



RINA


VALIDATION REPORT

Final

“Waste heat recovery at blast furnace of IISCO, SAIL”
in
India

Report N° 2009-IQ-04-ME
Revision N° 2.1


VALIDATION REPORT

Project Title: Waste heat recovery at blast furnace of IISCO, SAIL		Country: India	Estimated CERs (tCO₂e): 64,626 annual average	
Client: Steel Authority of India Limited (SAIL)		Client contact: Mr. Ranen Nag		
Report No.: 2009-IQ-04-ME		Revision: 2.1	Date of this report: 14/10/2011	
Approved by (Final Report – DCI Director approval):  Roberto Cavanna			Date of approval: 20/10/2011	
Methodology				
Number: ACM0012	Version: 3.2 of 04/12/2009	Title: “Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects”	Scale Large	SS(s): 1 and 4

RINA Services S.p.A. (RINA), commissioned by Steel Authority of India Limited (SAIL), , has performed the validation of the project activity “Waste heat recovery at blast furnace of IISCO, SAIL” in India, with regard to the relevant requirements for CDM activities.

In conclusion, it is RINA’s opinion that the project activity “Waste heat recovery at blast furnace of IISCO, SAIL”, in “India”, as described in the PDD version 06 of 14/10/2011, meets all relevant requirements for CDM activities and all relevant host Party criteria and correctly applies the baseline and monitoring methodology “ACM0012”, “Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects”, version 3.2 of 04/12/2009.

Hence RINA requests the registration of the project as a CDM project activity.

Work carried out by: Marcello Manno, Deepankar Chowdhury, Cyril Augustus Arokiasamy, Nisha Raghavan.	<input checked="" type="checkbox"/> No distribution without permission from the Client or organizational unit responsible <input type="checkbox"/> Strictly confidential <input type="checkbox"/> Unrestricted distribution
Work verified by (Final Report – CRT person responsible approval)  Paolo Teramo	Keywords: Climate Change, Kyoto Protocol, Clean Development Mechanism, Validation

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Abbreviations

ACEMIPL	Asia Carbon Emission Management India Private Limited
BE	Baseline Emissions
BFG	Blast Furnace Gases
BFS	Blast Furnace Stoves
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM M&P	Modalities and Procedures CDM
CER(s)	Certified Emission Reduction(s)
CH ₄	Methane
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
COG	Coke Oven Gas
CRT	Coordination and Technical Control Staff
DCI	Certification Division of RINA Services Spa
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EIA	Environmental Impact assessment
ER	Emission Reductions
EF	Emission Factor
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
IISCO	Indian Iron and Steel Company
IRR	Internal Rate of Return
KP	Kyoto Protocol
LoA	Letter of Approval
MoV	Means of Verification
MP	Monitoring Plan
MR	Monitoring Report
MoEF	Ministry of Environment and Forests – India
NCC	Nagarjuna Construction Company
NGO	Non-governmental Organization
NCV	Net Calorific value
NCDMA	National CDM Authority
ODA	Official Development Assistance
OM	Operational Margin
PDD	Project Design Document
PE	Project Emission

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POSCO	POSCO Engineering and Construction Company Limited
PP(s)	Project Participant(s)
Ref.	Document Reference
RINA	RINA Services Spa
RINL	Rashtriya Ispat Nigam Limited
SS(s)	Sectoral Scope(s)
SAIL	Steel Authority of India
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual
WHR	Waste Heat Recovery

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VALIDATION REPORT

1 INTRODUCTION

Steel Authority of India Limited (SAIL) has commissioned RINA to carry out the validation of the “Waste heat recovery at blast furnace of IISCO, SAIL” project in India.

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

1.1 Objective

The objective of the Validation is to have an independent evaluation of a project activity by a designated operational entity against the requirements of the CDM as set out in decision 3/CMP.1, its annex and relevant decisions of the COP/MOP, on the basis of the project design document. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC requirements and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the 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).

1.2 Scope

The validation scope is to review the PDD against the UNFCCC criteria for CDM.

UNFCCC criteria for CDM refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent decisions by the CDM Executive Board.

Validation is not meant to provide any consultancy towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

2 METHODOLOGY

Validation was conducted using RINA procedures in line with the requirements specified in the CDM M&P, the latest version of the CDM Validation and Verification Manual /6/, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques.

The validation consisted of the following three phases:

- Document review;
- Follow-up actions;
- The resolution of outstanding issues and issuance of the final validation report

The following sections outline each step in more detail.

2.1 Document Review

The PDD, version 06 of 14/10/2011 /01/, in particular the applicability of the methodology, the baseline determination, the additionality of the project activity, the starting date of the project, the monitoring plan, the emission reduction calculations provided in the form of a spreadsheet, and additional documents were assessed as part of the validation /01/ - /70/.

The following table lists the documentation that was reviewed during the validation.

/01/	Asia Carbon Emission management India Pvt. Ltd.: CDM-PDD for the project activity “Waste heat recovery at blast furnace stoves at IISCO, SAIL” in India, Version 06 of 14/10/2011, and previous Version 05 of 09/06/2011, Version 04 of 10/12/2010, Version 03 of 04/08/2010 and Version 02 of 04/02/2010 and Version 01 of 15/12/2008.
/02/	NCDMA under MoEF: Letter of Approval, reference no. 4/15/2008-CCC, dated 16/01/2009

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/03/	SAIL, IISCO-Steel Plant: Emission reduction calculation sheet, Version 1 dated 15/04/2008 and Version 2 of 04/02/2010
/04/	SAIL, IISCO-Steel Plant: IRR sheet , version -1 dated 04/02/2010 and version 2 dated 04/08/2010
/05/	CDM Executive Board: ACM0012 “Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects” – Version 03.2 of 04/12/2009
/06/	CDM Executive Board: Validation and Verification Manual, version 01.2 of 30/07/2010
/07/	CDM Executive Board: Guidance on the demonstration and assessment of prior consideration of the CDM. Version 4, Annex 13 of EB 62 dated 15/07/2011.
/08/	MECON: Detailed Project Report of 2.5 MT/yr New Stream Expansion from MECON limited 2006, Page 30-1 TO 30-14, page 10-1 to 10-55, page 16-1 to 16-66
/09/	SAIL: 324 th Meeting of the Board of Directors to be held on 21 st May 2007, SAIL Plants. 324 th Adjourned Meeting of the Board of Directors held on Saturday 26 th May 2007 at new Delhi.
/10/	West Bengal Pollution Control Board: Consent to Establish (NOC) from Environmental point of view, dated 8 July 2008. SAIL: Application for the Renewal of Consent to operate for SAIL-IISCO steel plant for the period up to 31 December 2010, dated 25 November 2008. West Bengal Pollution Control Board: Form–II, Grant of Authorization under the provisions of the Hazardous Waste (Management & Handling) Rules, 1989 & its amendments made thereafter, valid up to 30 November 2010, dated 10 February 2006.
/11/	SAIL, POSCO & NCC: Contract agreement between SAIL and Consortium Comprising of M/s POSCO Engineering and Construction Company LTD. South Korea and M/s Nagarjuna Construction Company Limited, Hyderabad for the setup of Blast Furnace Complex under 2.5 MT new stream expansion. Dated 16/10/ 2007.
/12/	CDM Executive Board: Methodological Tool “Tool for the Demonstration and Assessment of Additionality” – Version 05.2.1of 11/08/2011and version 5.2
/13/	CDM India website (English), Designated National Authority (DNA):- http://www.cdmindia.nic.in/cdmindia/projectList.jsp?search=search
/14/	MoEF: Environmental Impact Assessment notification (English) dated 14/09/2006 available at http://envfor.nic.in/legis/eia/so1533.pdf , retrieved on 09/08/2010
/15/	SAIL, POSCO & NCC: Technical specification, from Contract Agreement for Blast furnace Complex (Package 07) page 17 of chapter 4.3- Hot Blast Stoves, stating the campaign life in excess of 20 years.
/16/	POSCO and Kuttner Energy: Contract specification of Heat Exchanger for IISCO dated 06/2008.
/17/	MECON: P & I Diagram, Hot Blast Stoves 1, 2 & 3 prepared by MECON LIMITED Dated 04/05/2009Technical.
/18/	MECON: Detailed Project Report of 2.5 MT/yr New Stream Expansion from MECON limited page no 01-2 as proof of DPR awarded dated 11/01/2006
/19/	SAIL: Letter of award S.N. EMD/TCH/SES/CDM/1463 to M/s Asia Carbon Emission Management India Pvt. Ltd. Dated 19/11/2007
/20/	SAIL: Copy of the Invitation letter for stakeholder consultation dated 31/01/2008
/21/	SAIL: Copy of the records notes of stakeholders meeting held at IISCO dated 04/02/2008 ACEMIPL: Copy of the stakeholder comments 04/02/2008
/22/	ACEMIPL on behalf of SAIL: Copy of application letter sent to Ministry of Environment and Forests for HCA approval, dated 18/06/2008
/23/	RINA: Copy of the Proposal for appointing the DoE dated 12/01/2009
/24/	The handbook on The State-of-the-Art Clean Technologies (SOACT) for Steelmaking by Asia Pacific Partnership for Clean Development and Climate, December 2007, page 46 of the report. (English) The web link –

