects, each with emission reductions not exceeding 15,000 tonnes?	VVM	60	Not Applicable		
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	Yes. Physical site visit was conducted to cross-check the description in the PDD with proposed CDM project activity.	OK	OK
f. If yes to (d.iii) above, was the number of physical site visits base on samping?	VVM	60	Not Applicable		
g. If yes is the sampling size appropriately justified through statistical analysis?	VVM	60	Not Applicable		
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		
i. For all other proposed CDM project activities not	VVM	62	Not Applicable		

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referred to in paragraphs 59 – 61, was a physical site inspection conducted?					
j. If no, was it appropriately justified?	VVM	62	Not Applicable		
k. Does the proposed CDM project activity involve the alteration of an existing installation or process?	VVM	63	Proposed project activity does not involve the alteration of an existing installations or process. Only the waste flue gases coming from the kiln are utilized in WHRBs to produce steam which is further used to run the 30 MW turbine. Earlier water scrubbing mechanism is now put off.	OK	OK
l. If yes, does the project description clearly state the differences resulting from the project activity compared to the pre-project situation?	VVM	63	PDD described the details about pre-project scenario and project activity setup at LMEL.	OK	OK
5. Baseline and monitoring methodology					
a. General requirement					
a. Do the the baseline and monitoring methodologies selected by the project participants comply with the methodologies previously approved by the CDM Executive Board?	VVM	65	Yes, ACM0012 methodology used by project participant is previously approved by the CDM Executive Board.	OK	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	VVM	67	Refer to (5.e) below	-	-

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
applied with respect to Algorithms and/or formulae used to determine emission reductions?					
g. Has the selected methodology been correctly applied with respect to additionality?	VVM	67	Yes, selected methodology has been correctly applied with respect to additionality.	OK	OK
i. Has the project participant used 'the latest approved version of "Tool for the demonstration of additionality'?	ACM 0012	V 4.0	Methodology referes to latest version of additionality tool, "Tool for the demonstration and assessment of additionality" (Ver 06).	OK	OK
h. Has the selected methodology been correctly applied with respect to monitoring methodology?	VVM	67			
i. Are all data collected as part of monitoring plan archieved electronically and kept at least for 2 years after the end of the last crediting period?	ACM 0012	V 4.0	Yes. All the data collected as part of monitoring plan is stated to be kept for 12 years. i.e. crediting period + 2 years.	OK	OK
ii. Is 100% of the data monitored? Please comment.	ACM 0012	V 4.0	Yes. 100% of the data will be monitored.	OK	OK
b. Applicability of the selected methodology to the project activity					
a. Is the selected baseline and monitoring methodology, previously approved by the CDM Executive Board, applicable to the project activity?	VVM	68	Yes	OK	OK
i. Is the project activity implemented in an existing or Greenfield facility converting waste energy carried in identified WECM stream/s, that will be utilized in the project activity.?	ACM 0012	V 4.0	Yes, project activity is implemented in existing facility wherein WECM stream and heat content of waste gas was wasted by passing gases through water scrubber and finally to atmosphere via chimney.	OK	OK
ii. Is the WECM stream is energy source for one of the following option in project activity.			WECM stream is energy source for the generation of electricity at the project site.	OK	OK

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a) Generation of electricity b) Cogeneration c) Direct use as a process heat source d) Generation of heat in element process e) Generation of mechanical energy; or f) Supply of heat of reaction with or without process heating.					
b. In absence of project activity, is the WECM stream :					
i. would not be recovered and therefore would be flared, released to atmosphere, or remain unutilized in the absence of the project activity at the existing or Greenfiled project facility; or			In absence of project activity the WECM stream would not be recovered and therefore would be released to atmosphere at the existing facility.	OK	OK
ii. would be partially recovered, and unrecovered portion of WECM stream would be flared, vented or remained unutilized at the exisitng or Greenfield project facility.			Not Applicable. Waste gas in pre-project scenario was not recovered and sent to atmosphere via the water scrubber.	OK	OK
c. Are following applicability conditions fulfilled: • For project activities which recover waste pressure, the methodology is applicable where waste pressure is used to generate electricity only and the electricity generated from waste pressuere is measureable. • Regulations do not require the project facility to recover and /or utilize the waste	ACM 0012	V 4.0	1) Not Applicable. Project activity does not involve the recovery of waste pressure. 2) Regulations do not require the project facility to recover and/ or utilize the waste energy prior to implementation of project activity. All consent to operate for existing 500 TPD and 4 x 100 TPD kilns does not mandate to recover the waste	OK OK	OK OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
energy prior to the implementation of the project activity; • The methodology is applicable to both Greenfield and existing waste energy generation facilities. If the production capacity of the project facility is expanded as a result of the project activity, the added production capacity must be treated as a Greenfiled facility; • Waste energy that is released under abnormal operation (for example, emergecies, shut down) of the project facility shall not be included in the emission reduction calculations;			energy contained in waste gas. 3) The sponge iron kilns are in existing facilities generating the waste flue gases and operating prior to implementation of project activity. 4) The justification offered against applicability condition requiring that waste energy released under abnormal conditions not be accounted for, is inadequate and needs to be explained further. The "abnormal conditions" referred to that can occur, causing unintended release of waste energy are not specified. 5) Justification offered for the applicability condition pertaining to constraints on fossil fuel use lacks clarity and needs to be re-worded (section B.2)	OK **CL-11**	OK
d. Are multiple waste gas streams are available in the project facility which can be used interchangebly for various applications as part of the energy sources in the facility? In such case, recovery of any waste gas stream which would be totally or partially recovered in the absence of the project activity, shall not be reduced due to the implementation of CDM project activity. In such cases follow the guidance provided in Annex 3 of the			Each kiln produces single stream of WECM i.e. flue gases and was treated using water scrubber where the temperature was brought down by water which is then put in drain and then gases released to atmosphere for each stream. Hence waste heat was being released to atmosphere. There is no recovery of any heat before the project activity. In the project activity separate dedicated WHRBs	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
methodology.			are provided for each kiln for total recovery of waste heat.		
e. Is the WECM stream partially recovered in absenece of CDM project activity to supply the heat of reaction, and recovery of this WECM stream is increased under the project activity to replace fossil fuels used for the purpose of supplying heat of reaction? If yes then for such cases methodology is not applicable.			Not Applicable. In pre-project scenario WECM stream was not recovered at all.	OK	OK
f. Is the waste heat or gas recovery project is implemented in a single cycle power plant (e.g. gas turbine or diesel generator) to generate power? If yes then for such cases methodology is not applicable. Only projects recovering waste energy from single cycel and/or combined cycle power plants for the purpose of generation of heat only can apply this methodology.			Not Applicable. Waste heat recovery project is not implemented in a single cycle power plant to generate power.	OK	OK
i. Are following guidelines followed for Demonstration of use of waste energy in absence of CDM project activity: 1) **For existing project activities**: It shall be demonstrated that the waste energy utilized in the project activity was flared or released into the atmosphere (or wasted in case of project activity recovering waste pressure) in the absence of the project activity at the existing facility by either one of the following	ACM 0012	V 4.0	Use of waste energy for existing project activity is demonstrated using the following evidences. 1) Waste energy in form of waste flue gases was released to atmosphere via treating it through water scrubbers. This is checked from the electricity bills of the process plants for last three years. Wherein total electricity demand of the plant was met through the grid import power. In	OK	OK

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ways: • By **direct measurements** of the energy content and amount of the waste energy produced for at least *three years* prior to the start of the project activity; • Providing an **energy balance** of the relevant sections of the facility to prove that the waste energy was not a source of energy before the implementation of the project activity. For the energy balance applicable process parameters are required. The energy balance must demonstrate that the waste energy was not used and also provide conservative estimations of the energy content and amount of waste energy released; • **Energy bills** (electricity, fossil fuel) to demonstrate that all the energy required for the process (e.g. based on specific energy consumption specified by the manufacturer) has been procured commercially. Project participants are required to demonstrate through the financial documents (e.g. balance sheets, profit and loss statement) that no energy was generated by waste energy and			current project activity this power requirement is met through project activity power plant and surplus is exported to third party as a sell. 2) Further the energy requirement details are cross checked from the financial balance sheets which are audited by registered chartered accountant. Audited balance sheets were checked for last three years before the project decision date to confirm the import of grid power for meeting the energy demand of the plant. 3) DOE visited the site during validation site visit on 04/01/2010 to 07/01/2010. Project activity was not commissioned and old practice of waste gas treatment via water scrubber was observed. Hence during site visit it was confirmed that no equipment for waste energy recovery and utilization was installed on waste flue gas stream.		

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sold to other facilities and/or the grid. The bills and financial statements should be audited by competent authorities; • **Process plant** manufacturer's commissioning report from the facility could be used as an estimate for the quantity and energy content of the waste energy produced for the rated plant capacity/per unit of product produced; • The DOE should suppliment the above analysis by following **On site checks** prior to project implementation to confirm that no equipment for waste energy recovery and utilisation has been installed, on the specific WECM stream (that is recovered under the project activity).					
ii. **For the existing project activities**, in cases where waste energy recovery activities were already implemented in other streams of WECM prior to the implementation of the CDM project activity, is the following demonstrated: • That there is no decrease in energy generated from the waste energy recovered previous to the implementation of the CDM project activity; or • In the case where there is a decrease in	ACM 0012	V 4.0	There were no waste heat recovery activities in pre-project scenario at LMEL. Therefore this is not applicable.	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
energy generation from previously recovered waste energy, it can be demonstrated that the decrease is due to a decrease in generation of waste energy on account of the factors not related to the project activity; • The conditions shall be confirmed by the verifying DOE for each issuance period.					
iii. **For Greenfield project activities,** is the guidelines provided in Annex-1 of the methodology are followed for assessment of extent of use of WECM and determination of baseline practice factor for CDM project activity? **Option 1:** 1. Is the greenfield or new facility generating the WECM used in the CDM project activity categorised based on following criteria applicable to project facility: (i) Industry sector; (ii) Product manufactued, its specifications and applications; (iii) production capacity; (iv) quality of raw material used; (v) process flow or technology type; (vi) configuration of the facility; (vii) facilities implemented in the previous 10 years. 2. Are above projects are listed based on the information from literature from the recognised sources or from surveys in the	ACM 0012	V 4.0	Project activity is implemented in existing facility wherein waste heat was sent to atmosphere after treatment through water scrubber. Project involves the implantation of waste heat recovery based power plant in existing facility. Therefore this paragraph is not applicable. Not Applicable	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
relevant industry sector? The selected facilities can vary by +/-10% in terms of capacity of the facility as compared to the proposed facility under CDM. 3. Is it ensured that these facilities should not cover the registered or under validation waste heat recovery project activities under CDM? 4. Explain the difference between the project facility and the selected facilities based on the use of waste energy from the source that is recovered under proposed project activity. 5. The facilities identified above should be studied for the use of waste energy. The following can be the possible uses of waste energy by these facilities: (i) the waste energy completely used, (ii) waste energy partially used, (iii) waste energy not used but incinerated, flared or released to atmosphere. 6. Analyse the practice of more than 75% facilities in the list. For example the following situations can apply: (i) if more than 50% of the facilities do not use waste energy, it can be decided that the proposed Greenfield facility also would have wasted the energy in the absence of waste energy recovery CDM project ; (ii) if more than 50% of the facilities use the			Not Applicable Not Applicable		

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
waste energy partially the baseline emissions can be capped using the most conservative baseline practice factor ($f_{practice}$) based on the percentage of waste energy used in the baseline; for example a 50% usage of waste energy in these facilities results in to $f_{practice}$ of 0.5; (iii) if more than 50% of the facilities recover the waste energy fully, the methodology is not applicable as it can not be demonstrated that waste energy would not have been recovered in the absence of CDM project. Use operational information or manufacturer's specification of the facilities. 7. For use of option 1, is it ensured that at least five facilities are analysed to arrive at "reference facility" practice mandatorily? **Option 2 :** 1. Have the project participants been successful in identifying at least five facilities of similar type as the Greenfield project facility? 2. If yes, then use Option 1. 3. If no, then is following procedure is followed for determining the extent of use of WECM as per Option 2 of Annex-1 in methodology? 4. The manufacturer of the project facility will be			Not Applicable		

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	invited to submit an alternative design including the usage of WECM that is recovered under project. The project participant have to demonstrate thorugh investment analysis that the use (or no use) of WECM of such alternative design would have been the baseline scenario for the waste energy generated in the Greenfield facility. The alternative design provides the value of factor "$f_{practice}$" that is referred in Option 1 above.			Not Applicable		
g.	Has the DOE applied specific guidance provided by the CDM Executive Board in respect to the applicable approved methodology?	VVM	69	Yes.	OK	
h.	Is the methodology correctly quoted?	VVM	70	The methodology is referred to in section B.1 of the PDD. The reference to ACM0012 is correct. But methodology version referred is not the latest. Also, Tool to calculate emission factor for an electricity system v1.1 is not the latest one. Please refer CAR-2 in reference 3-k-i above.	Not OK	
i.	Are the applicability conditions of the methodology met?	VVM	71	Yes	OK	
j.	Is the project activity expected to result in emissions other than those allowed by the methodology?	VVM	71	No. Project activity will be having emissions of GHGs as specified by the methodology.	OK	OK
k.	Is the choice of the methodology justified?	VVM	71	Yes	OK	
l.	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.c) above		-

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m. 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.c) above		
n. 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	No.		
o. 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 choices)	VVM	71	Not Applicable.		
p. Can a determination regarding the applicability of the selected methodology to the proposed CDM project activity be made?	VVM	72	Yes	OK	OK
q. If no, clarification of the methodoloy was requested, in accordance with the guidance provided by the CDM Executive Board?	VVM	72	Not Applicable	OK	OK
r. 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
s. If yes to (5.b.l) and (5.b.m) above, a request for registration was submited before the CDM Executive Board has approved the proposed deviation or revision?	VVM	74	Not Applicable	OK	OK
c. Project boundary					
a. Does the PDD correctly describe the project	VVM	78	Please refer sub-questions below.	Not OK	

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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?					
i. Does the geographical extent of project boundary include the following: 1. The relevant WECM stream(s), equipment and energy distribution system in the ”Project Facilities” and the ”Recipient Facilities”. Recepient facilities which may be same as the ”Project facilities”. 2. The spatial extent of the grid is as defined in the ”Tool to calculate the emission factor for an electricity system”. 3. Is project boundary described in the PDD covers following. i) In project facility, the WECM stream(s), waste energy recovery and useful energy generation equipment, and distribution system(s) for useful project energy; ii) In a recipient facility, the equipment which receive useful energy supplied by the project, and distribution system(s) for useful project energy. 4. Where multiple waste gas streams are available in the project facility, and can be used interchangeable for various	ACM 0012	V 4.0	The grid or power trading company and the recipient plant (i.e. LMEL’s steel manufacturing plant) to which electricity generated by the project activity power plant would be exported is not included in the project boundary. Please correct in line with the definition of project boundary as per ACM0012 version 4.	**CAR-8**	

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applications as a part of energy sources in the facility, the guidance provided in Annex 3 shall be followed to establish the project boundary.					
ii. Are summary of gases and sources included in the project activity as per table 1 of the methodology?	ACM 0012	V 4.0	Yes. Summary of the gases and sources are included in the project activity as per table 1 of the methodology	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	Refer CAR-8 above	-	
c. Does the delineation in the PDD of the project boundary meet the requirements of the selected baseline?	VVM	79	Please refer CAR-8 at reference 5-c-a-i above.	-	
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	Please refer CAR-8 at reference 5-c-a-i above.	-	
e. Have all sources and GHGs required by the methodology been included within the project boundary?	VVM	79	Please refer CAR-8 at reference 5-c-a-i above.	-	
f. Does the methodology allow project participant to choose whether a source or gas is to be included within the project boundary	VVM	79	Methodology does not specifically allow project participant to choose whether a source or gas is to be included within the project boundary. Methodology has predefined sources of GHGs which are to be included or excluded from the		

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			project boundary.		
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
d. Baseline identification					
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	In webhosted PDD, baseline for the proposed CDM project activity identified as "Coal based power plant implementation in absence of the project activity." However during subsequent validation process, the baseline was reassessed based on latest version 4 of approved ACM0012 methodology. The final assessed baseline determined for the project is equivalent power generation from Grid power plants connected to NEWNE grid.	OK	OK
b. Has any procedure contained in the methodology to identify the most reasonable baseline scenario, been correctly applied?	VVM	82	Yes, identification of baseline scenario is carried out as per steps and procedure given in ACM0012.	OK	OK