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	http://www.asiapacificpartnership.org/english/pr_steel.aspx#steel_project_5 , retrieved on 09/08/2010
/25/	SAIL: Copy of the proposed budget for Corporate Social Responsibility for year 2008-09
/26/	SAIL: Copy of the undertaking letter stating the waste gas released under abnormal condition will not be accounted dated 16/02/2010
/27/	SAIL – Training schedule from DGM (BF-Mech), ref no.BF-Mech/PNL/MODERN/79/09 dated 28/05/2009
/28/	SAIL: Copy of the Excel spreadsheet detailing CO ₂ e during construction of the 'Waste Heat Recovery at Blast Furnace Stove' Project at ISP
/29/	MECON: Letter on the PLF of the plant dated 12/02/2010
/30/	Web-link of UNFCCC, where project was uploaded for comments, http://cdm.unfccc.int/Projects/Validation/DB/ECCE7PJIJTYIIAMZDMU558Y5HYN1PO/view.html (English) , retrieved on 09/08/2010
/31/	SAIL: Copy of the Bidding Document, No.EMD/TCH/CDM/TD/673, dated 02/08/2007
/32/	MECON: Copy of the letter for detailed project report submission by MECON dated 10/11/2006
/33/	IPCC: Chapter 2 of Volume 2 of IPCC Guidelines for National Greenhouse Gas Inventories, 2006.
/34/	SAIL: Disaster Management Plan of SAIL-ISP, Burnpur
/35/	MECON: Letter confirming basic cost of the waste heat recovery system from, ref. No. MEC/36/133 A/Pkg/07/01, dated 12/06/2010
/36/	SAIL: Annex - IV Guidelines for formulation of investment proposal for appraisal, confirming expenses during construction @ 17% of total project cost.
/37/	SAIL: Annex - III Guidelines for formulation of investment proposal for appraisal, confirming contingency as 3%.
/38/	POSCO E & C Co.Ltd.: Certificate confirming Operation & Maintenance cost @ 5 % of total cost Dated 12/06/2010
/39/	SAIL: Letter confirms calorific value of the boiler coal ref. no L/90 dated 12/02/2010
/40/	SAIL: Detailed Project Report, page 4 of chapter 13, 2006
/41/	CER Prices: http://www.carbonpositive.net/viewarticle.aspx?articleID=730 (English), retrieved on 09/08/2010
/42/	SAIL: Letter confirms exchange rate dated 09/03/2010, ref. no. PEDD/EXPB-B/BF-050/Z.O.-05/281
/43/	Ministry of Steel: Copy of the presentation by Ministry of Steel to the APP Steel task force, Beijing China on 26/11/2008 available at http://www.asiapacificpartnership.org
/44/	RINA: List of interviewed persons on 27/05/2009 at IISCO; Plant Burnpur, West Bengal, India.
/45/	CDM Executive Board: Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM), version 7, dated 02/08/2008.
/46/	UNFCCC clarification AM_CLA-0156, to demonstrate that Green field projects need not prove energy was wasted in the baseline, available at weblink http://cdm.unfccc.int/filestorage/AM_CLAR_OX92RZSDD7KRBD5FX3QHU788YVGVQM/Cla%20to%20ACM0012%20ver.%203?t=WTB8MTI5MDE4OTY2NC41OA== YgzUk-am2xaiEPePILjxitqaffw= (English), retrieved on 09/08/2010.
/47/	SAIL: Annual reports for the last three years 2004-05, 2005-06 and 2006-2007 evidence to demonstrate no use / diversion of ODA funds
/48/	SAIL: Monthly coal receipt of Coal purchase from Eastern Coal Field (06 -07) and Coal purchase from Ramnagore Coal Field (06 -07) SAIL: Book Transfer of cost of coal- ISP cost of coal from 2003 till date. SAIL: Increase in cost of coal, spread sheet to prove that the variation in cost of coal assumed is about 5%

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/49/	CDM Executive Board: EB51, Annex 58:- Guidelines on the assessment of investment analysis, version 3.1 dated 15/01/2010.
/49a/	CDM Executive Board: EB61, Annex 13:- Guidelines on the assessment of investment analysis, version 5, dated 15/07/2011.
/50/	UNFCCC Website: List of Parties ratified Kyoto Protocol and the respective DNAs Weblink: http://cdm.unfccc.int/DNA/index.html#I retrieved on 09/08/2010
/51/	Solar India website: http://www.solarindiaonline.com/solar-india.html , information on use of solar energy in India, available in English retrieved on 03/08/2010.
/52/	Prof. D. Chandrasekar, Head Dept of Earth sciences IIT, Bombay, India: Geothermal sources available in India, information is available in English at weblink http://www.geos.iitb.ac.in/geothermalindia/pubs/geoweb.htm retrieved on 03/08/2010.
/53/	Website worldcoal: Weblink - http://www.worldcoal.org/coal/where-is-coal-found/ to prove surplus availability of coal in India, the information is available in English, retrieved on 03/08/2010.
/54/	Reserve Bank of India: Source for benchmark selected available in English at the weblink http://www.rbi.org.in/scripts/WSSView.aspx?Id=11130 retrieved on 03/08/2010
/55/	New Energy and Industrial Technology Development Organisation (NEDO): Weblink http://www.nedo.go.jp/english/activities/portal/gaiyou/p93050/p93050.html to prove that the only one iron and steel industry in India has done this project using funds from NEDO Japan under Kyoto Mechanism.
/56/	JSW steel: Letter with ref no. EMD/TC/INO/10-11/009 dated 03/08/2010 confirming no Heat recovery projects in Blast Furnace as of date. RINL: Letter with ref no. Ref/WK/GM (UTL)/10/42 dated 04/08/2010 confirming no heat recovery projects in Blast Furnace as of date.
/57/	SAIL: Copies of List of costs certified by SAIL.
/58/	Government of India: Addressing energy security and climate change: available in English at http://moef.nic.in/modules/about-the-ministry/CCD/Addressing_CC_09-10-07.pdf retrieved on 03/08/2010
/58a/	- National Action Plan on Climate Change available in English at http://pmindia.nic.in/Pg01-52.pdf retrieved on 03/08/2010
/58b/	- Energy Conservation Act. 2007. Available in English at http://www.powermin.nic.in/acts_notification/energy_conservation_act/index.htm retrieved on 03/08/2010.
/58c/	Electricity act available in English at http://www.powermin.nic.in/acts_notification/electricity_act2003/preliminary.htm . retrieved on 03/08/2010
/58d/	- Energy Conservation Building codes 2006 available in English at http://www.spaenvis.nic.in/pdfs/ECBC.PDF retrieved on 03/08/2010
/59/	World energy outlook: World energy outlook, 2007 edition available at http://www.worldenergyoutlook.org/2007.asp , English language, retrieved on 03/08/2010.
/60a/	RINL: Confirmation for biomass not used as energy source dated 28/05/2011 by Mr. Venkateswara Rao, General Manager, RINL, Visakapatnam Steel Plant.
/60b/	JSW Steel Plant: email dated 02/06/2011 from Mr. SMR Prasad of JSW steel plant.
/60c/	Tata Steel: Corporate sustainability report, 2008.
/61/	Deepak Agarwal Associates: Chartered Accountant's certificate dated 16/05/2011 and the following certified documents.

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/61a/	SAIL: Guidelines for Formulation of Investment Proposals for approval dated 07/10/2000 approved by Chairman, SAIL on 30/10/2000.
/61b/	SAIL: Environmental concurrence for the project activity augmentation of return ladle from
/61c/	SAIL: Draft investment proposal for augmentation of return of empty ladle from CCD to SMS-II of 2006.
/61d/	SAIL: Environmental Concurrence for the project activity rebuilding of coke oven battery number 4 at RSP of 2005, and its summary of capital cost estimated.
/61e/	SAIL: Feasibility report for the project installation of cast house slag granulation plant at blast furnace no.3 of 2006 and its Detailed capital cost estimate
/61f/	SAIL: Environmental concurrence for the project activity steel making facility at salem steel plant of 2005 and its capital cost estimates.
/61g/	SAIL: Order issued by the executive director projects (SAIL), on use of Guidelines for formulation of Investment proposals dated 27/11/2000
/61h/	SAIL: Screenshot of Projects: Directorate webpage of SAIL, screenshot in English printed on 03/06/2011
/62/	Deepak Agarwal associates: Chartered accountant's certificate dated 20/05/2011
/62a/	SAIL: Letter from Plant engineering and development division dated 14.05.2011 on Manpower requirement for the proposed project activity.
/62b/	POSCO: Drawing no. ISP-POSCO- E&C- V-007-492-01-DE-72042 approved on 26/11/2010
/62c/	POSCO: Drawing no. ISP-POSCO- E&C- V-007-400-50-BE-40002 approved on 12/08/2010
/62d/	POSCO: Drawing no. ISP-POSCO- E&C- V-007-400-50-BE-70036 approved on 17/09/2010
/62e/	SAIL: Financial appraisal of capital projects – Repair & maintenance cost, No.FIN/02/PFA/Circular - issued by the AGM Finance dated 28/15/2008.
/62f/	POSCO: Certificate from POSCO received by SAIL on 13/05/2011
/62g/	SAIL: Letter from power engineering department of SAIL dated 09/04/2010
/62h/	Letter from SAIL, ISP Finance, pay execution section, dated 30.04.2011
/63/	Coal India Limited: Various grades of Coal and Grade wise Basic Price of coal at the Pit-head excluding statutory levies for Run-of-mine (ROM) Non- Long-Flame Coal for various subsidiaries of Coal India Limited.
/63a/	Coal India Limited: Letter dated 15/06/2004
/63b/	Ministry of Coal, GoI: Office memorandum dated 29/03/2007, approved monthly linkage of coal for the period April-June of financial year 2007- 2008, and run of mine coal cost,
/63c/	SAIL: Boiler coal passed bill dated 19/04/2007 and 27/04/2007
/63d/	SAIL Colliery: Debit for transfer of coal for Ramnagore dated 12/07/2007.

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/63e/	SAIL Research and Development centre: Energy Performance 2006-07 and Plan 2007-08.
/64/	POSCO E & C Co.Ltd: Certificate on alternative design for waste heat recovery from Blast Furnace dated 08/08/2011.
/65/	SAIL: Investment analysis for identification of baseline scenario, spread sheet "FINAL_CC_ISP_37_2_- 29th_Sept2011" of 29/09/2011_
/66/	Deepak Agarwal Associates, Chartered Accountants: Certificate on the costs towards setting up of the project activity, dated 14/09/2011.
/67/	<p>Evidences for demonstrating non availability of renewable resources:</p> <p>Report by Global Energy Network Institute, October 2006 available at weblink: http://www.geni.org/globalenergy/library/energytrends/currentusage/renewable/Renewable-Energy-Potential-for-India.pdf, available in English, retrieved on 14/10/2011</p> <p>West Bengal Renewable Energy Development Agency, weblink: http://www.wbreda.org/energy-small-hydel.htm available in English, retrieved on 14/10/2011</p> <p>ICLEI, Local governments for sustainability association: http://local-renewables.iclei.org/fileadmin/template/projects/localrenewables/files/Local_Renewables/Publications/RE_EE_report_India_final_sm.pdf available in English, retrieved on 14/10/2011</p> <p>Biomass resource atlas of India: Available at weblink http://lab.cgpl.iisc.ernet.in/atlas/Tables/Tables.aspx available in English, retrieved on 14/10/2011</p> <p>Government of India: http://planningcommission.nic.in/aboutus/committee/wrkgrp11/wg11_renewable.pdf, available in English, retrieved on 14/10/2011</p> <p>The World Steel Association: Weblink: http://www.worldsteel.org/dms/internetDocumentList/fact-sheets/Fact-sheet_Breakthrough-technologies/document/Fact%20sheet_Breakthrough%20technologies.pdf, available in English retrieved on 14/10/2011</p> <p>Bluescope steel: Weblink, http://asdi.curtin.edu.au/csrp/_media/events/csrp08/Jahanshahi_CSRP08_C02BreakthroughOverview.pdf available in English retrieved on 14/10/2011</p>
/68/	Central Electricity Authority (CEA); CO ₂ Baseline Database for the Indian Power Sector User Guide, Version 6.0, March 2011 available at weblink http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm in English, retrieved on 14/10/2011
/69/	CDM Executive Board: Clarification on the approved consolidated methodology ACM0012 version 03.2 regarding CDM project activities that recover waste energy in greenfield facilities, EB61 report, Annex 5, dated 03/06/2011 available at http://cdm.unfccc.int/Reference/Guidclarif/meth/meth_guid40.pdf , in English, retrieved on 14/10/2011
/70/	POSCO E & C Co. Ltd: Introduction on POSCO, available at http://www.poscoenc.com/english/company/introduction.asp , in English, retrieved on 14/10/2011

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2.2 Follow-up actions

On 27/05/2009, RINA visited IISCO Plant, Burnpur, West Bengal to see the physical implementation of the Project activity and to resolve questions and issues identified during the document review and to perform interviews with relevant stakeholders /44/ in the host country.