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i. Does the PDD explain how Realistic and credible alternatives has been determined for: • Waste energy use in the absence of the project activity; • Power generation in the absence of the project activity for each recipient facility if the project activity involves the electricity generation for that recipient facility; • Heat generation (process heat and/or heat of reaction) in the absence of the project activity, for each recipient facility if the project activity invovles generation of useful heat for that recipient facility; and • Mechanical energy generation in the absence of the project activity, for each recipient facility if the project activity involves generation of useful mechanical energy for that recipient facility.	ACM 0012	V 4.0	PDD explains the realistic and credible alternatives for waste energy generation facility and for power generation facility in absence of project activity. No further scenarios were identified for heat generation and mechanical energy generation as project site does not have requirement for heat or steam in sponge iron manufacturing process. Also no mechanical energy generation is happening at site. However after review of PDD following queries needs to be clarified by PP. 1) Option P4: combination of coal based power plant and grid can not be ruled out on account of the reasons stated (unreliability of grid supply). The power requirement pre-project was already met 100 % through grid. 2) Option P5, P7: justification is not appropriately worded. 3) Option P6: demonstrate the unreliability of grid supplied power through evidences. 4) Provide evidence that installation of WHRB is not a mandatory requirement by MPCB and also that there are no restrictions on setting up of a coal based CPP.	**CL-12**	

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ii. Does the alternative identified for the project activity provide the same heat, power or mechanical energy output as in the project activity scenario and include the alternate use of the waste energy utilized in the project activity.	ACM 0012	V 4.0	Yes. In line with the methodology, Alternatives identified for the project activity provide the same power output as in the project activity scenario and include the alternative use of waste energy utilized in the project activity.	OK	OK
iii. Has the project participant provided evidence and supporting documents to exclude baseline options that • Do not comply with legal and regulatory requirements; or • Depend on fuels (used for generation of heat, power or mechanical energy), that are not produced or imported in the host country.	ACM 0012	V 4.0	All the alternatives mentioned in PDD comply with the legal and regulatory requirements.	OK	OK
iv. Does the PDD explain how most plausible baseline scenario is identified? (Step1). PI comment	ACM 0012	V 4.0	PDD explains how the most plausible baseline scenario is identified as per step 1 described in the applied methodology to project activity.	OK	OK
v. Have the most realistic and credible alternatives for waste energy (WECM) been properly determined? PI comment	ACM 0012	V 4.0	Most realistic and credible alternatives for waste energy (WECM) have been determined in line with those provided in the methodology. In the pre-project scenario, waste flue gases were sent to atmosphere via passing it through water scrubber therefore it fits in alternative W2 described in PDD wherein waste heat is released to atmosphere.	OK	OK
vi. Have the most realistic and credible alternatives for power generation been properly determined? PI comment	ACM 0012	V 4.0	Most realistic and credible alternatives for power generation have been identified in line with the applied methodology. Accordingly three scenarios were shortlisted based on applicability to project	OK	OK

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			activity.		
vii. Have the most realistic and credible alternatives for heat generation been properly determined? Pl comment	ACM 0012	V 4.0	Project activity does not involve the heat or steam generation and no requirement in sponge iron process. Therefore the alternatives for heat generation are not required to be indentified.	OK	OK
viii. Have the most realistic and credible alternatives for mechanical energy been properly determined? Pl comment	ACM 0012	V 4.0	Project activity does not involve the recovery of mechanical energy. Hence alternative for mechanical energy are not required to be identified.	OK	OK
ix. Does the PDD employ the Step 2 and/or Step 3 of the latest approved version of the Tool for the demonstration and assessment of additionality to eliminate non-feasible options? (Step2). Pl comment	ACM 0012	V 4.0	After assessment of applicable baseline scenarios for waste heat and power generation, PP arrived at three scenarios for power generation. Therefore to assess the most appropriate baseline scenario Levelized cost was calculated. Therefore in line with the procedure stated in the methodology, Step 2 of the latest approved version of the additionality tool is used to eliminate non-feasible options.	OK	OK
x. If there has more than one credible and plausible alternatives scenario been identified, does the PDD choose the lowest baseline emissions as the most likely baseline scenario? (Step3). Pl comment	ACM 0012	V 4.0	PDD identifies the two scenarios namely 1) Coal based captive power plant 2) Equivalent Power import from grid Levelized cost of option 1 i.e. coal based power generation is lowest compared to per unit cost of power from grid. However the emission factor of coal based CPP is 1.04 tCO_2/MWh which is higher than emission factor of grid 0.8433 tCO_2/MWh. Therefore conservatively grid power "P10" is selected as the most likely baseline scenario for project activity. This will result in lowest emission	OK	OK

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			reductions.		
c. Is the selection of baseline in accordance with the following • Annex 1: Assessment of extent of use of WECM and determination of baseline practice factor for CDM project activity implemented in Greenfield facilities using a reference waste energy generating facility (or reference facility for the purpose of this annex) and manufacturer's specifications. • Annex 2: Assessment of extent of use of WECM in the existing facility • Annex 3: Conservative baseline emissions if multiple waste gas stream(s) with potential for interchangeable application exist in the project facility	ACM 0012	V 4.0	Selection of baseline is in accordance with the procedure described in Annex 2 of the revised methodology ACM0012 version 4.	OK	OK
d. 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	Selected methodology ACM0012 requires use of step 2 of "Tool for the demonstration and assessment of additionality" to establish the baseline scenario.	OK	OK
e. If yes, was the methodology consulted on the application of thes tools? (In such cases, the guidance in the methodology shall supersede the tool.)	VVM	82	Yes.	OK	OK
f. Does the methodology require several alternative scenarios to be considered in the identification of the most reasonable baseline scenario?	VVM	83	Yes	OK	OK
g. If yes, are all scenarios that are considered by	VVM	83	1) The discussion on each of the baseline options	**CL-13**	

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the project participants and are supplementary to those required by the methodology reasonable in the context of the proposed CDM project activity?			for waste gas (W1, W2..etc) in PDD section B.4, does not clearly indicate whether that particular option is considered as applicable or not. 2) The discussion for option P4 states that char/ dolachar could be used as fuel in the baseline coal based power plant. It is not explained how it would be possible to source this from other sponge iron manufacturers at "no cost", given that the said fuel has some calorific value and is capable of heat generation in the boiler. The quantity of char/ dolachar stated as 60,000 tonnes also needs to be explained.		
h. Has any reasonable alternative scenario been excluded?	VVM	83	No	OK	OK
i. Is the baseline scenario identified reasonably supported by:	VVM	84			
i. Assumptions?	VVM	84	Yes	OK	
ii. Calculations?	VVM	84	Yes	OK	
iii. Rationales?	VVM	84	Yes	OK	
j. Are the documents and sources referred to in the PDD correctly quoted and interpreted?	VVM	84	Yes. Documents and sources referred to in the PDD are correctly quoted and interpreted.	OK	OK
k. Was the information provided in the PDD cross checked with other verifiable and credible sources, such as local expert opinion, if available? (idendify the sources)	VVM	84	No.	OK	OK
l. Have all applicable CDM requirements been taken into account in the identification of the baseline scenario for the proposed CDM project	VVM	85	In identification of baseline scenario for the proposed CDM project activity all applicable CDM requirements have been taken in to account.	OK	OK

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activity?					
m. 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	
n. 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	
e. Algorithms and/or formulae used to determine emission reductions					
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, the steps taken and equations applied to calculate project emissions, baseline emissions, leakage emission and emission reductions comply with the requirements of the selected baseline and monitoring methodology.	OK	OK
b. Have the equations and parameters in the PDD been correctly applied with respect those in the select approved methodology?	VVM	90	The notations used in the equations (section B.6.1) do not match those in the methodology. Use of subscript notation is not seen (applies to all sections, wherever appearing). The same practice should be followed through out the PDD.	**CAR-9**	
i. Baseline Emissions Have the baseline emissions for the year y has been calculated through the formula (1) of the methodology?	ACM 0012	V 4.0	Yes	OK	
ii. Has baseline emissions for the different	ACM	V	Yes	OK	

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scenarios calculated as per respective formulae of the methodology?	0012	4.0			
iii. As a measure of conservatiness, Is capping of baseline emissions done by using one of the 3 methods described in the methodology? Justify the method used.	ACM 0012	V 4.0	Capping of baseline emissions are done by using the Method 2 out of three methods described in methodology. Project participant did not select the method 1 to cap the baseline emissions as this method requires the past three year data before the project activity. In this project 4 x100 TPD kilns were in operation for approximately 1 year. Only 500 TPD kiln was in operation for more than 3 years. Therefore method 1 was not selected. Therefore method-2 as per hierarchy is selected wherein PP have the data for specific amount of WECM per unit of product. It is not explained how the parameter $Q_{WCM, BL}$, which is a value to be determined ex-ante at the time of validation, is arrived at in relation to the pre-existing production levels of the DRI kilns of LMEL plant, (i.e. before the start of the project activity). The value applied for this parameter- 210000 Nm^3/hr (in section B.6.2) is sourced from process data sheets of M/s. ERK Germany; however, how this value is also related to the pre-existing production level is not explained.	**CAR-10**	
iv. Project Emissions	ACM	V	It was observed during the site visit by the	**CL-14**	

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Have the project emissions been calculated through the formula (41) of the methodology?	0012	4.0	validation team that there are electricity imports by the project activity from grid. However, the monitoring plan does not include monitoring of the same.		
v. Leakage No leakage is included	ACM 0012	V 4.0	As per methodology no leakage is applicable	OK	OK
vi. Emission Reductions Have the emission reductions due to the project activity during the year y calculated through the formula (42) of the methodology?	ACM 0012	V 4.0	Yes. Emission reductions due to project activity during year y are calculated using the equation 42 of the methodology.	OK	OK
c. Does the methodology provide for selection between different options for equations or parameters?	VVM	90	Yes	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. Adequate justification is provided for selections between methodological options.	OK	OK
e. If yes, have correct equations and parameters been used, in accordance with the methodology selected?	VVM	90	Yes. Correct equations and parameters have been used in accordance with the methodology.	OK	-
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			
i. Appropriate and correct?	VVM	91	Appropriateness and correctness of baseline grid emission factor will be subject to application of	Not OK	

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			latest version of approved tools as referred in methodology. Please refer CAR-2 in reference 3-k-i above.		
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	Please refer 5-e-g-i above.	Not OK	
h. Will data and parameters be monitored on implementation and hence become available only after validation of the project activity?	VVM	91	Yes		
i. If yes, are the estimates provided in the PDD for these data and parameters reasonable?	VVM	91	Yes		
6. Additionality of a project activity					
a. Does the PDD describe how a proposed CDM projet activity is additional?	VVM	94	Yes	OK	OK
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 section B.5 in the PDD: the alternatives to the project activity are not clearly stated.	**CAR-11**	
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	PP has carried out investment analysis as per step 2 of additionality tool where it was stated that the project activity is not the most economically or financially attractive.	OK	
iii. Barriers analysis?	EB 39	Ann 10	PP have carried out barrier analysis as per additionality tool in section B.5 of PDD	OK	
iv. Common practice analysis?	EB 39	Ann 10	Yes	OK	

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c. In step 1 (i) have all the sub-steps as below been followed?	EB 39	Ann 10			
i. Sub-step 1a: Define alternatives to the project activity	EB 39	Ann 10	Please refer CAR-10 above.	**Not OK**	
ii. Sub-step 1b: Consistency with mandatory laws and regulations	EB 39	Ann 10	Yes	OK	
d. Have the following alternatives been included while defining alternatives as per sub-step 1a?	EB 39	Ann 10			
i. (a) The proposed project activity undertaken without being registered as a CDM project activity;	EB 39	Ann 10	Yes	OK	OK
ii. (b) Other realistic and credible alternative scenario(s) to the proposed CDM project activity scenario that deliver outputs services or services with comparable quality, properties and application areas, taking into account, where relevant, examples of scenarios identified in the underlying methodology;	EB 39	Ann 10	The justification provided in the PDD section B.4 for not including alternatives for power generation (in the absence of the project activity) viz., P5 and P7 is not adequately worded as it does not fully explain the reasons why these alternatives are not considered to be plausible.	**CL-15**	
iii. (c) If applicable, continuation of the current situation (no project activity or other alternatives undertaken).	EB 39	Ann 10	Yes. In absence of project activity, waste gases would have been passed through scrubber and then released in to atmosphere at lower temperature (Scenario W2) which is continuation of current situation. Currently LMEL is taking power from grid as stated in PDD which will be continuation of current scenario in absence of project activity.	OK	
e. Has the project participant included the technologies or practices that provide outputs or services with comparable quality, properties and	EB 39	Ann 10	Yes. Project participant included the coal based captive power plant as alternative with comparable quality, properties and application	OK	

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application areas as the proposed CDM project activity and that have been implemented previously or are currently being introduced in the relevant country/region?			areas as the proposed CDM project activity.		
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	Yes. Out of the alternative mentioned in section B.4 of PDD, PP has selected coal based captive power generation as only plausible and credible alternative. However PP needs to address CL-10 in (6-d-ii) above.	Not 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	Refer CL-6 above in 6-d-ii	Not 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 systematically not enforced and that noncompliance with those requirements is widespread in the country?	EB 39	Ann 10	Refer CL-6 above in 6-d-ii		
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	EB 39	Ann 10	Refer CL-6 above in 6-d-ii		

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regulations done correctly? Please state the outcome.					
j. Has PP selected Step 2 (Investment analysis) or Step 3 (Barrier analysis) or both Steps 2 and 3?	EB 39	Ann 10	PP has selected both the step 2 and step 3 (i.e. Investment analysis and Barrier analysis) in additionality tool.	OK	
k. In step 2, have all the sub-steps as below been followed?	EB 39	Ann 10			
i. Sub-step 2a: Determine appropriate analysis method;	EB 39	Ann 10	Sub-step 2a is followed. However clarification/ justification will be required for selected analysis method. Refer CL-5 above at reference (5-e-d).	Not OK	
ii. Sub-step 2b: Option I. Apply simple cost analysis;	EB 39	Ann 10	Not applied		
iii. Sub-step 2b: Option II. Apply investment comparison analysis;	EB 39	Ann 10	Investment comparison analysis is followed in PDD.	OK	
iv. Sub-step 2b: Option III. Apply benchmark analysis;	EB 39	Ann 10	Not Applied to arrive at baseline scenario. However project additionality is demonstrated by evaluating the equity IRR compared with benchmark return i.e. RoE in revised PDD	OK	
v. Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III);	EB 39	Ann 10	IRR calculation and levelized cost calculations are done for investment comparison analysis.	OK	
vi. Sub-step 2d: Sensitivity analysis (only applicable to Options II and III).	EB 39	Ann 10	Sensitivity analysis is performed.	OK	
l. In sub-step 2a has the determination of appropraite method of analysis done as per the guidance as below?	EB 39	Ann 10			
i. Simple cost analysis if the CDM project activity and the alternatives identified in Step 1 generate no financial or economic benefits	EB 39	Ann 10	Please Refer CL-5 above at reference (5-e-d).	Not OK	

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other than CDM related income (Option I).					
ii. Otherwise, use the investment comparison analysis (Option II) or the benchmark analysis (Option III). Specify option used with justification.	EB 39	Ann 10	Refer CL-5 above at reference (5-e-d).	Not 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	Simple cost analysis is not performed.	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	IRR calculation and levelized cost calculations are done for investment comparison analysis. IRR is calculated for the coal based power plant and WHRB based power with CDM and without CDM revenue.	OK	
o. Has the below guideline followed for Sub-step 2b: Option III. Apply benchmark analysis?	EB 39	Ann 10	Sub-step 2b: Option III is not followed	OK	
i. Identify the financial/economic indicator, such as IRR, most suitable for the project type and decision context.	EB 39	Ann 10	Yes. Equity IRR is selected for the project activity		
ii. When applying Option II or Option III, the financial/economic analysis shall be based on 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	EB 39	Ann 10	Not Applicable		

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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 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	EB 39	Ann 10	Not Applicable		

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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			
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	Revenue considered for IRR calculations should be based on the expected savings accrued due to cash outflow for purchase of grid power.	**CAR-12**	
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	Project participant needs to provide the documentation or references to support the following assumptions made in PDD or in separate annexes to PDD and clarify. a) Land and site development cost, building, structures etc. b) Assumed cost of plant and machinery does not match with actual PO's raised. There is a large	**CL-16**	

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			difference (actual Rs.136 cr. Assumed Rs.81 cr) c) Provide supporting for other project cost items – spare parts, pre-operative expenses, consultancy fees d) Include the internal consumption of power in assumptions sheet and provide its source e) Explain source of assumptions for consumables, labor, repairs/maintenance, administrative & other expenses f) Explain finished goods inventory cost for 15 days-what are the finished goods? g) In working capital sheet, explain what is meant by receivables considered from internal sales-explain. External sales can be considered as receivables; but why an also internal sale, as the entity (i.e. LMEL) remains the same. h) Depreciation @5.28% SLM- explain how it can be calculated for items such as preliminary expenses, contingencies, consultancy fees, interest during construction all forming the total of project cost of 110.55 cr.		