The key personnel interviewed and the main topics of the interviews are summarized in the table below.

	Date	Name and Role	Organization	Topic
/a/	27/05/2009	Mr. G Viswanandham – DGM Projects	SAIL	Resources, training needs and procedures for operation and maintenance
/b/		Mr. T K Mukhopadhyaya – AGM Projects	SAIL	Monitoring Plan / Records (backups)
/c/		Mr. B Bhattacharya – AGM ECD	SAIL	Maintenance program (calibration)
/d/		Ms. Ajanta Sengupta – Sr. Manager	SAIL	Project boundaries
/e/		Mr. P K Paul – Sr. Manager ECD	SAIL	Additionality issues
/f/		Mr. R Banerjee – GM	MECON	Baseline and project emissions
/g/		Mr. K R Palchandhuri – Dy. General Manager	MECON	Emissions reductions calculations
/h/		Mr. D Sathish – CDM Process Engineer	Asia Carbon	

2.3 Resolution of outstanding issues

The objective of this phase of the validation is to resolve any outstanding issues which need to be clarified for RINA's positive conclusion on the project design.

To guarantee transparency a validation protocol has been customized for the project. The protocol shows in a transparent manner the requirements, means of validation and the results from validating the identified criteria. The validation protocol consists of four tables; the different columns in these tables are described in the figure below (see Figure 1). The completed validation protocol is enclosed in Appendix A to this report.

A corrective action request (CAR) is raised if one of the following occurs:

- The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions.
- The CDM requirements have not been met.
- There is a risk that the emission reductions cannot be monitored or calculate.
- A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration. CARs, CLs and FARs identified are included in the validation protocol in Appendix A of this report.

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Figure 1 Validation protocol tables

Validation Protocol, Table 1 - Mandatory requirement		
Requirement	Reference	Conclusion
The requirements the project must meet.	Makes reference to the documents where the answer to the requirement is found.	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) if a requirement is not met. A request for clarification (CL) is used when the validation team has identified a need for further clarification.

Validation Protocol, Table 2 - Requirement checklist					
Checklist Question	Ref.	MoV	Comments	Draft Conclusion	Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organized in seven different sections.	Makes reference to documents where the answer to the checklist question or item is found.	Explain how conformance with the checklist question is investigated. Examples are document review (DR), interview or any other follow-up actions (I), cross checking (CC) with available information relating to projects, (N/A) means not applicable.	The discussion on how the conclusion is arrived at and the conclusion on the compliance with checklist question so far.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. For CAR, CL and FAR see the definitions above.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements.

Validation Protocol, Table 3 - Resolution of Corrective Action Requests and Clarification			
Corrective action requests and/or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
The CAR and/or CLs raised in table 2 are repeated here.	Reference to the checklist question number in Table 2 where the CAR or CL is explained.	The responses given by the project participants to address the CARs and/or CLs.	The validation team's assessment and final conclusion of the CARs and/or CLs.

Validation Protocol, Table 4 - Forward Action Requests		
Forward action request	Reference to Table 2	Response by project participants Validation Conclusion
The FAR raised in table 2 is repeated here.	Reference to the checklist question number in Table 2 where the FAR is explained.	Response by the project participants on how forward action request will be addressed prior to first verification.

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2.4 Internal quality control

All the revisions of the validation report before being submitted to the client were subjected to an independent internal technical review to confirm that all validation activities had been completed according to the pertinent RINA instructions.

The technical review was performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for CDM validation and verification.

2.5 Validation team and the technical reviewer(s)

The validation team and the technical reviewers consist of the following personnel:

Role/Qualification	Last Name	First Name	Country
Team Leader CDM	Manno	Marcello	Italy
CDM Validator	Chowdhury	Deepankar	India
CDM Validator	Arokiasamy	Cyril Augustus	India
Financial Expert	Raghavan	Nisha	United Kingdom
Technical Reviewer	Valoroso	Rita	Italy
Technical Reviewer	Teramo	Paolo	Italy

3 VALIDATION FINDINGS

The findings of the validation related to the project, as described in the PDD 06 of 14/10/2011 and the previous versions /01/, are stated in the following sections.

The validation requirements, the means of validation and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

3.1 Approval and Participation

The project participant is Steel Authority of India and is public sector undertaking; the project is a unilateral project and hence the host country is the only Party involved in the proposed project activity. India fulfils the requirements to participate in the CDM, having ratified the Kyoto Protocol on 26/08/2002 and establishing as DNA the National Clean Development Mechanism (CDM) Authority as per the UNFCCC website /50/; the project participant is correctly listed in table A.3 of the PDD and the information is consistent with the contact details provided in Annex 1 of the PDD /01/.

The DNA of India issued a Letter of Approval on 16/01/2009 (No. 4/15/2008-CCC), authorizing SAIL as project participant and confirming that the project assists in achieving sustainable development /25/. The Letter of Approval was received directly by the PP and refers to the precise project activity in the PDD /02/. The authenticity of the letter of approval has been validated by verifying official website of Indian DNA /13/. The team noted that the project is also listed in the DNA web site in project Id no: 1057/08. By checking the above website RINA considers the LoA in accordance with paragraphs 45-48 of the VVM /06/.

The proposed project does not involve any public funding from an Annex I Party, and the validation did not reveal any information that indicated that the project could be seen as a diversion of official development assistance (ODA) funding towards the host country. This was also confirmed by interviewing and cross checking with the annual reports of the project participant. /47 /

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Project participants	Steel Authority of India
Parties involved	India
LoA received	Yes /02/
Date of LoA	16/01/2009
LoA received from	NCDMA, India
Validation of authenticity	Verifying the document /02/
Validity of LoA	Yes
Party is party to Kyoto Protocol	Yes
Voluntary participation	Yes
Project contribution to SD	Yes

3.2 Project design document

The PDD for the project activity “Waste heat recovery at blast furnace of IISCO, SAIL”, in “India”, version 01 of 15/12/2008, Version 02 of 04/02/2010, Version 03 of 04/08/2010, Version 04 of 10/12/2010, version 05 of 09/06/2011 and the final version 06 of 14/10/2011/ submitted by the M/s Steel Authority of India have been the basis for the validation process. RINA confirms that the above PDD is based on the currently valid PDD template and is completed in accordance with the applicable guidance “Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM)/45/.

The main differences between the PDD published for Global stakeholders comments and the PDD submitted for registration are the expected Emission Reductions, which have been revised to be conservative. In version 01 of the PDD, sectoral scope was only 04 (manufacturing Industry) since the project involves energy recovery in an industry, this has been changed to Sectoral Scope 01 (Energy Industry) and 04 (manufacturing Industry). Webhosted PDD Version 01 used version 3.1 of the methodology ACM10012, PDD has now been updated as per the latest version of the methodology version 3.2. Project boundary diagram in section has been modified to make the project description to be complete and transparent. Baseline scenario has been elaborated in detail. Applicability criteria with respect to the updated methodology Version 3.2 have been updated. The additionality discussions made transparent with inclusion of investment analysis and the chronology of events to demonstrate CDM consideration. Further,, there are incorporation of few minor changes in monitoring procedures and changes as required in the calculation part due to new version of the methodology version 3.2. The clarifications raised during the information completeness check have been addressed in the PDD version 06, dated 14/10/2011. The above changes are also discussed in detail in the respective sections of this report.

3.3 Project Design

The project activity involves the installation of waste heat recovery system at the hot blast stoves of blast furnace that recovers the waste heat in flue gases from hot stoves. The recovered heat is then utilized for the pre-heating of the combustion air and BF gas. The project activity is a Greenfield project and is implemented as a part of SAIL’s plant expansion. (Capacity 2.5 Mt/ year of hot metal production) /08/. The Project activity is located at Asansol (IISCO Steel Plant) in West Bengal in India and its geographical coordinates are 23° 40’ 33.89” N, 86° 55’ 21.68” E /01/. This was also cross checked with geographical coordinates as per the google earth for the plant’s location and found to be correct.

The project activity is Greenfield project as all facilities are newly built and there was no pre-project situation in practice, thus there is no historical data available. Team has also confirmed through discussions with the PP that in the pre-project scenario the flue gas would have been released into the atmosphere. The same was confirmed during site visit /44/.

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The waste heat recovery system will consist of heat exchangers, expansion joint, a main burner, air/gas control sets, flame ignition system, valve manifolds and local control cabinet. Thermic fluid is used as the heat exchange medium; the thermic fluid is heated in the heat exchanger by the stove flue gas at 400°C from the stove stack. The heated thermic fluid passes through two heat exchangers to impart the heat to combustion air and BF gas. The thermic fluid is thus cooled and the cycle repeats. The waste flue gas from hot blast stoves will be at a maximum temperature of 400°C and normal flue gas temperature of 150°C to 200°C. In the project activity, heat exchangers will be used for the recovery of heat from the waste flue gas leaving the stoves. While the temperature of exhaust gas is reduced from 400°C to 150°C this heat recovery system enables the recovery of the sensible heat of exhaust gas and it is utilized to pre-heat BF gas and combustion air. The BF gas temperature has been increased from 35°C to 180°C and the combustion air temperature has been increased from 25°C to 180°C. This results in higher hot blast temperature and reduced BF gas consumption in hot stove /16/. The flue gas heat exchanger for heating BF gas is capable of handling 270,000 Nm³/hr. With a specific heat of the gas at 1.03KJ/kg °C and with the maximum exchanged sensible heat of 145°C and 85% load factor the heat exchanged is 10.23526 Gcal/hr amounting to 359.9 TJ annually. The flue gas heat exchanger for heating combustion air is capable of handling 240,000 Nm³/hr. With a specific heat of air at 1.01KJ/kg °C and with the maximum exchanged sensible heat of 155°C and 85% load factor the heat exchanged is 9.193292 Gcal/hr, amounting to 323.26 TJ annually. Thus the overall all energy saved by heat recovery is 683.15TJ/year.

The project will contribute to sustainable development by recovery of waste heat at the hot blast stoves of Blast furnace, reducing global emissions of greenhouse gases and creating employment opportunities for local residents. Since it is a technology transfer from Germany, it requires extensive initial training to ensure efficient operation of the plant during the project period. The training schedule was verified and found relevant and appropriate /27/. During on-site visit, relevant stakeholder and personnel with knowledge of the project were interviewed. The stakeholders interviewed include the project participants, suppliers and the project consultant /44/. In light of the above, RINA confirms that the project description as included to the PDD is sufficiently accurate and complete in order to comply with the requirements of the CDM.

The Project's start date is defined as 16/10/2007; this is the contact agreement date between SAIL and Consortium Comprising of M/s POSCO Engineering and Construction Company Ltd. South Korea and M/s Nagarjuna Construction Company Limited, Hyderabad for the setting-up of Blast Furnace Complex under 2.5 Mt new stream expansion /11/. The validation team accepted the same as this is the first real action taken by the project participant towards implementation of the project activity and also the earliest date on which the project participant has committed to expenditures related to the implementation of the project activity as per the CDM Glossary terms.

The operational life of the project is expected to be 20 years and 0 months as the same was substantiated with the documents provided by supplier /15/. PP has opted for renewable crediting period of 7 years with a forecasted start on 01/03/2011 or a date not earlier than the date of registration of the large scale project activity. The project is expected to reduce CO₂ emissions to the extent of 64,626 tCO₂e / year average and 452,385 tCO₂e totaled over the 7 years crediting period.

RINA was able to verify all the documented evidence listed above during the validation process and can confirm that data and considerations are complete and accurate; moreover RINA confirms that the description of the proposed CDM project activity, as contained in the PDD sufficiently covers all relevant elements, is accurate and complete and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity.

3.4 Application of selected baseline and monitoring methodology

The project correctly applies the approved baseline and monitoring methodology "ACM0012", "Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects", version 3.2 of 04/12/2009 /05/. The assessment was carried out for each applicability criteria and included among others the compliance check of the local project setting with the applicability conditions in regard to baseline setting and eligible project measures. The project activity under consideration recovers the waste heat in flue gases from blast furnace hot stoves for generation of heat in elemental process.

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- The project is a green field activity as it is a part of the expansion project of SAIL and utilization of waste heat for preheating the fuel gas and combustion air, it falls under Type – I activities of ACM0012, version 3.2.
- the project activity involves the installation of waste heat recovery system that recovers the waste energy in flue gases from blast furnace hot stoves for generation of heat in elemental process (preheating combustion air and BF gas).

The proposed project activity meets the criteria defined in the baseline methodology as it ensures that:

- the project activity involves the only utilization of waste heat for preheating BF gas and combustion air, and no electricity generation is expected as confirmed by the project feasibility report prepared by MECON, a Government of India Enterprise.
- the energy in the project activity is generated by the owner of the industrial facility and used within industrial facility; the waste heat recovery project is installed as a part of the SAIL's expansion activity and hence the project involves installation of a new waste recovery, which is used for heating up the combustion air and BF gas used in Hot Blast Stoves. SAIL is one of the largest steel manufacturers in India and covers a huge area within its boundary, accommodating the industrial facility, township and other related amenity / utility facilities. Also, there are no major industries around SAIL. Hence, any transfer of heat to a third party outside the premises of SAIL is not likely to happen. This is also confirmed by RINA on interaction with PP during the site visit.
- the Project activity is a part of Greenfield 2.5 Mt capacity Integrated Steel Plant as a new expansion of SAIL and commercial production has not yet begun at the time of validation. The validation site visit on 27/05/2009 revealed that project is in state of implementation and different units were under construction stage and waiting commissioning. As project is not an existing facility and being installed in parallel at new integrated steel plant of SAIL, thus the demonstration of waste energy utilized in the project activity was flared or released into the atmosphere in the absence of the project activity at the existing facility is not relevant in this case, since this project activity is a green field project. (as per EB clarification: AM_CLA_0156) Hence this option has not been considered for this project activity/46/.
- Waste energy that is released under abnormal operation of the plant will not be accounted for /26/ as per the self declaration made by SAIL.
- There are no regulations preventing the use of mixed gas for energy generation prior to the implementation of the project activity/10/, this is transparent from the no objection certificate no. 57722 issued by the West Bengal Pollution Control Board /10/ for the project. There are no conditions with respect to this as well as per the list of environmental laws applicable to the steel industry as a whole as given paragraph 7 of this no objection certificate.
- Emission reductions are claimed by SAIL as per Annex of the PDD, SAIL is the project proponent, recovering waste heat from flue gas, uses the energy recovered for preheating BF gas and combustion air and claims the emission reduction resulting from the project,.