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			i) In IRR worksheet, scale of the diagram to be changed to give correct impression-with and without CDM. j) IRR calculations for coal based CPP are not provided (IRR of 23.5%) k) State the basis for assumption made for capital cost of coal based CPP (88.7 cr) l) Basis for 90% PLF assumed for coal based CPP, fuel cost (cost of coal /kWH, O&M cost) m) Explain clearly the justification for selecting those parameters to which the sensitivity analysis has been applied, in line with the guidance for investment analysis EB 51 Annex 58 n) Sensitivity analysis would be more appropriate if parameters like PLF, O&M cost, project cost , etc. are changed for WHRB and the results are compared with base case for coal based CPP.		
iii. Justify and/or cite assumptions.	EB 39	Ann 10	Please refer CL-15 above.		
iv. In calculating the financial/economic indicator, the project's risks can be included through the cash flow pattern, subject to project-specific	EB 39	Ann 10	Please refer CL-15 above.		

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expectations and assumptions.					
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	Please refer CL-15 above.		
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	Please refer CL-15 above.		
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	Yes, sensitivity analysis is performed to check the robustness of identified baseline scenario by giving reasonable variations in the critical parameters.	OK	
r. Has the outcome of Step 2 clearly mentioned with justification?	EB 39	Ann 10	Yes. From calculation of equity IRR and levelized cost of electricity generation with sensitivity analysis PP have justified the CDM project activity is unlikely to be most financially attractive.	OK	
s. In step 3: Barrier analysis have all the sub-steps as below been followed?	EB 39	Ann 10			
i. Sub-step 3a: Identify barriers that would prevent the implementation of the proposed CDM project activity;	EB 39	Ann 10	PP has identified the barriers that would prevent the implementation of the proposed CDM project activity.	OK	OK
iii. 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	PP has applied Sub-step 3b which shows that the identified barriers would not prevent the implementation of coal based captive power plant as no identified barriers are preventing it.	OK	OK
t. Has the below guideline followed for Sub-step 3a: Identify barriers that would prevent the	EB 39	Ann 10			

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implementation of the proposed CDM project?					
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	Yes. PP has stated that LMEL has incurred losses when steel industry faced acute recession a few years back, accumulated losses and is under BIFR with debt restructuring of liabilities. Hence company faces the financial barriers due to the non-availability of fresh funds to carry out expansion activities both from financial institutes and equity markets.		
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 manufacturer information, The particular	EB 39	Ann 10	The link provided under technological barriers for www.steelworld.com/magmay2006 is not working. Also www.steelworld.com/magjan2007 is not working.	**CAR-13**	

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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	For prevailing practice barriers study of captive power plants in India in august 2005 is provided. a) The information presented in the PDD in section B.5 on additionality is not backed up with the references of their sources. , e.g. the claim that 48 projects are pursuing CDM out of 227 sponge Iron manufacturing companies. b) Prevailing practice barriers can be regarded only if applying to the technology of the project activity. The technology, viz., waste heat recovery is not a first of its kind as there are several WHR plants operating in the geographical region. The project participant is requested to explain how the project activity could be regarded as a first of its kind in terms of the technology employed.	**CAR-14**	
iv. (d) Other barriers, preferably specified in the underlying methodology as examples.	EB 39	Ann 10	Other barriers are not separately discussed in the PDD. They are included under prevailing practice and technological barriers.		
u. Has the outcome from Step 3a clearly mentioned in PDD?	EB 39	Ann 10	Outcome of step 3a is mentioned under step 3b with five broad category identified barriers.	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	EB 39	Ann 10	Sub step 3b is followed in PDD and showed that coal based captive power generation is not affected by any of the identified barriers.		

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alternatives (except the proposed project activity)?					
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	The documentation submitted to support investment barrier (difficulty in raising finance for the project activity) is limited to only a letter from M/s. Nariman Point Finance Ltd (Refer letter dated 6-Dec-2006). The said barrier is not proved only on the basis of a single such letter; as there would be other avenues of finance also open to the project participant and it is not established whether all these were also exhausted. 1) Explain why lack of experience in running power plant should be considered as a barrier as it is possible to hire the services of trained personnel to carry out the operations. 2) Uncertainties in PLF due to plant shut downs, etc. are already taken into consideration when the value of PLF is determined. Hence, they can not be treated as separate barriers 3) Provide evidence that flue gas conditions vary and result in unsteady power generation, so as to constitute a technological barrier. The provision of FBC boiler would stabilize the operations. 4) Project participant needs to objectively demonstrate that CDM benefits would alleviate the	**CL-17**	

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			claimed barriers, in line with the guidance for the demonstration and assessment of barriers EB 50 Annex 13. 5) Prevailing practice barriers can be regarded only if applying to the technology of the project activity. The technology, viz., waste heat recovery is not a first of its kind as there are several WHR plants operating in the geographical region. The project participant is requested to explain how the project activity could be regarded as a first of its kind in terms of the technology employed		
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 are prevented by these barriers.	EB 39	Ann 10	Please refer CL-16 above at (6-v-i)	Not OK	
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	EB 39	Ann 10	Please refer CL-16 above at (6-v-i)		

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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 centres), industry associations and others. Please specify.					
w. Has the outcome from Step 3 clearly mentioned in PDD?	EB 39	Ann 10	Yes. Outcome of the step 3 is mentioned that coal based power plant is the alternative which is not prevented by any of the barrier and it is most economical option.	OK	
x. In step 4: Common practise analysis have all the sub-steps as below followed?	EB 39	Ann 10	Yes		
i. Sub-step 4a: Analyze other activities similar to the proposed project activity;	EB 39	Ann 10	PP needs to provide the actual data source link for the information provided from www.simaindia.org website to access the data or information directly. Also provide the link for JPC survey report as mentioned in PDD.	**CAR-15**	
ii. Sub-step 4b: Discuss any similar Options that are occurring.	EB 39	Ann 10	Sub step 4b states that WHRB is not recommended for 100 TPD and lower capacity plants as the same is not viable. Please provide correct web link in PDD to support this statement.	**CAR-16**	
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 to the proposed project activity. Other CDM	EB 39	Ann 10	Yes. Sub step 4a has provided the analysis of similar activities to the proposed project activity. However all the analysis is based on registered CDM project activities or those waste heat recovery based power generation project activities	OK	

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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.			which are seeking CDM benefits. PP has not identified any other similar project activity similar to proposed CDM project activity.		
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	Similar project activity in terms of size and scale, broadly similar technology are identified as below. 1) GIPL with 2 WHRBs for 2x500 TPD 2) SKS Ispat Ltd with 4 boilers for 2x350 TPD, 2x100 TPD. 3) Chattisgarh Electricity Co. Ltd. (CECL) with 4 WHRBs working on 2x100 TPD, 2x500TPD kilns with ferro Alloy furnaces. However all the projects are seeking CDM benefits. PP has not identified any other similar project as to the proposed CDM project activity which is operating WHRBs power plant without CDM revenue.	OK	
aa. Has the outcome from Step 4 clearly mentioned in PDD?	EB 39	Ann 10	PDD has mentioned that CDM registration has been driving force as all the waste heat recovery units are under CDM and such projects can not be	OK	

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			considered as common practice.		
bb. Has it been proved that the porject is additional?	EB 39	Ann 10	It is subjected to resolution of all CLs and CARs raised in above additionality section as well as relevant queries in DVR.	-	
a. Prior consideration of the clean development mechanism					
a. Is the project ativity start date prior to the date of publication of the PDD for stakeholder comments?	VVM	98	Yes.	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	Board got awareness about the CDM benefits availability during board resolution meeting when LSIL representative made the presentation to set up waste heat recovery boiler for steam generation and power generation to the tune of 25 MW. Since board resolution date 28/10/2006 is taken as project start date PP need to clarify that they had CDM awareness prior to project start date through reliable evidences.	**CL-18**	
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	Project start date 28th Oct 2006 is taken as board resolution date on which CDM benefits were considered necessary for the project. However selected project start date is earlier than the date on which real action for the project was taken i.e. on 15th March 2007 on which contract was given for the design, engineering, manufacture, supply and commissioning of the project equipment. Hence we can take project start date as board resolution date as conservative.	OK	

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d. Does the project activity require construction, retrofit or other modifications?	VVM	99	Project activity is new installation of power plant by recovering waste heat from existing 1x500 TPD and 4x100 TPD sponge iron DRI kilns.	OK	
e. If yes, is it ensured that the date of commissioning cannot be considered as the project activity start date?	VVM	99	Project start date is conservatively taken as board resolution date of LMEL on which CDM revenues were considered for propose project activity.	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	No	OK	
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 PPs 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	
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	Start date of the project activity is taken as board resolution date which is prior to the date of publication of the PDD for global stakeholder consultation.	OK	
ii. evidence that must indicate that awareness of the CDM prior to the project activity start date,	VVM	102			

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and that the benefits of the CDM were a decisive factor in the decision to proceed with the project, including, inter alia:					
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?			LMEL's Board of director had undertaken the project activity as a CDM project activity in board resolution meeting and agreed to establish the WHRBs based captive power plant with CDM revenue for making project viable.	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			
a. contract with consultants for CDM/PDD/methodology services?	VVM	102	Lloyds Steel Industries Limited (LSIL) was appointed as a CDM Consultant during board resolution meeting. Officially LSIL was appointed as consultant on 15 Jan 2007	OK	
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	ERPA is not signed yet or other documentation with related to sale of potential CERs.	OK	
c. evidence of agreements or negotiations with a DOE for validation services?	VVM	102			
d. submission of a new methodology to the CDM Executive Board?	VVM	102	No new methodology has been submitted to CDM Executive Board.	OK	
e. publication in newspaper?	VVM	102	No		
f. interviews with DNA?	VVM	102	On 17th January 2007 application for HCA was	OK	

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			made.		
g. earlier correspondence on the project with the DNA or the UNFCCC secretariat?	VVM	102	No	OK	
h. Has the chronology of events including time lines been appropriately captured and explained/detailed in the PDD?	VVM	102	Yes. Chronology of events including timelines have been appropriately captured and explained in PDD.	OK	
b. Identification of alternatives					
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. baseline scenario is to be identified as the most plausible baseline scenario among all realistic and credible alternative(s) as per ACM0012.	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. ACM0012 has provided the list of realistic and credible alternatives for use of waste energy and power generation. PP has considered the same to arrive at the baseline for the project activity and demonstrate the additionality.	OK	
c. Does the list of alternatives given in the PDD esure that:	VVM	106			
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	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	OK	
iii. the alternatives comply with all applicable	VVM	106	Refer CL-6 above in 6-d-ii	Not OK	

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and enforced legislation?					
c. Investment analysis					
a. Has investment analysis been used to demonstrate the additionality of the proposed CDM project activity?	VVM	108	Yes	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	PDD has done investment comparison analysis for Equity IRR and levelized electricity cost of electricity genration for both coal based captive power plant and WHRBs captive power plant. Based on this it is shown that proposed CDM project activity is not most economically or financially attractive alternative.	OK	
ii. economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs)?	VVM	108	Yes	OK	
c. Was this shown by one of the following approaches?	VVM	109			
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 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.	VVM	109	The proposed project activity will be producing other benefits in terms of sell of power to third party other than CDM related income.	OK	
ii. The proposed CDM project activity is less economically or financially attractive than at	VVM	109	PDD has done investment comparison analysis for Equity IRR and levelized electricity cost of	OK	

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least one other credible and realistic alternative.			electricity genration for both coal based captive power plant and WHRBs captive power plant. Based on this it is shown that proposed CDM project activity is not most economically or financially attractive alternative than coal based Captive power plant.		
iii. The financial returns of the proposed CDM project activity would be insufficient to justify the required investment.	VVM	109	Equity IRR calculated by the PP for waste heat recovery boiler CPP is only 1.5% as compared to equity IRR for coal based CPP of 23.5%. Therefore we can say that fiancial returns of the proposed CDM project activity would be insufficient to justify the required investment.	OK	
d. Is the period of assessment limited to the proposed crediting period of the CDM project activity?	EB 62	Ann 5	No. It is taken for the life of the project activity that is 15 years.	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 62	Ann 5	Equity IRR is calcualted for the project where assessment is done for 15 years of technical lifetime of the project activtity.	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 62	Ann 5	Yes, IRR calcuation includes the cost of maintenance and repair.	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	EB 62	Ann 5	PP has considered the 15 years as a assessment period which is technical lifetime of the project activity. It is in line with EB51, Annex 58	OK	

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period?					
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 62	Ann 5	Yes, cash flow in final year include the fair value of project activity assests at the end of assessment period of 15 years.	OK	
i. Has the fair value been calculated in accordance with local accounting regulations where available, or international best practice?	EB 62	Ann 5	Fair value of the assesst is taken as 10% in form of salvage value at the end of assessment year.	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 62	Ann 5	Yes	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 62	Ann 5	Yes	OK	
l. Has taxation been included as an expense in the IRR/NPV calculation in cases where the benchmark or other comparator is intended for post-tax comparisons?	EB 62	Ann 5	Yes. Taxation been included as an expense in IRR calculation. Equity IRR is compared with return on equity which is post tax comparator	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 62	Ann 5	Explain why the debt:equity ratio is not considered from actual project funding pattern of equity and loans. Provide evidence that past invsetments have also been made with similar debt:equity ratio.	**CL-19**	
n. Is the timing of the investment decision consistent and appropriate with the input values?	EB 62	Ann 5	Yes. Board decision for the project activity was on 28/10/2006. All input values are consistent and appropriate with the decision date on project	OK	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			activity.		
o. Are all the listed input values been consistently applied in all calculations?	EB 62	Ann 5	Yes.	OK	
p. Does the investment analysis reflect the 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?	EB 62	Ann 5	Not Applicable.	OK	
q. Have project participants supplied the spreadsheet versions of all investment analysis?	EB 62	Ann 5	Yes	OK	
r. Are all formulas used in this analysis readable and all relevant cells be viewable and unprotected?	EB 62	Ann 5	Yes	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 62	Ann 5	There is no such request from PP.	OK	
t. In case the PP wishes to black-out certain elements of the publicly available version, is it justifiable?	EB 62	Ann 5	No such request is made by PP.	OK	
u. Was the cost of financing expenditures (i.e. loan repayments and interest) included in the calculation of project IRR?	EB 62	Ann 5	Not applicable. PP has evaluated the equity IRR and not a project IRR.	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 62	Ann 5	Only equity portion of investment cost is considered in calculation of equity IRR.	OK	
w. Has the portion of the investment costs which is	EB	Ann	No.	OK	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
financed by debt been considered as a cash outflow in the calcualtion of equity IRR? (this is not allowed)	62	5			
x. Was a pre-tax benchmark be applied?	EB 62	Ann 5	Pre-tax bechmark is not applied	OK	
y. In cases where a post-tax benchmark is applied, is actual interest payable taken into account in the calculation of income tax?	EB 62	Ann 5	Not Applicable. This is required to be done for project IRR.	OK	
z. In cases where a benchmark approach is used is the applied benchmark appropriate to the type of IRR calculated?	EB 62	Ann 5	Yes. Equity IRR is compared with return on equity (RoE) bechmark which is in line with the investment guidelines.	OK	
aa. Has local commercial lending rates or weighted average costs of capital (WACC) selected as appropriate benchmarks for a project IRR?	EB 62	Ann 5	Not Applicable	OK	
bb. Has required/expected returns on equity selected as appropriate benchmark for an equity IRR?	EB 62	Ann 5	Yes. Return on equity is selected as the appropriate benchmark for the proejct activity to be compared with the Equity IRR.	OK	
cc. In case benchmarks supplied by relevant national authorities selected is it applicable to the project activity and the type of IRR calculation presented?	EB 62	Ann 5	Not Applicable	OK	
dd. 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 62	Ann 5	Yes. Benchmark applied is based on the parameters that are standard in the market.	OK	
ee. 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	EB 62	Ann 5	Not Applicable	OK	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
cases where there is only one possible project developer?					
ff. 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 62	Ann 5	Not Applicable	OK	
gg. Has a minimum clear evidence of the resolution by the company's Board and/or shareholders been provided to the effect as above?	EB 62	Ann 5	Not Applicable	OK	
hh. 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 conduted?	EB 62	Ann 5	Not Applicable	OK	
ii. Company's internal benchmark can be derived in different ways, including CAPM model, however is it checked that values/benchmark derived based on such approaches were consistently used by the company in the past.	EB 62	Ann 5	Company's internal benchmark is not used. Benchmark is evaluated based on data available in standar market.	OK	
jj. Is the bechmark derived is based on the parameters that are standard in market, the cost of equity should be 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 underlaying factors.			Yes. The cost of equity is determined by option b; that is by calculating the cost of equity using the best financial practices, based on data sources which can be clearly validated by the DOE. Market Sensex Data is used to calculate cost of equity using CAPM model.	OK	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
kk. Values in the table in Appendix A may also be used, as a simple default option, if a company internal benchmark is used.			Company internal benchamark is not used.	OK	
ll. If company's internal benchmark is used for expected return on equity, the cost of debt should be based on weighted average cost of debt financing of the legal entity owning the CDM project activity. For loans, use the weighted average cost of outstanding long term debt. For bonds, is it ensured that weighted average yield of the bonds during the last three months prior to submission of CDM PDD for validation or prior to investment decision, whichever is earlier is made?			Not Applicable	OK	
mm. Is it ensured that, If company's internal bencmark is used for expected return on equity, then the percentage of debt financing and equity financing should reflect the long-term debt/equity fiannce structure of the legal entity owning the assets of project activity.			Not Applicable	OK	
nn. If benchmark is based on parameters that are standard in market, then the typical debt/equity finance structure observed in the sector of the country should be used. If such information is not readily available, 50% debt and 50% equity financing may be assumed as default.			PP has taken Debt to equity ration from MERC tarrif order dated September 7, 2006. It is typical debt/equity finance structure observed in the sector in host country India.	OK	
oo. Has an investment comparison analysis and not a benchmark analysis used when the proposed baseline scenario leaves the project participant	EB 62	Ann 5	Investment comparison analysis is used to identify the baseline scenario. Bechmark analysis is performed to demonstrate the additionality in	OK	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
no other choice than to make an investment to supply the same (or substitute) products or services?			revised version of PDD.		
pp. 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 62	Ann 5	Variables including the initital investment cost that constitute more than 20% of either total project cost or total project revenues been subjected to reasonalble variatons. Details are provided in PDD section B.5 under sub step 2d- sensitivity analysis.	OK	
qq. 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 62	Ann 5	Not applicable		
rr. Is the range of variations selected is reasonable in the project context?	EB 62	Ann 5	PP needs to clarify and provide justification for the variation range selected for the variables included in sensitivity analysis. 1) + 5% increase in operating days 2) + 5% increase in PLF 3) +15% Sales price of exported electricity 4) – 10% plant and machinery cost 5) – 10% operating cost	**CL-20**	
ss. 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 62	Ann 5	Please refer CL-18 above.	Not OK	
tt. In cases where a scenario will result in the project activity passing the benchmark or	EB 62	Ann 5	PP has shown that in any of the cases the equity IRR or levelized electricity cost is not having the	OK	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
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 consideration correlations between the variables as well as the specific socio-economic and policy context of the project activity?			best indicators as compared to financial indicators for coal based CPP.		
uu. Was the plant load factor defined ex-ante in the CDM-PDD according to one of the following options:	EB 48	Ann 11			
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	The values of Plant Load Factor (PLF) considered as 70% in first year and 80% from second year onwards (for the project activity) and as 90% for the baseline coal based CPP need to be suitably justified.	**CAR-17**	
ii. The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company)?	EB 48	Ann 11	Please refer CAR-16 above.		
vv. 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	Thorough assessment of all parameters and assumptions is done in calculating the relevant financial indicator.	OK	
ww. Were the parameters cross-checked agains third-party or publicly available sources, such as invoices or price indices?	VVM	111	Yes	OK	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
xx. Were feasibility reports, public announcements and annual financial reports related to the proposed CDM project activity and the project participants reviewed?	VVM	111	Yes. Annual report of the project activity were reviewed.	OK	
yy. Was the correctnes of computations carried out and documented by the project participants assessed?	VVM	111	OK	OK	
zz. 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	Yes	OK	
aaa. Is the type of benchmark applied is suitable for the type of financial indicator presented?	VVM	112	Yes. Cost of equity is compared with the Equity IRR which is in line with the investment guidelines.	OK	
bbb. Do any risk premiums applied determining the benchmark reflect the risks associated with the project type or activity?	VVM	112	Risk premium applied reflects the risk associated with the project activity.	OK	
ccc. 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	Not Applicable	OK	
i. assessing previous investment decisions by the project participants involved?	VVM	112			
ii. determining whether the same benchmark has been applied?	VVM	112			
iii. determining if there are verifiable circumstances that have led to a change in the benchmark?	VVM	112			
ddd. Did the project participants rely on values	VVM	113	No. Feasibility report is not available	OK	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
from Feasibility Study Reports (FSR) that are approved by national authorities for proposed CDM project activities?					
øø. 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 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?	VVM	113	Not Applicable		
ii. Are the values used in the PDD and associated annexes fully consistent with the FSR?	VVM	113	Not Applicable		
iii. If not, was the appropriateness of the values validated?	VVM	113	Not Applicable		
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		
d. Barrier analysis					
a. Has barrier analysis been used to demonstrated the additionality of the proposed CDM project activity?	VVM	115	Yes	OK	OK
b. If yes, does the PDD demonstrate that the	VVM	115			

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
proposed CDM project activity faces barriers that:					
i. prevent the implementation of this type of proposed CDM project activity?	VVM	115	Yes		
ii. do not prevent the implementation of at least one of the alternatives?	VVM	115	Yes		
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	There are no other big issues that have a clear direct impact on the financial returns of the project activity apart from technical barriers and investment barriers for financing the project activity.	OK	
d. Were the barriers determined as real by:	VVM	117			
i. asssing 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	Yes		
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	Yes		
iii. Is existence of a barrier substantiated only by the opinions of the project participants?	VVM	117			

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
(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 *at least one of* the possible alternatives, in particular the identified baseline scenario?	VVM	117	Yes		
e. Common practice analysis					
a. Is this a proposed large-scale, or first-of-its kind small-scale project activity?	VVM	119	This is proposed large scale project activity.	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	Yes	OK	
c. Was it assessed whether the geograpphical 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 technologis the relevatn region for assessment will be local and for others it may be transnational/global.	VVM	120	Geographical scope of the common practice analysis is taken as India.	OK	
d. Was a region other than the entire host country chosen?	VVM	120	No		

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
e. If yes, was the explanation why this region is more appropriate assessed?	VVM	120	Not Applicable		
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	As per justification of PP, Similar activities like proposed project activity of 25 MW power generation with 5 WHRBs on 1x500 TPD and 4x 100 TPD DRI kilns are all taking place with CDM benefits only. The reference for the information was taken from government sources as well as by referring UNFCCC website.	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	No similar activities to proposed project activity have been identified.	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	Not Applicable	OK	
7. Monitoring plan					
a. Does the PDD include a monitoring plan?	VVM	122	Yes	OK	
b. Is this monitoring plan based on the approved monitoring methodology applied to the proposed CDM project activity?	VVM	122	Monitoring plan is based on approved ACM0012 methodology	OK	
c. Were the list of parameters required by the the selected methodology identified?	VVM	123	Yes	OK	
d. Does the monitoring plan contains all necessary parameters?	VVM	123	The following inadequacies in the monitoring plan are required to be addressed : 1) As per the monitoring methodology in ACM 0012, one of the monitored parameters should also be feed water flow rate and feed water temperature for each WHRB and FBC boiler as the computation of the values of ST_{whr} and	**CAR-18**	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			ST_{other} would involve the same. Also, these values are required to be computed as the difference between output enthalpy of steam and feed water (returning condensate), for each boiler. 2) The PP needs to clarify how vented steam from each boiler is accounted for. 3) Following parameters are also required to be monitored, as per the monitoring methodology in ACM0012. However, these parameters are not included in the monitoring plan. a) Quantity of coal combusted in FBC boiler. b) NCV of coal fired in FBC boiler c) Electricity import for project activity from grid (if any) d) Any electricity supplied by DG sets during project plant shut down, DG consumption, etc.		
e. Are the parameters clearly described?	VVM	123	It is not clear from the monitoring plan how the net electricity generation (i.e. gross gen – aux consumption) would be monitored or calculated. PP needs to clarify monitoring and measurement of net electricity generation.	**CL-21**	
f. Does the means of monitoring described in the plan comply with the requirements of the methodology?	VVM	123	1) In section B.7.1 of PDD, Methodology requires $Q_{WCM,y}$ to be monitored in terms of mass units. However the units chosen are volumetric (Nm^3)	**CAR-19**	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			2) Parameters like $Q_{WCM,y}$ and $Q_{WHR\ steam}$ are stated in the monitoring plan as a single parameter, when they are actually the sum of the $Q_{wcm,y}$ values for each WHRB. 3) Method of measurement: "Average hourly reading is calculated" needs to be explained for all metering parameters in B.7.1. It is not clear why the measurement would not be done by taking the difference between end reading and start reading The monitoring plan needs to clarify if totalized data or provision of totalizer is available for each meter.		
g. Are following project emissions being monitored: (1) Quantity of fossil fuels used as supplementary fuel; (2) Net calorific value of fossil fuel; (3) CO_2 emission factor of the fossil fuel; (4) Quantity of electricity consumed by the project operations; (5) CO_2 emissions factor of electricity consumed by the project operations.	ACM 0012	V 4.0	1) No supplementary fossil fuel is used in the project activity. 2) Quantity of electricity consumed by auxiliary equipments of project activity is subtracted from gross generation to arrive at the net power generation. Also import of power from grid, if any for start up operation is monitored by auxiliary meter only. Therefore it gives net power export quantity available for supply to recipient facilities. Hence no separate project emission due to import of grid power is required to be considered in emission reduction calculation.	OK	
h. Are following baseline emissions being monitoried depending on the baseline scenario:	ACM 0012	V 4.0	Quantity of electricity supplied to recipient plants is monitored. CO2 emission factor of grid is	OK	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
(1) Quantity of electricity supplied to the recipient plant(s); (2) CO2 emission factor of electricity that would have been consumed by the recipient plant(s) in the absence of the project activity; (3) Quantity of heat supplied to the recipient plant(s); (4) Properties of heat (e.g. pressure and temperature of the steam) supplied to the recipient plant(s); (5) Properties of heat return to element process (e.g. pressure and temperature of the condensate return) supplied by the recipient plant(s) to the project plant; (6) Efficiencies of element process or cogeneration plant or mechanical conversion equipment that would have been built in the absence of the project activity; (7) Mechanical energy delivered to the recipient plant (s).			defined and fixed ex-ante. Pressure and temperature of steam is monitored to calculate the enthalpy of the steam.		
i. Are measuring equipment maintained/calibrated where ever applicable?	ACM 0012	V 4.0	All monitoring equipments are calibrated annually.	OK	
j. Are the monitoring arrangements described in the monitoring plan feasible within the project design?	VVM	123	Please clarify the exact point of measurement of the waste gas; i.e. whether the waste gas is monitored / measured before it enters the point of use. (e.g. before WHRBs)	**CL-22**	
k. Does the monitoring plan provide details regarding calibration of monitoring equipments/ instruments or does it include zero check as a	EB 24	37	Monitoring plan provides the details regarding calibration of monitoring equipments.	OK	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
substitute for calibration. As per EB guidance related to calibration (monitoring) requirements, zero check can not be considered as a substitute for calibration?					
l. 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			
i. data management procedures?	VVM	123	Please refer CAR-5 above at 3-u-iii	-	-
ii. quality assurance procedures?	VVM	123	OK.	OK	
iii. quality control procedures?	VVM	123	1) Procedure to be followed in case meter/s found to be out of calibration is not described in the monitoring plan. How will the data uncertainty be taken care of in such cases as also the effect on previously recorded readings is not explained? 2) The monitoring plan does not describe fail safe measures to take care of the data loss or inaccuracy that could arise as a result of meter malfunction/ stoppage. During the site visit, the validation team observed that there are no secondary meters that could be used as stand by. The project participant needs to explain how situations arising as a result of meter malfunction or inaccuracy would be taken care	**CAR-20**	

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			of, since there are no standby arrangements for the same.		
8. Sustainable development					
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
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	Yes. Letter of approval by the DNA of host country i.e. India confirm the contribution of project activity to the sustainable development.	OK	OK
9. Local stakeholder consultation					
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	Yes. Local stakeholder meeting was carried out on 09/02/2007 with the local people of Ghugus Village in presence of Sarpach heading the Grampanchyat. PP invited the local villagers and affected people for stakeholder meeting personally in advance of 15 days.	OK	OK
b. Have comments by local stakeholders that can reasonably be considered relevant for the proposed CDM project activity been invited?	VVM	129	Comments of local stakeholder were invited and were put up to PP by Sarpanch of gram panchayat.	OK	OK
c. Is the summary of the comments received as provided in the PDD complete?	VVM	129	Summary of comments received is provided in PDD and complete.	OK	OK
d. Have the project participants taken due account of any comments received and described this process in the PDD?	VVM	129	Yes	OK	OK
10. Environmental impacts					

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
a. Have the project participants submitted documentation on the analysis of the environmental impacts of the project activity?	VVM	131	Yes	OK	OK
b. Have the project participants undertaken an analysis of environmental impacts?	VVM	132	Environmental Impact Assessment study was carried out by project participants. The project activity has been accorded environmental clearance as required by regulations by MPCB.	OK	OK
c. Does the host Party require an environmental impact assessment?	VVM	132	Yes	OK	OK
d. If yes, have the project participants undertaken an environmental impact assessment?	VVM	132	Please refer 10-b above.	OK	OK

Table 2 Resolution of Corrective Action and Clarification Requests

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
CAR-1 The PDD requires corrections to be made in respect of the following : a. The purpose of the project activity, pre-project scenario, project activity and baseline scenario is not clearly described in section A.2 under separate titles to understand the nature of project activity. b. In section A.2, it is stated that steam from other sources is taken to the common header. There are only two sources of steam-WHRB's (5 nos.) and the FBC boiler (1 no.). These are already mentioned in the description and therefore, there are no other sources involved c. Under the paragraph captioned "social benefit to state", only 4 WHRB's have been stated, instead of the actual number, viz., 5	3-d-i	PDD is revised to include description of following issues in section A.2 of PDD. 1) Description of pre-project and project scenarios along with baseline scenario is added. 2) In project scenario reference to other sources is now deleted as 5 WHRBS and 1 FBC boiler is already indicated in PDD. 3) Correction is made to state 5 WHRBs instead of 4 WHRBs mentioned incorrectly in section A.2.	a) PP has now revised the PDD to include the clear description of purpose of project activity, pre-project scenario and project scenario under separate titles in section A.2. Also brief description of baseline scenario as identified in section B.4 is provided to clearly understand the project activity. b) Corrections are made in revised PDD at section A.2 to mentions the actual sources of steam from 5 WHRBs and 1 FBC boiler. Reference to other sources of steam is deleted. c) Correction is made to state total of 5 WHRBs instead of 4 in revised PDD.

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
			Therefore CAR is **closed.**
CAR-2: 1. The version of methodology ACM 0012 referred in the PDD is not the latest version. Thereby justification for all the applicability conditions is not discussed in line with latest version of methodology. 2. The latest version of "Tool to calculate emission factor" is not referred in section B.6.3.	3-k-i	1) PDD is revised to include the latest version of methodology in section A.4.2 and B.1. 2) PDD is revised to include the latest version of Tool to calculate emission factor for an electricity system i.e. Version 2.2.1 EB 63. Also latest version of additionality tool is used i.e. version 6.0.0 to demonstrate the additionality in section B.5	PP has used the latest version of approved methodology i.e. ACM0012 version 4. Also latest version of additionality tool and emission factor tools are used in latest revised PDD. Same is mentioned in section B.1 of the PDD. Therefore CAR is **closed.**
CAR-3: 1) The baseline discussion on power options in the absence of the project activity ("how the power demand would be met in the absence of the project activity"), rules out the option P1. However, P1 is the project activity itself, albeit without CDM benefits; and is therefore a realistic and credible option which can not be ruled out right in the beginning itself	3-n-iii	1) PDD is corrected in B.4 to include option P1 as an alternative option. Option P1 is a "Proposed project activity not undertaken as a CDM activity". This option is now taken for further analysis and Levelized cost of power generation is evaluated along with other alternatives. Based on the Levelized cost of all the alternatives, the option P1 was eliminated in the final outcome.	1) PP has included option P1 as per methodology under consideration for identification of alternatives of power generation. Levelized costs of final eligible alternatives were evaluated and alternative P1 was eliminated based on investment comparison analysis to arrive at most applicable baseline scenario.