It is confirmed by validating the methodology /05/ referred to in the PDD, by cross-checking the PDD against the methodology as mentioned in UNFCCC website /05/ that the PP has used the correct and latest version of the methodology as applicable to the project activity,

As required by para 77 of VVM version 1.2, the emission sources which are not addressed by the applied methodology and which are expected to contribute more than 1% of the overall expected average annual emissions reduction have been identified. PP has submitted a spread sheet indicating the use of heavy vehicles, light vehicles and lighting during the construction of the project and RINA reviewed the assumptions and calculations in the spread sheet and considers it to be sufficient and realistic /28/. The resultant project emissions are estimated to be very much less than 1% (0.02%) of the total emission reductions.

RINA hereby confirms that the selected baseline and monitoring methodology has been previously approved by the CDM Executive Board, and is applicable to the Project, which complies with all the applicability conditions therein.

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3.5 Project boundary and baseline identification

3.5.1 Project boundary

According to the approved baseline and monitoring methodology “ACM0012”, “Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects”, version 3.2 of 04/12/2009 the project boundary includes: blast furnace and blast furnace stoves, the facilities where waste energy is generated and reused, heat exchanger for BF gas and combustion air, the facility which recovers the waste heat from the flue gas of blast furnace hot stoves piping system to carry BF gas and air, which is used to transport hot air and Hot BF gas to the blast furnace stoves

Emissions sources included in the project boundary are shown in the table below:

	GHGs involved	Description
Baseline emissions	CO ₂	Emission from fuel consumption in furnace and boiler for thermal energy
Project emissions	N/A	Reusing heat content of flue gas, no supplemental fossil fuel or electricity consumption in the project, cleaning of BF gas is a process requirement and exists in the baseline; hence there are no project emissions.
Leakage	N/A	No Leakage, applying the methodology

By checking the information and the project site, RINA can confirm that the project boundary and emission sources described in the PDD are accurate and complete, and also that the selected sources and gases are justified for the proposed project activity.

3.5.2 Baseline identification

According to the approved baseline and monitoring methodology “ACM0012”, “Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects”, version 3.2 of 04/12/2009 /05/ the baseline scenario was determined through following four steps:

Step 1: Define the most plausible baseline scenario for the generation of heat and electricity using the following baseline options and combinations:

Six alternative scenarios for the use of waste energy and nine alternative scenarios from heat generation were identified. Power generation alternatives are excluded since the project activity does not involve the power generation.

For the use of waste energy realistic and credible alternatives includes:

W1: WECM is directly vented to atmosphere without incineration or waste heat is released to the atmosphere or waste pressure energy is not utilized; as per the project; this can be considered to be a likely baseline scenario.

W2: WECM is released to the atmosphere (for example after incineration) or waste heat is released to the atmosphere or waste pressure energy is not utilized; hence this can be considered to be a likely baseline scenario

W3, W5 and W6: Waste energy is sold as an energy source; this cannot be considered as baseline scenario as there is no system for recovering and transferring the waste heat for energy source. The project is a new project activity and being installed along with the expansion plan of SAIL, hence there was no system for recovering and transferring the waste heat. Also as per the site visit and the interview had with the project proponent and cross verification done with google earth, SAIL is one of the largest steel manufacturer in India and covers a huge area within its boundary, accommodating the industrial facility, township and other related amenity / utility facilities. Hence, any transfer of heat to a

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third party outside the premises of SAIL is not likely to happen and cannot be considered as a likely baseline scenario. This is also confirmed by RINA on interaction with the PP during the site visit.

W4 Waste energy is used for meeting energy demand requires huge investment and it faces technical as well as investment barriers. Hence it is not a plausible baseline scenario. This is the project activity and technical and investment barriers faced by the project are discussed subsequently in this report.

Out of the realistic and credible baseline alternatives available for the use of waste energy, W1 or W2 which state that waste heat would have been released to the atmosphere is found to be most appropriately considered in relation to the project activity.

For the heat generation, realistic and credible alternatives include:

H1: Proposed project activity is not undertaken as a CDM project activity; as it faces barriers for its implementation so cannot be considered as suitable baseline scenario. Further discussion is available in the additionality section of this report.

H2, H3 and H9: On-site or off-site existing/new fossil fuel based cogeneration plant; since project activity is not a cogeneration plant so these scenarios are not applicable for baseline.

H4: An existing or new fossil fuel based boilers; fossil fuel fired heat generation is an economically attractive option. So this scenario can be considered as a plausible baseline scenario. RINA accepted the same because during site visit and on interaction with the PP it is noted that the PP already has the expertise in fossil fuel based boilers and have installed and operating the same in the plant in other processes within the SAIL premises. Moreover there is no restriction on the use of fossil fuel based boilers.

H5: An existing or new renewable energy or other waste energy based boilers; SAIL is an integrated steel producing industrial facility and energy requirements of the facility is enormous and continuous. Since renewable sources such as wind, hydro and biomass are not continuously available throughout the year /67/; this would not cater to a continuous energy intensive process such as steel making. The CO₂ baseline database published by the Government of India /68/ does not consider wind, biomass and solar based plants under base-load category, as they are not continuously available, hence renewable sources such as wind, biomass and solar energy cannot be considered as a credible alternative in terms of continuous availability as in the case of project activity. Also as wind and Hydro projects only generate electricity; the same cannot be considered as baseline alternatives as the project activity recovers and supplies heat energy. Further, it is noted that no steel industry in India of comparable outputs as that of SAIL is known to operate on renewable energy based boilers. This is substantiated with the confirmation /60a/ from M/s. RINL and email /60b/ from M/s. JSW who are also major steel manufacturers in India and comparable to SAIL, which declares that they do not use any Biomass as an energy source for the process. The Corporate sustainability report, 2008 /60c/ of M/s. Tata Steel also mentions that in steel making process, use of renewable energy is highly limited due to techno-commercial non viability. Further, other waste energy based boilers were not available on site in the pre-project scenario as confirmed by the validation team during site visit. Considering the above facts, it is accepted that an existing or new renewable energy or other waste energy based boilers cannot be considered as a plausible baseline scenario. H6: Any other source such as district heat; there is no district heat facility is available in the project location, so not a baseline scenario. This is not a practice in any part of the host country, India is a tropical country and such district heat facilities are not available in the country. This information was also confirmed using Google search.

H7: Other heat generation technologies (e.g. heat pumps or solar energy); there is no such facility is available in the project location so not a baseline scenario. Use of solar energy in India is less than 0.1% of its total electricity production, as the installation costs are prohibitive as available in the solar energy website /51/. Direct use of solar heat energy in India is limited to domestic use and rare. The project location does not have any geothermal resources as per the study on geothermal sources done by IIT, Bombay /52/

H8: Steam/Process heat generation from waste energy, but with lower efficiency; considering the fact that there is no steam/process heat generation in the existing scenario which can be used as a source to supply the heat energy, as confirmed by the validation team during site visit, steam /process heat generation using waste heat with lower efficiency is not applicable. Process heat generation from waste energy, the project activity faces barriers for its implementation. The barrier faced by the project is discussed in detail in section 3.6.3. It is to be noted that lower efficiency brings down the amount of

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heat exchanged thus affecting the feasibility of the project and hence cannot be considered as a suitable baseline. The team also validated this by observing the consequent change in the investment analysis spreadsheet /04/ version 2 dated 04/08/2010, for a 10% drop in efficiency the Project IRR reduces from 9.75% to 8.06%. Hence this scenario cannot be considered as a plausible baseline scenario. Further certificate from the manufacturer of the blast furnace (POSCO E & C Co. Ltd) /64/ dated 08/08/2011, confirms that the only alternative for the project activity is to vent the waste heat.