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
2) Provide the expansion of abbreviation "BIFR" in section B.4		2) Expansion of BIFR is provided in PDD section B.4	2) Expansion of BIFR i.e. Board of Industrial and Financial Restructure" is provided in section B.4. Therefore CAR is **closed.**
CAR-4: 1) Calculation of weighted average simple operating margin emission factor in section B.6.3 is incorrect. Simple operating margin emission factor values are wrongly written in formula to calculate emission factor equal to 1.0167 tCO_2/MWh. 2) The PDD needs to provide supporting references for the sources of values considered such as PLF, auxiliary consumption that have been considered in section B.6.3	3-r-ii	1) PDD is corrected in B.6.3 taking into consideration CO_2 baseline Data base version 4 dated Oct 2008 by CEA. Emission factor is calculated using CO_2 baseline data for the year 2005-06, 2006-07 and 2007-08. The corrected emission factor for the grid is 0.8032 tCO_2/MWh. 2) PDD is corrected in B.6.3 by adding justification of PLF and Auxiliary consumption. Detailed explaining calculation are provided for Calculation of fwcm, Baseline cap "fcap" and "EG i,j,y"	1) PP has corrected the calculation of emission factor of the grid by using the CEA database version 4 which was the latest data available at the time of submission of PDD to DOE for validation. As per tool to calculate emission factor ver 2.2.1, calculation of simple OM is reported Ex-ante. Accordingly emission factor is determined once at validation stage by using 3-year-generation-weighted-average, based on most recent data available at the time of submission of CDM-PDD to the DOE for validation. The webhosting of PDD for global stakeholder consultation was done on 24/10/2009. Therefore data of 2005-06, 2006-07 and 2007-08 years was

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
			used. The emission factor calculated for the project activity is 0.8032 tCO_2/MWh. 2) PLF is reworked based on actual plant production data for past three years for 500 TPD kiln and 1 year data for 4x100 TPD kilns. Calculation of auxiliary power consumption is included in PDD and in excel sheet. Detail split up of auxiliary equipment is provided in PDD. Therefore CAR is **Closed.**
CAR-5: As per methodology ACM0012, all data collected as per monitoring plan should be archived electronically. Though the archiving of records is stated in section B.7.1, no details about the same (i.e. responsibility, procedures, etc.) are given either in section B.7.2 or in Annex 4.	3-u-iii	PDD is corrected in Annexure 4 under Monitoring plan by adding details about responsibility for archiving of records and procedures for managing uncertainties.	PP has provided the detailed monitoring plan in Annex 4 of the revised PDD. It is now specifically stating the archiving of all the monitored data in section B.7.1 in electronic form in dedicated computer. Also responsibility of archiving of monitored data electronically is rested with the CDM officer. GM of the power plant will be

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
			final responsible person. Since archiving procedures and responsibilities are now defined clearly in Annex 4 of the PDD, the raised CAR is **closed.**
CAR-6: The monitoring plan needs to include the following as separate monitoring parameters in the monitoring plan in section B.7.1, as it was seen during the site visit to LMEL's plant that there are individual meters to monitor these parameters. 1) electricity imports from the grid 2) electricity imports from DG set generation 3) auxiliary electricity consumed by the project activity 4) electricity supplied to the recipient plant (LMEL plant-DRI kilns and other manufacturing processes) 5) electricity exported to the third	3-u-iv	***Response-1:*** PDD is corrected in B.7.1 to include the monitoring data on the following parameters. 1) Separate grid electricity import parameter is not required to be mentioned in section B.7.1 as grid import power is only utilized for start up of power plant and it is monitored via auxiliary meters installed at project site. Therefore net power generation can be calculated as the difference of Gross generation minus auxiliary consumption involving any grid import also. Both the gross generation and auxiliary consumption is metered via separate meters in plant facility.	***Comment-1:*** 1) In revised PDD, detail description of monitoring parameters is not provided in line with the guidelines to complete CDM-PDD. Further metering arrangement at project facility is not clear from the monitoring plan in section B.7. Please provide the line diagram to understand the metering arrangement at project site.

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
party via grid		2) Electricity import from DG sets is not required to be included as monitoring parameter in section B.7.1. DG sets of 2x1010 KVA capacity are only provided to maintain the rotary motion of sponge iron kilns during power off situation. We are claiming the power generated by power plant displacing the grid power. Hence only gross generation minus the auxiliary consumption from power plant is considered for net power available for export and in-house consumption. 3) As per comment, auxiliary electricity consumed by the project activity is included as monitoring parameter in section B.7.1 of PDD. 4) Electricity supplied to the recipient plant (i.e. captive consumption in LMEL plant-DRI kilns and other manufacturing processes) is included as monitoring parameter i.e. "$EG_{export,y}$". Captive	2) Ok. It is checked by the validation team that DG power is only required to maintain the rotary motion of DRI kilns in case of power off situation. This is done to start the system faster when power supply starts. No production is possible with the DG power. Hence validation team accepts that the DG power is not required to be included as the monitoring parameter as power requirement will be met through only grid import in case of power plant shut down or during maintenance period. 3) The PP has provided an explanation to the query raised. 4) Electricity supplied to recipient

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
		consumption is monitored via meter designated as Me3. 5) Electricity exported to the third party via grid is also included as monitoring parameter in form of EGi,j,y only as above. It is second recipient plant apart from the LMEL facility of electricity generated from project activity. ***Response-2:*** 1) PDD section B.7 is now revised to provide description of monitoring parameters in line with the guidelines to complete CDM-PDD. Also the schematic diagram for metering arrangement at project site is provided for monitoring all the electricity generation, export and import parameters in section B.7.2.	plants i.e. captive consumption in LMEL and surplus power export to the third party via wheeling through grid is included as monitoring parameter in form of "$EG_{export,y}$." Captive consumption in LMEL plant is monitored via Me3. Whereas surplus export power is metered via Me4. "$EG_{export,y}$." is calculated from gross energy supplied to the recipient facilities after deducting the auxiliary consumption and applying the *fwcm* factor to account for only WHRB based power generation from project activity. 5) Refer above comment for point 4. ***Comment-2:*** 1) Description of all the monitoring parameters is now provided in line with the guidelines to complete CDM-SSC-PDD. Further the monitoring arrangement in project activity is now clear with inclusion of

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
			schematic line diagram of metering arrangement. Therefore CAR is **closed.**
CAR-7: Starting date of the CDM project activity is not in line with the definition of start date given in EB41, Para 67 report.		Starting date of the project activity initially taken as board resolution date for the project activity. However it is now revised in line with the start date definition in CDM EB guidance. Project start date is taken as the purchase order date for power plant as 15/03/2007 which is the earliest real action.	PP has now considered the project start date as the purchase order date instead of board resolution date for the power plant. This is real action taken to start the project by PP. Therefore starting date of the project activity is now mentioned in line with the definition of start date of project activity as per CDM EB guidance. Therefore CAR raised is **closed.**
CAR-8: The grid or power trading company and the recipient plant (i.e. LMEL's steel manufacturing plant) to which electricity generated by the project activity power plant would be exported is not included in the project boundary. Please correct in line with the definition of project boundary as per ACM0012	5-c-a-i	Please note the project boundary described in B.3 is in line with methodology. The methodology the geographical inclusion of the entities as broad boundary. But physical boundary of the project activity can only include 5 WHRBS, Turbine, piping connecting the boilers, electric systems up to the delivery of electricity to the point of pick up by grid and LMEL. The exported	Project boundary as per ACM0012 version 4 covers the geographical extent of relevant WECM stream(s), equipment and energy distribution system in "Project facility" and in "Recipient facility". In case of project activity project facility is same as recipient facility i.e. LMEL plant. Hence for recipient facility LMEL, power distribution panel to LMEL

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
version 4.		power is sold in spot market by power trading company and hence it is not possible to identify the end users of exported electricity and physically not possible to include in project boundary.	captive consumption is included in project boundary. Moreover, the surplus power exported to the third party via wheeling it through grid can be included in project boundary. However the end users of third party consuming the power are not identifiable, since the power is traded in spot power market. Hence it is assumed that only grid power is displaced by the project activity. Hence export meter of MSETCL provided by official of grid is included in project boundary. Therefore the raised CAR is **closed.**
CAR-9: The notations used in the equations (section B.6.1) do not match those in the methodology. Use of subscript notation is not seen (applies to all sections, wherever appearing). The same practice should be followed	5-e-b	PDD is corrected in B.6.1and in all sections to include the correct notations and same is done in other sections of PDD.	PP has corrected the equations along with actual notations and nomenclature as per methodology ACM0012 version 4 throughout the PDD. Therefore CAR is **closed.**

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
through out the PDD.			
CAR-10: It is not explained how the parameter $Q_{WCM, BL}$, which is a value to be determined ex-ante at the time of validation, is arrived at in relation to the pre-existing production levels of the DRI kilns of LMEL plant, (i.e. before the start of the project activity). The value applied for this parameter-210,000 Nm^3/hr (in section B.6.2) is sourced from process data sheets of M/s. ERK Germany; however, how this value is also related to the pre-existing production level is not explained.	5-e-b-i-5	***Response-1:*** Average quantity of WECM i.e waste gas released in atmosphere in three years prior to start of project activity i.e. "$Q_{WCM,BL}$" is calculated equal to 210,000 Nm^3/hr based on the DRI kilns production data . The same is corrected in section B.6.2 ***Response-2:*** PDD is corrected in B.6.3 to arrive at $Q_{WCM,BL}$ by using the available production data of LMEL for three years prior to project start date i.e. 15/03/2007. A) Sponge Iron production data is considered from 01/04/2004 up to 31/03/2007 for 1 x 500 TPD Kiln. Average of three year production data is considered to arrive at annual	***Comment-1:*** Please explain in detail how the quantity of waste gas released in atmosphere in pre-project scenario is calculated. Also provide the historical data with supportive evidences and calculation spreadsheet to cross check the correctness of the values. PDD does not provide the calculations of "$Q_{WCM,BL}$" in B.6.3 of PDD. Please correct the same. ***Comment-2:*** PP has provided the three year historical data of DRI kiln operation in LMEL plant before the start date of project activity. The same is verified from the log book record by validation team. Again annual production figures for three years are validated from audited balance sheets. The correctness of

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
		average sponge iron production. The annual average production figure for 1x500 TPD kiln is 93,288.3 Tonnes/yr. Other 4 x 100 TPD kilns start full operation from April 2006. Therefore sponge iron production data for 4x100 TPD kilns taken from April-2006 to March-2007. Data is selected for one year only as operational history of all four 100 TPD kilns is less than three years. The annual average production figure for 4x100 TPD kiln is 92,205 Tonnes/yr. Therefore "$Q_{BL,product}$" is equal to **185,493.3 Tonnes/yr.** B) The quantity of WECM i.e. waste gas is calculated by multiplying the actual production data of sponge iron production by LMEL per year (tonnes) and multiplying it with WECM generated per unit of product in (Nm3/tonne). The specific WECM generation per unit of product is	calculation is checked as provided in B.6.3 and it is confirmed that average quantity of WECM i.e waste gas released in atmosphere in three years prior to start of project activity i.e. "$Q_{WCM,BL}$" is equal to 1.068 x 10^9 Nm^3/yr Therefore CAR raised is **closed.**

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
		based on manufacture's supplied data as per operational manual. For 1 x 500 TPD, Specific WECM generation per unit of product = 5,280 Nm3/tonne. For 4 x 100 TPD, Specific WECM generation per unit of product = 6,240 Nm3/tonne. Therefore "$Q_{WCM,BL}$" is calculated equal to 1.068 x 10^9 Nm^3/yr. The same is corrected in section B.6.2	
CAR-11: Refer section B.5 in the PDD: the alternatives to the project activity are not clearly stated.	6-b-i	PDD is corrected in step 1 of B.5 to include the realistic and credible alternatives as identified in section B.4 of the PDD. All the plausible and realistic alternatives to the project activity are identified and listed in section B.4 of the PDD in line with the methodology ACM0012 version 4. After scrutinizing each of the alternatives for power generation, alternatives P1, P8	Final three credible and realistic alternatives i.e. P1, P8 and P10 to the project activity are listed in section B.5 which is finalized after analysis of all the listed alternatives in section B.4 of the PDD in line with the ACM0012 version 4. Therefore CAR is **closed.**

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
		and P10 were arrived at. They are now listed in section B.5.	
CAR-12: Revenue considered for IRR calculations should be based on the expected savings accrued due to cash outflow for purchase of grid power.	6-p-i	We are now considering the revenue saved on internal captive power consumption which would have sourced from the grid in the IRR calculation model. The average grid power cost for the period from February-2006 to September-2006 i.e. before the decision date is taken as the cost of power saved due to captive power consumption in LMEL facility. Also escalation of 1% is considered on annual basis in unit cost of power to account for inflation. 1% escalation is worked out by referring to power cost during the 1996-97 year i.e. 3.6 Rs/unit from the audited balance sheet of 1996-97 year. Grid power cost during the 2006-07 was 3.77 Rs/unit which is actually checked from original electricity bills. Hence there is escalation of 0.45% over the 10 year	PP has now considered the cost of power saved and thereby cash outflow saved due to implementation of project activity under head “sales inside”. This will be another revenue stream apart from sell of power to outside third party. This gives the conservative estimates for comparison of Equity IRR which is compared with benchmark RoE. Validation team accepts the conservative approach. Therefore CAR raised is **closed.**

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
		period. Therefore 1% escalation in grid power cost is conservatively considered as cash inflow in IRR financial model.	
CAR-13: The link provided under technological barriers for www.steelworld.com/magmay2006 is not working. Also www.steelworld.com/magjan2007 is not working.	6-t-ii	PDD is revised so that only step 2 investment analysis is used as per additionality tool. Hence this CAR is not applicable. (However if needed please note that the site has been updated to include 2008 on wards. There is no provision to go to older years. Hence downloaded pdf version may please be accepted.)	Barrier analysis for additionality is removed from the PDD by the PP. Hence reference to links is not required. Therefore CAR is **Closed.**
CAR-14: For prevailing practice barriers study of captive power plants in India in august 2005 is provided. a) The information presented in the PDD in section B.5 on additionality is	6-t-iii	PDD is revised so that only step 2 investment analysis is used as per additionality. Hence this CAR is not applicable. a) The information is from www.unfccc.int site. We are enclosing	PP has removed the barrier analysis from PDD for justification of additionality of project and only step 2 i.e. investment analysis is shown. Hence raised CAR is redundant. Therefore CAR is **Closed.**

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
not backed up with the references of their sources. , e.g. the claim that 48 projects are pursuing CDM out of 227 sponge Iron manufacturing companies. b) Prevailing practice barriers can be regarded only if applying to the technology of the project activity. The technology, viz., waste heat recovery is not a first of its kind as there are several WHR plants operating in the geographical region. The project participant is requested to explain how the project activity could be regarded as a first of its kind in terms of the technology employed.		the list of projects considered in appendix 3 of PDD as this information is used in Step 4 of B.5 The project activity involves 5 numbers WHR Boilers for 4x100 TPD and 1x500 TPD kilns and one turbine. The projects normally have 1-3 kilns and that too of higher capacity kilns. This combination has higher uncertainty as the kilns face regular maintenance shut downs. Hence the project activity is different from other 48 projects.	
CAR-15: PP needs to provide the actual data source link for the information provided from www.simaindia.org website to access the data or information directly. Also provide the link for JPC survey report as mentioned in PDD.	6-x-i	SIMA is referred as "Sponge Iron Manufacturers Association" and their web address is www.spongeironindia.in. DRI UPDATE of May 2007 referred in the PDD is their old publication and same is not available on their site. We are enclosing full scanned copy of the issue. The site carries only their latest issue.	Barrier analysis is removed from the PDD. Hence this CAR is not relevant and **closed.**

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
		The JPC report referred is available at http://cdm.unfccc.int/filestorage/7Q2KJZ3UEL2RWWO8B44D7XBSEEKBFH/Survey%20of%20Indian%20sponge%20iron%20Industry.pdf?t=ck58MTI5MDgzOTc4Ni4zNQ==|FAjUS0Cd90Lbfmhit4MvXJO3jWE=	
CAR-16: Sub step 4b states that WHRB is not recommended for 100 TPD and lower capacity plants as the same is not viable. Please provide correct web link in PDD to support this statement.	6-x-ii	Sponge Iron Industry March 2007 publication available on central pollution control board of ministry of environment and forests page 110 HAS THIS RECOMMENDATION, Same is available on www.**cpcb**.**nic**.in/upload/NewItems/NewItem_102_**SPONGE_IRON**.pdf *page 110. However down loaded pdf document can be made available to DOE as there is unceratainity on maintenance of site.*	Barrier analysis is removed from PDD hence this CAR is redundant. Therefore raised CAR is **Closed.**
CAR-17:	6-c-uu-i	***Response-1:*** PLF considered are justified in PDD in	***Comment-1:*** Response is not clear. Please

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
The values of Plant Load Factor (PLF) considered as 70% in first year and 80% from second year onwards (for the project activity) and as 90% for the baseline coal based CPP need to be suitably justified		B.6.3 and in B.5 by providing calculations for WHRB based power generation. As baseline selected is grid electricity, therefore Coal based power plant data is not applicable as investment analysis has been done on bench mark basis. ***Response-2:*** PLF is calculated based on three methods as described in section B.6.3 of PDD. *Method 1: PLF based on actual sponge iron and flue gas produced.* PLF worked out by method-1 as 69.31% *Method 2: Based on design steam generation data as provided to Boiler Manufacturer by licensor M/s ERK Eckrokessel, Germany.* PLF worked out by method-2 as 66.4% *Method 3: Based on Sponge iron production data of the industrial facility from start date.* PLF worked out by method-3 is in the range of 60 to 70%. Hence average	provide the detail calculation of PLF along with the production data. Also provide the calculation in excel sheet. ***Comment-2:*** PP has demonstrated the PLF by three methods and conservative PLF of 70% in first year and 80% PLF in subsequent year is selected. Validation team cross checked the correctness of calculation by verifying the production data for prior three years from start date of the project. It is seen that from all three methods PLF is approximately 70%. Therefore validation team accepts the justification of 70% PLF in first year and 80% in subsequent years. Therefore raised CAR is **closed.**

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
		PLF by method-3 is considered as 70%. However from second year onwards we aim to achieve the PLF up to 80% by more efficient operations. For calculation of PLF, all the production data and detail PLF calculation by all three methods is provided in section B.6.3. Also excel sheet is provided to DOE to cross check the authenticity of PLF calculation.	
CAR-18: The following inadequacies in the monitoring plan are required to be addressed : 1) As per the monitoring methodology in ACM0012, one of the monitored parameters should also be feed water flow rate and feed water temperature for each WHRB and FBC boiler as the computation of the values of ST_{whr} and ST_{other} would involve the same. Also, these values are required to be computed as the difference between	7-d	1) For calculation of "STwhr" and "STother" which are the enthalpy of steam from waste heat recovery boiler and enthalpy of steam from other fossil fuel coal fired boiler requires the monitoring of steam temperature and pressure only. Steam table will be used to calculate the enthalpy of steam in WHR and other boilers at monitored temperature and pressure of the steam. Conservative enthalpy values will be taken for calculation of baseline emissions.	1) Section B.7.1 includes the monitoring of steam pressure and temperature parameters. Enthalpy of steam will be calculated from steam tables at specified temperature and pressures monitored. Corresponding web-links of steam table is provided under each parameter in section B.7.1. Hence response provided by the project proponent is accepted

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
output enthalpy of steam and feed water (returning condensate), for each boiler. 2) The PP needs to clarify how vented steam from each boiler is accounted for. 3) Following parameters are also required to be monitored, as per the monitoring methodology in ACM 0012. However, these parameters are not included in the monitoring plan. a) Quantity of coal combusted in FBC boiler. b) NCV of coal fired in FBC boiler c) Electricity import for project activity from grid (if any) d) Any electricity supplied by DG sets during project plant shut down, DG consumption etc)		2) The steam generated from each boiler is metered after the vent connections by steam flow meter. The common steam header which receives the steam from boiler does not have vent connection. Therefore all the steam from common header is taken to for operation of STG and flow meter is provided for the same. Therefore vented steam is not required to be taken into consideration. 3) ACM0012 requires monitoring of fuel if only used as supplementary fuel. WHR Boilers do not use any supplementary fuel. Steam produced in fossil fuel based FBC boiler is "other steam" as per methodology which is monitored to arrive at "fwcm" factor. It is the fraction of total electricity generated by the project activity using the waste energy. Therefore quantity of coal and NCV of coal are not required to be monitored.	2) Ok. Closed. 3) Validation team accepts the justification provided by the project proponent as only steam and its enthalpy from FBC boiler is required to be monitored for calculation of "fwcm" factor. For calculation of baseline emissions as per equation 3 of methodology, there is no requirement of quantity of coal and it's NCV. Therefore these parameters are not included as monitoring parameters. Further the grid import power, if any, for start up of plant is monitored via auxiliary meter. Auxiliary consumption is monitored via four sub meters. In case of DG set, DG power is only

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
		Further electricity import from grid is only required during initial start up of power plant which is monitored through auxiliary meter at plant location. There is no power received from the DG sets which can be used for production of sponge iron or for operation of power plant. Hence DG set power is not required to be monitored.	used to maintain the rotary motion of DRI kilns during the power off situation. This helps to start the production process immediately once power gets restored. This was validated by validation team during site visit. Therefore justification provided by PP is accepted and CAR is **closed.**
CAR-19: 1) In section B.7.1 of PDD, Methodology requires $Q_{WCM,y}$ to be monitored in terms of mass units. However the units chosen are volumetric (Nm^3) 2) Parameters like $Q_{WCM,y}$ and $Q_{WHR\ steam}$ are stated in the monitoring plan as a single parameter, when they are actually the sum of the $Q_{wcm,y}$ values for each WHRB.. 3) Method of measurement: "Average	7-f	Following changes are made in PDD in section B.7.1 in response to CAR raised. 1) "$Q_{WCM,y}$" i.e. Quantity of waste gas used to generate electricity during the year y is monitored in terms of mass units. i.e. in Kg/year. 2) Parameters like $Q_{WCM,y}$ and $Q_{WHR\ steam}$ are stated in the monitoring plan as the sum of the individual values of $Q_{wcm,y}$ and $Q_{WHR\ steam}$ for each WHRBs. The quantity of waste gas from each DRI Kiln going to the WHRB is	1) "$Q_{WCM,y}$" parameter is now specified in terms of mass units i.e. in Kg/year in section B.7.1. 2) Response provided is accepted. 3) Ok. Arrangement for totalized data monitoring is mentioned. However in case of multiple monitored values, the most conservative assumption will be made.

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
hourly reading is calculated" needs to be explained for all metering parameters in B.7.1. It is not clear why the measurement would not be done by taking the difference between end reading and start reading. The monitoring plan needs to clarify if totalized data or provision of totalizer is available for each meter.		monitored individually by flow meter. Same is reported as the combined value under parameter $Q_{WCM,y}$. Similarly the steam generated in each of the WHR boilers is monitored separately by steam flow meters. Total quantity of steam going to STG is reported under parameter $Q_{WHR,steam}$. 3) Totalized data is available for each flow meter. In case of multiple values of monitored parameter, most conservative assumption would be made.	Therefore raised CAR is **closed.**
CAR-20: 1) Procedure to be followed in case meter/s found to be out of calibration is not described in the monitoring plan. How will the data uncertainty will be taken care of in such cases as also the effect on previously recorded readings is not explained?	7-i-iii	PDD is corrected in Annex 4 to describe the procedures to be followed in case of data uncertainty during monitoring of various parameters. 1) In case measuring devices and meters involved in project activity does not get calibrated within stipulated timeframe, then error corresponding to	Detail monitoring plan is provided in revised PDD under Annex 4 of the PDD. PP has described the detail monitoring plan along with the data uncertainty procedures to be followed in case calibration frequency not maintained during verification period. Moreover the every energy meters including for in-house consumption,

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
2) The monitoring plan does not describe fail safe measures to take care of the data loss or inaccuracy that could arise as a result of meter malfunction/ stoppage. During the site visit, the validation team observed that there are no secondary meters that could be used as stand by. The project participant needs to explain how situations arising as a result of meter malfunction or inaccuracy would be taken care of, since there are no standby arrangements for the same.		the accuracy class of meter will be applied in line with the guidelines for compliance with calibration frequency requirements, EB52, Annex 60. Details are provided in Annex 4 of PDD. Further the corresponding error observed during monitoring of energy values or other measurement values will be applied to all the readings till last calibration date of the meters to have conservative calculation of emission reduction. 2) Fail safe measures to avoid data loss or inaccuracy is ensured by providing mandatory spares to replace immediately the faulty meter. In case of flow meters, temperature and pressure gauges one number of mandatory spare for each type of transmitter will be maintained so that failed transmitter can be replaced immediately. Still in case of loss of data, the readings missed for the period will be calculated from the monitored readings of other individual and common meters before the STG.	auxiliary consumption, export to grid and gross generation, are provided with spare energy meters to tackle the situation of failure of meter during verification period. Hence stated monitoring arrangement at plant site is feasible and can give data to estimate correct emission reductions. Therefore validation team accepts the correction made in the PDD and CAR is **closed.**

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
		This is possible as multiple metering systems are installed in power plant. 1 number of mandatory spare for each type of energy meter will be maintained so that failed meter can be replaced immediately. Auxiliary meters as well as export energy meter along with the captive consumption meters have spare meters installed at plant location. Therefore in case of faulty working of any of the meter, data from other meters will be referred for emission reduction calculation.	
CL-1: For demonstration of use of waste energy in the absence of CDM project activity, EIA report is provided to DOE having Mar 2007 date. PP needs to clarify the date of the report as it is not matching with June 2005 mentioned in the PDD.	3-n-ii	EIA report of 2005 is for expansion planned i.e four additional 100 TPD kilns. This report is referred as proof that water scrubbers were used for cooling flue gases. EIA report of 2007 is especially for power project.	Explanation provided is accepted. EIA report of June 2005 which is carried out by the M/s Eco Engineers has elaborated the use of waste energy in flue gases before project activity, wherein the waste hot gases were treated by passing through water scrubber subsequently to ESP and then

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
			released to atmosphere. Whereas the EIA report of Mar 2007 was prepared for 25 MW project power plant. Hence CL is **closed.**
CL-2: In section B.5 of PDD following statement needs to be clarified further. "…The additional 4 number WHRB steam will improve the PLF of CPP and a new turbine can be added for use along with existing turbine to increase the electricity generation at a later date…" The statement is not clear as to whether it refers to WHRB's to be added in future or the present WHRB's?	3-o-iv	The corresponding statement is now removed as the project activity is only for recovery of waste heat from 4X100 TPD and 1x500 TPD kilns to produce the steam by 5 WHRBs and run 30 MW turbine by additional supporting steam supply from 90 TPH fossil fuel boiler. The order placed on power plant supplier LSIL on 15/03/2007 is also for 5 waste heat recovery boilers only. The expansion of 4 WHRBs at LMEL plant site will happen in future and will be taken separately for CDM registration. Board resolutions clearly states that the 25 MW generation is from 5 waste heat recovery boilers. The board referred to 4 additional boilers which will be installed when additional 4x100 TPD kilns are installed in future as planned expansion. LMEL have consent to	Response provided to clarification request is accepted and CL is **closed.**

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
		establish these kilns issued on 20/02/2006. But the expansion activity has not yet started as on this day. When additional 4 boilers come along with kilns LMEL will approach for CDM EB registration considering it as new project activity.	
CL-3: It is stated in the PDD that LMEL exports surplus power to Power trading company which supplies power to consumers not identifiable but normally uses grid power. However it is not clear whether all the consumers use grid power only. In such case, each such end user of the emission free electricity generated as a surplus by LMEL and exported (wheeled) through grid/Indrajit would have their own respective baselines. Each of such baselines has to be taken into account for Emission Reduction calculation. Please Explain	3-p-i	As Project activity is yet not supplying electricity to IPTPL. It is not possible to identify consumers at the moment. As it is established fact that in India all consumers receive their electricity from grid. Hence the baseline for such consumers is grid only. Grid emission factor is conservative. LMEL has taken grid as baseline and calculated CERs.	The validation team agrees with the response of the PP. The project activity exports surplus power to the grid. Hence, the grid itself can be regarded as a recipient without the need to look further into the individual baselines of the grid power users. Also, it is a known fact that most of the consumers receive their power supply from the grid. As the power generated by the project activity is due to the utilisation of waste heat and no fuels are consumed that would give rise to emissions, the power exported displaces equivalent amount of power that would have been

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
			generated in the grid by the predominantly fossil fuel based plants connected to it. Hence, the CL is **closed.**
CL-4: Project description in the section A.2 shows that FBC boiler will supply 13.2 TPH steam, however in section B.7.1, the quantity of steam from FBC boiler is mentioned to be 20,000 kg/hr (i.e. 20 TPH) which is contradictory. Please clarify rated capacity of FBC boiler and provide technical details in section A.4.3 of PDD.	3-t-ii-a	Waste heat power generation at rated capacities of 5 WHR Boilers generate 103 TPH steam which is capable of generating 25.24 MW electricity. At optimum conditions the boilers can generate 109.2 TPH steam which can generate 26.76 MW. 30 MW requires 122.4 tonnes/hr of steam. Therefore additional 13.2 tonnes steam was arrived after taking optimum steam of 109.2 tonnes 122.4-109.2 =13.2 tonnes PDD is revised in section A.4.3 to replace optimum capacity by rated capacity when WHR steam generation is 103 TPH. Therefore required FBC steam will be 123-103= 20 TPH even	WHRBs rated capacities are mentioned now in PDD and 20 TPH steam requirement from FBC boiler in normal operating conditions is justified. Hence clarification provided is accepted. Therefore CL is **closed.**

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
		though FBC boilers rated capacity is 90 TPH. FBC steam quantity = 122.4- quantity of steam generated by WHRB The rated capacity of 90 tonnes/hr for FBC boiler is kept to take care of situation when 500 tpd kiln and one 100 tpd kiln going for shut down simultaneously which will lead to a situation of only 36 tonnes/hr of WHRB steam generation and shortage of 86.4 tons/hr of steam (122.4-36) for power generation leading to turbine not being operated healthily. PDD is revised in A.4.3 accordingly.	
CL-5: Clarify how the project activity was described to all stakeholders so that they could understand it and provide their comments.	3-gg-ii	PDD is revised to include how the information was provided to stake holders. The project activity was explained in personal meeting with stake holders by company officials.	PDD is providing the information as how local stakeholders were informed about the project activity so that they could understand it and provide their comments. Company officials met with the representative

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
			of village level governing body i.e. "Panchayat" who is headed by "Sarpanch". They appraise the project activity to the members of Panchayat. And after fortnight, Stakeholder's meeting was conducted by company officials in Ghugus village on 09/02/2007. Therefore CL is **closed.**
CL-6 a) Project participant to explain the Power requirement for the LMEL sponge iron plant in pre-project scenario and how that power requirement was being met. b) The project participant is also requested to provide full details of the Power demand Vs Supply and export in the project scenario	4-a	***Response-1:*** PDD is corrected in section A.2 to include power requirement in pre project scenario and post project scenario and also possible surplus power for export. ***Response-2:*** Stated power requirement of 14 MW was typographical error. PDD is revised now in section A.4.3 as per guidelines to complete CDM-PDD to clear the confusion. Power requirement in pre project	***Comment-1:*** Section A.2 of PDD is updated with the power requirement in pre-project scenario which is approximately equal to 14 MW for total LMEL facility. After addition of project activity power requirement for total LMEL facility is 6 MW. Where as expected power generation is mentioned as 21 MW which will provide 15 MW as surplus power for export after deducting 6 MW of internal power requirement. PP needs to clarify how the power

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
		scenario is as follows: 1) Existing machinery power requirement is - 3.5 MW. This power requirement is met from MSEDCL grid as follows: MSEDCL Grid connected load - 6.914 MW MSEDCL Grid demand load - 3.5 MW Grid connected load means the total electrical load of all electrical appliances. Demand load is the maximum electricity allowed to be drawn at any particular moment. Hence they are not to be added. 2) Power plant auxiliary consumption is 2.5 MW. Therefore total LMEL internal power consumption will be 3.5 +2.5 = 6 MW. Considering the 70% load factor total power generation from 30 MW power plant would be 21 MW. Hence surplus power available for export would be 21-	requirement of LEML is varying drastically from 14 MW to 6 MW after implementation of project activity. ***Comment-2:*** Power requirement of LMEL facility is 3.5 MW and auxiliary consumption of power plant is 2.5 MW. This will add up to 6 MW of internal power requirement. Hence surplus of 15 MW will be available for export considering the 21 MW power generations at 70% load from 30MW captive power plant. The detail split up of power demand Vs supply from power plant is provided in tabular format in section A.4.3 of PDD. Therefore CL raised is **closed.**

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
		6 = 15 MW.	
CL-7 The gross electricity generation estimation has been made on the basis of the installed capacity of the WHRB power generation stated as 25 MW (section B.6.3). It is to be noted, however, that the project activity involves setting up not only the 5 nos. of WHRB's but also 1 no. FBC boiler and the capacity of the combined power plant (in the project activity scenario) is 30 MW (as also seen from the Technical Concept Profile prepared by M/s. HIQ Power Associates Pvt. Ltd.). Therefore, the gross generation estimate is required to be in relation to 30 MW and not 25 MW. Project participant is requested to clarify.	5-e-b-i-6	***Response-1:*** PDD is developed only for 25 MW waste heat power generation because at rated capacities 5 WHR Boilers generate 103 TPH steam which is capable of generating 25.24 MW electricity. At optimum conditions the boilers can generate 109.2 TPH steam which can generate 26.76 MW. Section B.6.3 is revised to start with gross electricity generated by 30 MW turbine power generation capacity which involves the 20 TPH steam from FBC boiler. Out of the total power generation of 30 MW, the waste heat based electricity generation from WHRBs is arrived by using equation 34 of ACM0012 version 4, i.e. by calculating "f_{WCM}". It is fraction of total electricity generated by the project activity using waste energy.	***Comment-1:*** PDD is now corrected to calculate the emission reduction based on 30 MW of power generation and corrected by fraction "fwcm" to arrive at electricity generated by project activity i.e. contribution of WHR power of 25MW. Justification for 0.7 PLF considered for first year and then 0.8 PLF considered in next year is provided. However calculation of 9% auxiliary consumption is not clear as how it is arrived at.