For heat generation amongst the realistic and credible baseline alternatives provided by the methodology applied, H4, which is new or existing fossil fuel fired heat generation, is considered appropriate.

Thus the potential baseline alternatives available to the proponent in absence of the project activity are either of the combination of waste energy and heat W1 /H4 or W2/H4

Step 2: Identify the fuel for the baseline choice of energy source taking into account the national and/or sectoral policies as applicable:

There is no national or local regulation on mandatory uses of waste heat recovery in such cases. However, the National Government has been very proactive towards the utilization of energy efficiency technologies. Some of the Policies which support/promote energy efficiency as well as Climate change mitigation initiatives are listed below:

- National Action Plan on Climate Change./58a/
- Energy Conservation Act. 2007./58b/
- Electricity from Renewables/58c/
- Enhancing Energy Efficiency for Power Plants /58/.
- Introduction of Labeling programmes for appliances /58/.
- Energy Conservation Building codes /58d/.
- Accelerated Introduction of Clean Energy Technologies through the CDM /58/

The above policies do not bind SAIL to take up the proposed project activity.

In the absence of the proposed project activity excess BF gas would have been consumed for the same output (Hot blast). Since BF gas has a higher emission factor (260 tCO₂e/TJ sourced from IPCC /33/), as a conservative approach equivalent amount of coal (94.6 tCO₂e/TJ) also from IPCC /33/ is used as a baseline fuel.

There is no supply constraint for coal in India. As per the World Energy Outlook 2007/59/, although the coal deposits are widely distributed, 67% of the World's recoverable reserves are located in four countries, the United States, Russia, China and India. This has also mentioned and confirmed by the World Coal Association in its web site /53/. Indian Coal reserve is 10% of the total world coal reserve. Hence it is demonstrated that the coal is available in surplus and available throughout the year and the primary fuel for SAIL.

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

The assessment of the above step is described in section 3.6 of this report.

Step 4: If more than one credible and plausible alternative scenario remain, the alternative with the lowest baseline emissions shall be considered as the most likely baseline scenario.

SAIL release heat energy by virtue of its process in blast furnace and hot stoves that gets wasted. The proposed project is to recover waste heat and using the recovered waste heat to preheat BF gas and air used in Blast furnace stoves.

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The baseline is generation of only heat energy

Project Scenario	Baseline options		Description of situation
	Waste gas	Heat	
1	W1 or W2	H4	The waste heat will be released in to the atmosphere along with the flue gas without any utilization and the heat demand will be met by burning of fossil fuels

W1 and W2 are different scenarios only if there is a waste energy carrying medium, in the baseline, the waste energy is the flue gas (by-product gas) which is the by product of combustion, which is vented to the atmosphere directly, hence W1 and W2 are the same.

Further in line with the requirements as set out in the clarification /69/ on the approved consolidated methodology ACM0012 version 03.2 regarding CDM project activities that recover waste energy in Greenfield facilities, the PP has obtained a certificate /64/ from the manufacturer of the Blast Furnace including the stoves on the alternative design for waste heat recovery from blast furnace stove, which mentions that "Based on our global experience as a Blast Furnace technology provider, it is stated that in absence of this project facility, the waste energy would have been released in to the atmosphere through chimney, as there is no other viable option & design to recover waste energy from Blast Furnace Stove flue gas (exhaust), RINA accepted the letter as it is from POSCO E & C Co. Ltd, a world renowned organization in the manufacturer of the Blast furnace, the blast furnace stove and the waste heat recovery system / 70 / .

Hence , the only credible alternative is a combination of baseline scenario for the proposed project activity is W1 /W2 and H4 i.e., "The waste heat will be released in to the atmosphere along with the flue gas without any utilization and the heat demand will be met by burning of fossil fuels".

Further, the PP has also demonstrated through investment analysis /65/ that the selected baseline is the least cost option by comparing the unit cost of energy based on additional investment and operational costs due to the project activity and against the expenses on fossil fuel consumption which would have been incurred in the event of continuation of the baseline.

The input values taken for this analysis are the same as that of what is used in the benchmark analysis and the same is justified in section B.6.3 of this report except for additional cost of funds and the additional manpower cost. The additional cost of funds INR 8977.51 (8021.09 +956.42) lakhs, as confirmed by the Chartered accountant vide certificate /66/ dated 14/09/2011 and the additional manpower cost INR. 1317.6 lakhs through the lifetime of the project activity, as certified by the manufacturer /38/ were taken by the PP and it has been demonstrated that the baseline chosen, that is: combination of W1/W2 and H4 is the least cost option.

RINA was able to verify all the documented evidence listed above during the validation process and can confirm that:

- All the assumptions and data used by the project participants are listed in the PDD, including their references and sources;
- All documentation used /01/-/70/ is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD;
- Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable;
- Relevant national and/or sectoral policies /58-58a-58b-58c/ and circumstances are considered and listed in the PDD;

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- The approved baseline methodology “ACM0012” has been correctly applied to identify the most reasonable baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed CDM project activity.

3.6 Additionality

According to the approved baseline and monitoring methodology “ACM0012”, “Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects”, version 3.2 of 04/12/2009 /05/, the additionality of the project has been established applying the tool “Tool for the Demonstration and Assessment of Additionality”, version 5.2.1 /12/.

The opinion of RINA to the additionality of the proposed project is further explicitly explained in the following steps.

3.6.1 Prior consideration of the clean development mechanism

The proposed project starting date is 16/10/2007 when the contract for the setup of Blast Furnace Complex under 2.5 Mt new stream expansion /11/ is signed as it is the earliest date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity as per the Glossary of CDM Terms.

The proposed project has the starting date of 16/10/2007 which is before 02/08/2008 and prior to 12/03/2009 when the PDD was published for global stakeholder consultation; for that reason the PP has demonstrated that the CDM was seriously considered in the decision to implement the project activity through the document “324th Adjourned Meeting of the Board of Directors”, dated 26 /05/2007 wherein it has clearly mentioned the projects identified to be taken up with the CDM and the decision for the appointment of a consultant for CDM projects /09/. The PP has also submitted the detailed project report which also confirms the financial viability of the project considering the CDM revenues. The detailed project report /08/ prepared during 2006 issued on 10/11/2006 for the proposed project activity was available to the project proponent before the date of decision making and hence the project has been included in the Annexure I of the 324th Meeting of the Board of Directors. However since this Board minute is not reflecting the decisiveness with respect to this project activity, it is taken as evidence for the awareness of PP to CDM. However, the PP further demonstrated through the investment analysis that the project is not viable without the CDM revenues. It is noted that the input values to the financial analysis are relevant at the time of decision making. SAIL being a public sector undertaking, the documents are audited by the company auditors and are also reported to the ministry. Hence the Board minutes and the related documents submitted to the validation team to demonstrate the financial unattractiveness of the project without CDM revenues are considered credible.