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
		The above explanation is provided B.6.3 of PDD. ***Response 2:*** In section B.6.3 of PDD, auxiliary consumption of 9% is substantiated with greater details with power consumption details of all the equipments in project activity. Also the detailed break up of all auxiliary power consumption units and calculation is provided in tabular format.	***Comment-2:*** The PP has provided a satisfactory justification for the auxiliary power consumption and hence, CL raised is **Closed.**
CL-8 1) The details of FBC coal fired boiler are not specified in the project activity description in A.2. Whether it was pre-existing before proposed project activity or would be installed new as a part of project activity, is not clear from the description. 2) The total number of WHRBs installed in the project activity is not apparent from the description in the PDD in section A.2. Is it 5 or 9? The Board resolution letter also does not clarify the		***Response 1:*** 1) PDD is corrected to include clarification on FBC as it is being installed new along with WHRBs and did not exist prior to project activity.	***Comment-1:*** 1) Section A.2 of the PDD is updated with the details of 90 TPH FBC coal fired boiler. It is newly installed boiler after the installation of 5 WHRBs installed with small time lag. (4 kilns of 100 TPD will produce rated 12 TPH x 4 = 48 TPH steam) (1 kiln of 500 TPD will produce rated 55 TPH steam). Total steam requirement to operate 30 MW turbine is 122.4 Tonnes/hr. The rest amount of 20 TPH steam will come from FBC boiler. 90 TPH FBC boiler was newly installed to take

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
same. 3) The pre-project description does not include the 2 nos. diesel generating sets within the LMEL plant, which come into play during situations of power outage of the grid, etc.		2) PDD is corrected to include this clarification. Total numbers of WHRB boilers installed in project activity are 5 which are installed on individual 5 kilns i.e. (4x100 TPD & 1x500 TPD kilns). 3) PDD is corrected in A.2, to include the information on DG sets. However DG sets are only provided to support the rotary motion of DRI kilns in case power off situation occurs. Once power gets restored the DRI kilns can be immediately started and takes into operation. There is no production possible by supplying power through DG sets. ***Response 2:*** Board resolutions clearly states that the 25 MW generation is from 5 waste heat	care of situations when 500 TPD kiln and one 100 TPD kiln is shut down simultaneously causing total shortage of 86.4 tonnes/hr of steam. Detail description provided in the PDD is accepted. 2) Board resolution letter does not specifically clarify the number of boilers operating in the project activity and planned expansion in future. i.e. 4 more 100 TPD kilns with 4 more WHRBs for additional power generation. Clarify. 3) PDD now mentions 2 x 1010 KVA DG sets available in pre-project scenario which will operate to provide the power for maintaining rotary motion of DRI kilns in case of power failure.

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
		recovery boilers. The board referred to 4 additional boilers which will be installed when 4x100 TPD kilns are installed in future as planned expansion. LMEL have consent to establish these kilns issued on 20/02/2006. But the expansion activity has not yet started as on this day. When additional 4 boilers come along with kilns LMEL will approach for CDM EB for registration considering it as new project activity. Moreover it is to be noted that the order placed on power plant supplier LSIL on 15/03/2007 is also for 5 waste heat recovery boilers only. Hence corrections are made everywhere in PDD to include 5 WHRBs and reference to additional expansion is removed.	***Comment-2:*** The explanation provided here is now accepted. Validation team have verified the consent to establish obtained for new additional planned 4x100 TPD kilns dated 20/02/2006. Therefore it is now clear that 4 new WHRB boilers will be installed in LMEL facility after expansion of sponge iron manufacturing plant. However the CDM project activity is limited up to 30 MW STG operations by 5 WHRBs and 1 FBC fired boiler. Effectively 25 MW of power generation from 5 WHRB boilers. Therefore CL is **closed.**
CL-9 Licensed capacity of the LMEL plant is stated as 3,90,000 tonnes per year (Refer paragraph "Background of the	4-a	PDD is corrected to delete this information as it is superfluous and erroneous. The company as per balance sheet considers 240,000	Company balance sheet for the year 2005-06 is providing production capacity of 240,000 TPA. One 500 TPD kiln operating from

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
Company"-section A.2). However, the consents to operate issued by the State Pollution Control Regulator, are for a total of 12,000 + 15,000 =27,000 tonnes per month only. This would come to only 3,24,000 tonnes per year. Please clarify the actual operating capacity that is permitted under the statutory requirements.		tonnes as installed capacity. Consent to operate for 500 TPD kilns indicate 150,000 tonnes as annual production. This considers 300 days working in a year while actual working days for 500 TPD kiln during 2005-06 was 264 days.	1997, is producing 150,000 TPA. Additional 90,000 TPA capacity is from 4 x 100 TPD kilns which got consent to operate dated 27/02/2006. It is confirmed from the balance sheet for 2006-07 that actual production for the year 2006-07 is well below the installed capacity of 240,000 TPA. Therefore justification provided by PP is accepted. The erroneous value of 3,90,000 TPA is removed from PDD. CL is **closed.**
CL-10 1) Project participant to clarify how much power is exported (wheeled) via grid to consumers of the third party (i.e. Indrajit Power technology Pvt. Ltd) 2) The project participant needs to	4-a	***Response-1:*** 1) PDD is corrected in section A.4.3 to include the excess power quantity for export which is 15 MW presently. PPA between LMEL and IPTL attached. 2) As project activity has not started	***Comment-1:*** DOE have received the power purchase agreement copy between LMEL and M/s Indrajit power which specify the purchase of up to 15MW surplus power available for export from LMEL captive power plant.

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
clarify how many consumers are beneficiaries of the power supplied by 3rd party. Names of these consumers may be provided. It is not clear how the contract between LMEL and Indrajit Power technology Pvt. Ltd. also binds each of such consumers. 3) It is stated that consumers of the 3rd party Indrajit Power Technology were users of the grid power. The validation team requests evidence of the same from the project participant.		supplying electricity to IPTPL it is not possible to identify the consumers. LMEL and IPTPL have signed the MoU for sell of power. In the MoU, binding clause is put up for IPTPL and their consumers so that they will not claim credits for using WHR electricity which is produced using zero emission source. PDD is corrected to include this clarification in B.2. 3) Grid is the main supplier of electricity in India to all consumers who do not have their generation capacity or have only part generation capacity. Hence Grid is considered as baseline source of power. Once LMEL starts supplying electricity to IPTPL then only consumers of this electricity will be identified. Grid electricity is having the low emission factor and hence conservative.	2) Validation team have checked the MoU signed between LMEL and IPTPL for sell and purchase of surplus power from project activity. IPTPL will be selling this power in power exchange market. Therefore it is difficult to identify the final power purchaser. However, IPTPL as per MoU will ensure that their power purchaser of LMEL WHR power will not claim the credits for using zero emission power source. Again once the power is injected via grid it is impossible to identify the source of power and can be consider that only grid power is displace by the project activity. 3) Ok. Response provided to CL is accepted. CL is **closed.**

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CL-11: 1) The justification offered against applicability condition requiring that waste energy released under abnormal conditions not be accounted for, is inadequate and needs to be explained further. The "abnormal conditions" referred to that can occur, causing unintended release of waste energy are not specified. 2) Justification offered for the applicability condition pertaining to constraints on fossil fuel use lacks clarity and needs to be re-worded (section B.2)	5-b-c-7	PDD is revised in section B.2 to include the abnormal conditions of boiler shut down and kiln shut down.	Abnormal condition identified in section B.2 of the PDD are i) In case WHR boilers are in shut down mode, waste gases have to be diverted through top of ABC chamber to atmosphere. Hence WHR boiler will also get shut down and no power generation is possible. ii) In case kilns are in shut down mode then for that individual kiln no waste gases will get generated. Less quantity of flue gases may get available from other operational kilns which will produce less quantity of power by contribution of waste heat. This will be taken care by calculation of "fwcm" factor. In either of the cases, only the waste gas which is passed through the boiler and steam is generated to produce the power is evaluated. Therefore no waste gas under abnormal condition will be taken into account for power generation.

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
			2) PP has provided the justification for applicability of point "c". Regulations do not constraints LMEL from using coal before the project activity. This is confirmed from the "consent to operate" received from MPCB for use of coal. Therefore CL is **Closed.**
CL-12: PP needs to clarify following: 1) Option P4: combination of coal based power plant and grid can not be ruled out on account of the reasons stated (unreliability of grid supply). The power requirement in pre-project was already met 100 % through grid. 2) Option P5, P7: justification is not appropriately worded.	5-d-b-i	***Response-1:*** 1) PDD is revised in B.4 to include rule out applicable options only in outcome at the end of option description as applicable or not applicable. . 2) B.4 is revised in P5/P7 to explain the justification in appropriately worded manner. 3) Shortage of power and load shedding is available on http://www.mahadiscom.in/consumer/why_load_shedding.shtm and please note grid is now taken as baseline in	***Comment-1:*** 1) Option P4 is explained further to rule out scenario of combination of coal based power plant and grid for power requirement of the plant. This combination is not preferred option as the same does not make economic sense. Full capacity captive coal based power plant is the best option economically considering availability of coal abundantly in surrounding area. 2) Option P5 and P7 are explained further in PDD and also in CL-7

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
3) Option P6: demonstrate the unreliability of grid supplied power through evidences. 4) Provide evidence that installation of WHRB is not a mandatory requirement by MPCB and also that there are no restrictions on setting up of a coal based CPP.		line with methodology and PDD is revised in P6 and hence reference to power shortage has been deleted. 4) Consent to operate issued by MPCB for operation of kilns do not have requirement of waste heat recovery boilers as mandatory requirement and hence consent to operate is evidence as it is issued by MPCB a government agency. ***Response-2:*** 1) PDD is revised as per ACM0012 version 4 and scenario P4 is now described as scenario P8 as per revised	above by PP. Justification provided above is accepted and closed. 3) Reference link of MSEDCL is giving information about load shedding in Maharashtra. However option P6 is now considered as one of the baseline options as it was business as usual scenario to LMEL i.e. plant was having MSEDCL grid connection for their power requirement. Hence this is accepted. 4) Please refer consent to operate issued by MPCB dated 01/04/2009 with consent number BO/PCI-II/EIC No. CH/NG-0028/1602-08/R/CC-130. Clause 5, A (ii) is directing LMEL to put waste heat recovery boilers for power generation on kilns with more than 100 TPD capacity. LMEL is having one 500 TPD kiln. PP needs to clarify this directive in terms of CDM requirement regarding said project activity.

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
		version of methodology. Combination of coal fired power plant along with the grid import is now removed from revised PDD as the same is not an economical alternative. 2) Ok. 3) Ok. 4) WHRB for more than 100 tpd kiln is recommended but not compulsory as there is no mandatory regulation is present at the moment. LMEL 500 tpd kiln is operating since 1997 with water scrubbed conditioning system. Consent to operate BO/Wardha/RONR/R/C-388 Dated 12/5/1997 is provided to DOE which does not have any recommendation. The same was renewed by letter BO/RONK/CHANDRAPUR-23/R/21-03/CC-89 DATED 7/5/2003 for the period up to 31/12/2007. WHRB based CDM project activity decision was taken by board decision of 28/10/2006 and	***Comment-2:*** 1) Ok. Response is accepted as full load captive coal power plant will be cheaper options as per Levelized cost sheet submitted to DOE. Hence combination of coal based power and grid import will not be economical alternative. Hence this option is removed. 2) Ok. Closed. 3) Ok. Closed. 4) Ok. Validation team have checked the consent to operate as per response provided by PP and found that no such regulation exists on PP to install the WHRB systems on kiln size more than 100 TPD at the time of decision making context. Hence response is accepted. Therefore CL raised is **Closed.**

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
		start date 15/03/2007 with placement of order for power plant. During this period WHRB recommendation was not mentioned in consent to operate. Both these consent to operate enclosed. Hence DOE may note i) At the time of board resolution and start date of project activity WHRB was not mentioned in consent to operate by MPCB. ii) No mandatory regulation exists for providing WHRB even today as it is only recommendation.	
CL-13: 1) The discussion on each of the baseline options for waste gas (W1, W2..etc) in PDD section B.4, does not clearly indicate whether that particular option is considered as applicable or not 2) The discussion for option P4 states that char/ dolachar could be used as	5-d-f	***Response-1:*** PDD is revised in B.4 to include outcome at the end of options to exclude the applicable option. The char/dolachar generation is by product of sponge iron manufacturing through DRI process. The quantity of char/dolachar is revised to the quantity of 48000 tonnes in line with consent to operate for 5 kilns.	***Comment-1:*** Each of the baseline options for power generation and use of waste heat is elaborated with proper justification for their inclusion/ exclusion to come at most probable baseline scenario. It is not explained as how the char /dolachar can be sourced from other sponge iron manufacturing units at no cost. Provide details of other steel units from whom coal/charcoal

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
fuel in the baseline coal based power plant. It is not explained how it would be possible to source this from other sponge iron manufacturers at "no cost", given that the said fuel has some calorific value and is capable of heat generation in the boiler. The quantity of char/ dolachar stated as 60,000 tonnes also needs to be explained.		Consent to operate indicate 500 TPD 26640 tonnes/year of char 100TPD 1800 tonnes per month x12 Months is 21600 Sum is 48240 tonnes. ***Response-2:*** PDD is revised in B.4. P4 and sourcing char from other sources is deleted as LMEL generates 48000 tonnes per year char which can be used.	is or will be sourced free of cost for operation of FBC unit in project activity. ***Comment-2:*** As the PDD is revised in line with the validation team comment, the CL is **Closed.**
CL-14: PP has not considered the project emissions. It was observed during the site visit by the validation team that there are electricity imports by the project activity from grid. However, the monitoring plan does not include monitoring of the same.	5-e-b-i	PDD is revised in B.7.1 to state that any grid import for start up of power plant is measured by auxiliary meters located in power plant.	Since grid import, if any, for start up of power plant is measured by auxiliary meters only, therefore the net power export is calculated as difference of gross generation and auxiliary consumption. This will include any grid import power also and net power available for captive consumption or for export can be taken for emission reduction calculation.

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
			Therefore CL is **Closed.**
CL-15: The justification provided in the PDD section B.4 for not including alternatives for power generation (in the absence of the project activity) viz., P5 and P7 is not adequately worded as it does not fully explain the reasons why these alternatives are not considered to be plausible.	6-e-ii	***Response-1:*** PDD is revised to include properly worded explanation on P5 and P7 in B.4 to exclude them as plausible alternative.	***Comment-1:*** Justification is provided in the PDD for exclusion of options P5 and P7 as defined in ACM0012 version 3.2. For PP, Option P5 states that LMEL is not having any renewable captive power plant and no plans to install the renewable captive power plant in future. LMEL had grid connection only in the past. Hence option P5 is not feasible for PP. Whereas option P7 is about installation of waste heat based captive power plant which is less efficient than the project activity power plant based on waste heat. LMEL is taking maximum heat from waste gases for power generation and releasing gases above 169 deg cent. Hence low efficiency plant will not be feasible as then high temperature gases will have to be released in atmosphere which is not

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		Response-2: Lower than 169 deg.C and higher than 180 degC temperatures of flue gases will damage ESP. As per ESP manufacturer specifications, a letter is provided regarding the minimum temperature to ESP to be above169 deg C to avoid acid condensation and operating temperature of 180 degC. Supporting documents of Manufacturer letter and ESP specifications attached.	good for ESP as well as it is not acceptable as per norms of MPCB. However PP should clarify in detail as what norms of MPCB are not allowing release of waste hot gases above 169 deg centigrade and at what temperature waste gases can be passed through ESP so that it can be operated efficiently. ***Comment-2:*** Ok. However since the methodology is revised to version 4, the corresponding applicability conditions are revised and renamed under options P9 and P11. Validation team cross checked the letter from ESP manufacturer for operation of ESP in range of 169 deg cent to 250 deg cent temperature range of flue gases. Hence ESP is operated in range of 180 deg cent temperature flue gases. Since most of the heat from flue gases is recovered and flue

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
			gases are sent at 180 deg cent outside, there is no low efficiency option available than project activity. Therefore raised CL is **Closed.**
CL-16: Project participant needs to provide the documentation or references to support the following assumptions made in PDD or in separate annexes to PDD and clarify. 1) Land and site development cost, building, structures etc. 2) Assumed cost of plant and machinery does not match with actual PO's raised. There is a large difference (actual Rs.136 cr. Assumed Rs.81 cr) 3) Provide supporting for other project cost items – spare parts, pre-operative expenses, consultancy fees 4) Include the internal consumption of	6-q-ii	***Response-1:*** PDD is revised in B.5 to include all the explanations from point 1 to 5 with detailed calculations. IRR excel spread sheet revised to reflect all the above which include proper cost of plant and machinery. 6) This is not finished good but credit given to trading company for electricity supplied. 7) For calculation of Equity IRR purpose internal consumption is considered as receivable even though it is actually not receivable as the electricity from grid is replaced by electricity from project activity. This is not receivable as entity remains same and LMEL is having accumulated losses and is under BIFR	***Comment-1:*** Project participant has removed Levelized cost calculations and applied benchmark calculations. PP needs to substantiate following points. 1) It is still not clear how the land and site development cost, building and structure cost is taken. Provide reference or justification for 202 lacs land amount. 2) Assumed cost of plant and machinery is calculated as 9414 lacs. Please clarify how it is in line with the PO. 3) Section B.5 mentioned spare cost as 6 million. While excel spreadsheet for equity IRR and

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
power in assumptions sheet and provide its source 5) Explain source of assumptions for consumables, labor, repairs/maintenance, administrative & other expenses 6) Explain finished goods inventory cost for 15 days-what are the finished goods? 7) In working capital sheet, explain what is meant by receivables considered from internal sales-explain. External sales can be considered as receivables; but why an also internal sale, as the entity (i.e. LMEL) remains the same. 8) Depreciation @5.28% SLM- how it can be calculated for items such as preliminary expenses, contingencies, consultancy fees, interest during construction all forming the total of project cost of 110.55 cr.		and hence receivables do not generate any additional profits. However for calculation of equity IRR the internal consumption was considered as per the actual average grid power cost from feb-2006 to Sep-2006 before the decision date. Hence we have considered grid electricity cost as internal consumption Revenue @Rs 3.77/unit and export electricity to power trading company Indrajit Power Technology Private Limited (IPTL) @Rs 3/unit as per PPA. 8) Depreciation considered is as per companies act on capitalised investment which is project cost excluding land cost and accounting practices. As land was already available, only the development cost of the land has been considered and hence the capitalised cost is the project cost. 9) IRR work sheet is corrected to contain proper impression.	sensitivity mentioned the spare part cost as 23.5 million. Please clarify inconsistency of values and provide proper evidences for values considered. 4) Internal consumption of power needs to be clarified. 5) Source of assumptions for consumables, labor, repaires/ maintenance, administrative & other expenses is provided. 6) The PP has provided an explanation to the query raised. 7) The PP has provided an explanation to the query raised. 8) Need further clarification on the issues.

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9) In IRR worksheet, scale of the diagram to be changed to give correct impression-with and without CDM. 10) IRR calculations for coal based CPP are not provided (IRR of 23.5%) 11) State the basis for assumption made for capital cost of coal based CPP (88.7 cr) 12) Basis for 90% PLF assumed for coal based CPP, fuel cost (cost of coal /kWH, O&M cost)		10) Excel sheets enable selection of all the options automatically. You have to select In IRR sheet With CDM without CDM Cell enter enter C 11 1 1 I 13 3 4 11) please note as bench mark analysis is done coal based excel spread sheet are not required. 12) Refer point 11 response above ***Response-2:*** LMEL Response: 1) The land cost is considered from the initial proposal reference "CPP/VVS/LMEL/R1/200 Dated 15/10/2006" received from the power plant supplier i.e. LSIL based on which management took the decision on	9) In IRR worksheet now only one diagram is shown where scale of diagram is fixed. Only scenario needs to be changed to check with or without CDM benefits. 10) IRR calculations for coal based CPP is provided. However changing cells C11 to 2 does not result in calculations of IRR. 11 & 12 PP has now done benchmark analysis. Response is accepted. ***Comment-2:*** 1) Ok. Land cost is taken from proposal received from power plant supplier which was available to board for taking the decision on project activity. This is in line with the paragraph 6 of the guidelines on

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		28/10/2006 to proceed with the project activity. This is in line with guidelines for investment analysis. 2) Plant and machinery cost is taken as 1001 million rupees based on proposal provided by LSIL. Same is updated in revised IRR sheet. 3) The mandatory spares as defined in Annex-4 of PDD are 6 million. This includes the spare flow meters, temperature and pressure transmitter and energy meters. Other spare which are part of the project cost are bought along with the power plant. These are 2.5% of plant and machinery cost as quoted in the proposal by power plant supplier. These are estimated equal to 25 million rupees. Engineering and Consultancy fees is taken as 20 million as per offer. Pre-operative and preliminary expenses are estimated as per budgeted cost worked	the assessment of investment analysis. 2) The PP has provided an explanation to the query raised. 3) Spares are defined as 2.5% of plant and machinery cost in proposal provided by LSIL to the project proponent. Further the engineering and consultancy fees are mentioned as 20 million ruppes. Validation team has also checked the budgeted pre-operative and preliminary expenses for the project activity and found appropriate to be considered in financial model.

<table>
<tr><th>Draft report clarifications and corrective action requests by validation team</th><th>Ref. to checklist question in table 1 and 2</th><th>Summary of project owner response</th><th>Validation team conclusion</th></tr>
<tr><td></td><td></td><td>on prior to decision making on the project activity. DOE is provided with the list of expenses under this category.

4) The internal consumption has been worked as per the latest last 3 years consumption provided in Form A of balance sheets
<table>
<tr><td>Year</td><td>electricity consumed Units</td></tr>
<tr><td>2007-08</td><td>24433877</td></tr>
<tr><td>2008-09</td><td>22226749</td></tr>
<tr><td>2009-10</td><td>17961254</td></tr>
<tr><td>Total</td><td>64621880</td></tr>
</table>
Based on above data, maximum consumption is considered as 2007-08 levels i.e. 24.45 million units.

5) All the costs under consumables, labor, repairs/maintenance, administrative & other expenses is</td><td>4) Ok. Internal consumption is conservatively taken as the maximum value of 24.45 million as a captive consumption.

5) All these expenses are adjusted under single “cost of production”</td></tr>
</table>

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
		considered under “cost of production”. Please refer “power” sheet of excel IRR spreadsheet. O&M expenses are 7% of gross fixed assets and evaluated equal to 0.71 Rs/unit. 6 & 7) Ok. 8) Depreciation as 5.28% on capitalized project cost on straight line depreciation as per Schedule XIV of Company’s act 1956 which will include all costs of project other than land cost. As land was already in possession of PP therefore only depreciation was calculated on total project cost. 9) Ok. 10) Only benchmark evaluation is performed to demonstrate additionality and equity IRR is calculated. Calculation of IRR for coal based power plant is not required as only Levelized	category. Based on 139 Million units power generation from project activity and 1407 Million as a gross fixed asset, the O&M expenses have been worked out. Therefore it accepted by validation team. 6 & 7) The PP has provided an explanation to the query raised. 8) Ok. Only the depreciation with project cost after debiting the cost of margin money and land development cost is considered in IRR sheet. Therefore it is accepted and closed. 9) The PP has provided an explanation to the query raised.

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
		cost is now calculated for determination of baseline. 11 & 12) Ok.	10) Ok. IRR for coal based CPP alternative is now not required as additionality is worked out by evaluation of Equity IRR. 11 & 12) The PP has provided an explanation to the query raised. Therefore CL raised is **closed.**
CL-17: The documentation submitted to support investment barrier (difficulty in raising finance for the project activity) is limited to only a letter from M/s. Nariman Point Finance Ltd (Refer letter dated 6-Dec-2006). The said barrier is not proved only on the basis of a single such letter; as there would be other avenues of finance also open to the project participant and it is not established whether all these were also exhausted.	6-w-i And 6-w-ii	As PDD is revised to include step 2 i.e. investment analysis only to prove additionality. Barrier analysis is removed in revised version of PDD.	PP has now removed step 3- barrier analysis from PDD and followed step 2 i.e. investment analysis from "tool for the demonstration and assessment of additionality" to prove the additionality. Therefore this clarification request becomes redundant. Hence CL is **closed.**

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CL-18: Board got awareness about the CDM benefits availability during board resolution meeting when LSIL representative made the presentation to set up waste heat recovery boiler for steam generation and power generation to the tune of 25 MW. Since board resolution date is taken as project start date PP need to clarify that they had CDM awareness prior to project start date through reliable evidences.	6-a-h-ii	***Response-1:*** Start date has been revised to 15/03/2007 to take the ordering date for turn key contract on Lloyds Steel Industries Limited which is a commitment to the project activity. ***Response-2:*** PDD revised in B.5 to add start date as per C.1.1	***Comment-1:*** OK. However description of how particular start date is determined is not given in section C.1.1 of PDD. Again section B.5 is not updated with changed start date as per section C.1.1. ***Comment-2:*** Corrections are evident in PDD and CL is **closed.**
CL-19: Explain how the debt:equity ratio is considered in IRR calculation. Is it taken as per actual debt :equity ration for project activity? Provide evidence that past invsetments have also been made with similar debt:equity ratio.	6-c-m	***Response-1:*** The LMEL promoters brought in 23 crore as equity during 2006-07 as per balance sheet of 2006-07 and this is taken as equity for the project activity. ***Response-2:*** Debt to equity ratio is 83:17 in line with	***Comment-1:*** Response provided to clarification request is not complete. Specify the debt: equity ratio considered for the project activity. ***Comment-2:*** As per guidelines for investment

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
		introduction of equity of Rupees 23 crores by promoters during the year 2006-07.The same can be verified by audited balance sheet of the company for 2006-07. PDD is revised in B.5 under step 2 of investment analysis to mention the same. ***Response-3:*** As per tariff order of Maharashtra state, 2006, debt to equity ration is now taken as 70:30.	analysis version 5, para 18, debt to equity ratio is required to be taken as observed in the sector of the country to be used. Clarify. ***Comment-2:*** The debt-equity ratio considered is standard in the power sector. This meets the requirement of paragraph 18 of the investment analysius guidance. Hence, CL raised is **closed.**
CL-20: PP needs to clarify and provide justification for the variation range selected for the variables included in sensitivity analysis. 1) + 5% increase in operating days 2) + 5% increase in PLF 3) +15% Sales price of exported electricity 4) – 10% plant and machinery cost	6-c-nn	***Response-1:*** PDD is revised to include the justification for variables in sensitivity analysis in B.4 under sub step 2.d. ***Response-2:*** PDD is revised in B.5 under sensitivity adding justification for each variable selected. Sensitivity is provided to the following	***Comment-1:*** Section B.4 is not providing the justification for variables considered in sensitivity analysis. ***Comment-2:*** Revised version of PDD in section B.5, under sub step 2d provides the justification for parameters selected for sensitivity analysis.

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
5) – 10% operating cost		parameters. 1) Sales Tariff varied by +10% 2) Plant and Machinery cost by -10% 3) Production cost by -10% 4) PLF by +10% 5) Operating days by +10% Please refer the PDD section B.5 for justification towards the selection of sensitivity parameters.	Accordingly identified parameters are sales tariff, plant and machinery cost, production cost, PLF and Operating days which affects the calculation of IRR. Above parameters constitutes the 20% of total project cost or total revenue and validation team found it suitable to apply the sensitivity to identified parameters. Therefore CL is **closed.**
CL-21: It is not clear from the monitoring plan how the net electricity generation (i.e. gross gen – aux consumption) would be monitored or calculated. PP needs to clarify monitoring and measurement of net electricity generation.	7-e	***Response-1:*** PDD is revised in section B.7.1 to include explanation that net electricity is calculated by using metered values of gross generation and auxiliary consumption.	***Comment-1:*** EGi,j,y is defined in section B.7.1 to monitor the quantity of electricity supplied to the recipient plants j i.e. (LMEL and Power trading company ITPL). This net exported electricity is now calculated as difference between metered readings of gross generation meter and auxiliary consumptions meters. Auxiliary consumption meter is named as Me2 which is sum of auxiliary meter readings for 4 WHRBs and kilns. They are named as Me2A, Me2B,

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
		Response-2: Auxiliary meter installed is for entire power plant. Me2 is the calculated figure from metered values of auxiliary consumption by Me2A, Me2B, Me2C and Me2D meters. 1) Methodology considers only Net electricity generated EG i,j,y in the power plant. 2) Electricity due to WHRB project activity is calculated using fraction of energy *f*wcm formula as given in equation 34 of ACM 0012 version 4, methodology. 3) Hence the auxiliary consumption due to WHRB is also proportioned using fraction of energy fwcm formula as per equation 34 of ACM0012 version 4 of the methodology.	Me2C and Me2D. However it is not clear whether 500 TPD kiln and WHRB on it along with 90 TPH FBC boiler will also be covering in above meters to measure their auxiliary consumption. Is their separate auxiliary meter installed for these equipments apart from above stated meters? Please clarify ***Comment-2:*** All the loads of the power plant are covered by the above four auxiliary meters only. Hence auxiliary loads of 500 TPD kiln and 90 TPH FBC boiler is monitored by above meters only. PP has provided the schematic line diagram for metering arrangement in project activity. Therefore metering arrangement is now clear with the monitoring description provided for each of the parameters in section B.7.1 of PDD. Therefore raised CL is **closed.**

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
CL-22: Please clarify the exact point of measurement of the waste gas; i.e. whether the waste gas is monitored / measured before it enters the point of use. (e.g. before WHRBs)	7-g-4	***Response-1:*** PDD is revised to include corrections. The waste gas is measured at the exit point of boiler before ESP as metering instrument is suitable for temperature of 180 deg C and not suitable for 950 deg C at boiler inlet and such meter suitable for 900 deg C is not available. ***Response-2:*** 1) As boiler inlet temperature is 900-1000 C instrument for flow measurement is not available as some portion probe has to be in the path of flue gas 2) Flue gas flow meter is calibrated by manufacturer GE Sensing at factory and all flow instruments have been checked and calibrated by GE Sensing representative at site. 3) Site visit report of GE India of 19/01/2011 is enclosed.	***Comment-1:*** Please demonstrate the technical limitations which are preventing the measurement of waste gas at the inlet to WHRB with evidence. Since now waste gases are monitored between stack and WHRB, calibration details for the flow meter at temperature and pressure of waste gas to be provided to the DOE at validation stage to confirm the proper measurement of waste gases used in WHRBs. ***Comment-2:*** Positioning of waste flue gas flow meters is provided at the exit of WHRB on stack line before letting these gases out in to atmosphere i.e. before ESPs. Since the temperature of flue gases is more than 900 deg C, measurement is not possible at these temperature levels. PP has provided the

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			servicing report of UItrasonic flue gas flow meter from supplier i.e. GE sensing dated 19/01/2011 which confirms that these flow meters can be serviced and calibration is possible which will help in proper monitoring of waste flue gases. Therefore raised CL is **closed.**