Thus the team confirmed that the PP was aware of CDM before the start date of the project activity and that CDM has been the decisive factor to go ahead with the project activity.

The commencement of the validation (date of publication of the PDD for stakeholders) was 12/03/2009 /30/ and from the date of the investment decision and the date of the commencement of the validation process the following actions have been taken to secure the CDM status in parallel with the physical implementation:

Date	Activity	Evidence
16/10/2007	Contract signed between M/s Steel Authority of India Limited and Consortium of M/s POSCO E&C Limited and M/s. NCC for the construction of the project activity.	Copy of the contract agreement /11/
19/11/2007	Work order between SAIL and CDM consultants for CDM services.	Letter of award /19/
31/01/2008	Invitation sent to stakeholders for Stakeholder meeting.	Copy of the invitation letter /20/
04/02/2008	Stakeholder meeting conducted in IISCO Steel Plant, SAIL.	Copy of records notes /21/
18/06/2008	Submission of PDD to Ministry of Environment & Forests, Government of India for HCA.	Copy of the application

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30/06/2008	Grant of Consent to Establish by the West Bengal State Pollution Control Board, which is a pre requisite in India for starting any construction activities for the project.	/22/ Copy of consent condition /10/
16/01/2009	Host country approval received for the project activity.	Copy of the HCA /02/
12/01/2009	Appointment of the validator	Copy of the Economic Quotation /23/
12/03/2009– 10/04/2009	Web hosted for Global Stake holder Consultation Period.	http://cdm.unfccc.int/Projects/Validation/DB/ECC/E7PJIJTYIIAMZDMU558Y5HYN1PO/view.html
27/05/2009	Validation site visit.	Attendance sheet /44/

RINA was able to check the above documents and considers satisfactory actions were undertaken to secure CDM status in parallel with the physical implementation of the project activity according to EB49 Annex 22. During site visit it is confirmed that the project is under implementation only and still not commissioned.

To confirm the real and continuing action, RINA reviewed (contracts with consultants for CDM/PDD/methodology services, Public tender for CDM consultancy services, Contract signed between M/s Steel Authority of India Limited and Consortium of M/s POSCO E&C Limited and M/s. NCC for the construction of the project activity, stakeholder consultation and appointment of validator earlier correspondence on the project with the DNA or the UNFCCC secretariat.) Verify the gap between the date of the documented evidence and the date when the PDD was published for global stakeholder consultation.

RINA has assessed and verified the evidence related to timeline for serious CDM consideration and the real and continuing action to attain CDM status of the project activity in line with Annex 22 of EB 49. CDM was therefore seriously considered in the decision to proceed with the project activity in compliance with EB49 Annex 22.

In conclusion, in accordance with the requirements of the Guidance on the demonstration and assessment of prior consideration of the CDM /07/ and VVM /06/, RINA can confirm that the CDM was considered seriously in the decision to implement the project activity.

3.6.2 Identification of alternatives

The alternative scenarios for the project activity consistent with all applicable and enforced legislation have been identified, as shown below:

Alternative 1: Proposed project activity without undertaken as a CDM project activity

Alternative 2: Utilization of fossil fuel for meeting the heat demand

RINA can confirm that the alternatives identified in the PDD are credible and complete.

3.6.3 Investment analysis

The PP has used step 2 of Investment analysis of the Tool for the demonstration and assessment of additionality” to prove that project activity is not;

The most economically or financially attractive; or

Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).

3.6.3.1 Choice of approach

The project participant has chosen to apply the benchmark analysis method and has identified Pre tax Project IRR as the most suitable financial indicator. Additionality Tool (Ver. 05.2.1) recommends a financial/ economic indicator such as IRR, for demonstrating the additionality using benchmark

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analysis. The team consider pre tax project IRR as an appropriate financial indicator on account of the following:

1. Since the project activity generates revenue from the savings in equivalent coal consumption, the simple costs analysis (Option I) cannot be applied.
2. The alternative to use more BF gas in the hot stoves without waste heat recovery system does not require investment: hence the Investment Comparison Analysis (Option II) is not appropriate.

The financial Analysis was prepared at the time the decision to invest in the project was taken. Hence some of the costs used have been estimates or have been based on offer letters.

The three important parameters which determine the IRR are

- project cost
- financing levels and costs and
- Estimates of profits and incomes.

Accuracy and suitability of these parameters using the available evidence and expertise in relevant accounting practices:

The above parameters are in line with the generally accepted accountancy practices and the accuracy of the above parameters are verified using third party or publicly available resources as mentioned below in the section 3.6.3.3. Hence, benchmark analysis is considered appropriate for the project activity.

3.6.3.2 Benchmark selection

Prime lending rate of five major scheduled commercial banks for the period April 2007 has been considered as the benchmark. The rate is 12.75%. RINA independently verified the rate against the weekly statistical report provided by the Reserve Bank of India for the week ended 11th May 2007 /54/ and can confirm that these rates would have been available to the PP at the time of decision making.

It is imperative that the benchmark selected should be suitable for the type of financial indicator presented. Further guidance on this is provided in EB 51 Annexure 58 – Guidelines on the Assessment of Investment Analysis Version 3 wherein point 12 states *In cases where a benchmark approach is used the applied benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR. Required/expected returns on equity are appropriate benchmarks for an equity IRR. Benchmarks supplied by relevant national authorities are also appropriate if the DOE can validate that they are applicable to the project activity and the type of IRR calculation presented.*

The PP has chosen to use pre – tax IRR as the financial indicator. Normally the PLR would be considered as a benchmark for post tax IRR. However applying the tax rate to the PLR would only increase the benchmark, hence it is accepted that the benchmark chosen is suitable for the project, appropriate to the financial indicator chosen and relevant at the time of decision making.

Hence the selection of PLR as bench mark for the financial indicator i.e., project IRR is justified.

3.6.3.3 Input parameters

RINA has validated the input parameters used in the investment analysis and the following steps have been followed to assess the investment analysis.

Assessment of the sources used for input parameters. All input parameters used in the financial analysis are taken from third-party or publicly available sources as mentioned in the below table, and thus can be considered information provided by independent source;

Confirmation of the values in the PDD and investment analysis. RINA compared the input parameters for the financial analysis included in the PDD and in the investment analysis excel sheet with the parameters stated in the third-party or publicly available sources used and was able to confirm that the values applied are consistent with the value stated in the document mentioned before and described in the below table;

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Assessment of the period between the time of the DPR finalization and the starting date of the project activity. The starting date of the project was on 16/10/2007 which was eleven months after the DPR completion (10/11/2006) thus it is reasonable to assume that the DPR has been the basis of the decision to proceed with the investment decision taken during the SAIL Board meeting of 21/05/2007;

Cross check of the input parameters used in the financial analysis. The input parameters used in the financial analysis were cross-checked and all the data sources used to cross-check were checked during the validation process. The process is described in the below table.

The waste heat recovery project is a part of a larger 2.5 Mt new stream expansion at the IISCO Steel plant. The decision to proceed with the expansion was made on the basis of a DPR prepared by MECON Ltd for the entire 2.5Mt new stream expansion. No separate DPR was prepared for the Waste heat Recovery project. MECON LIMITED was established in 1959 under the aegis of Central Engineering & Design Bureau (CEDB), is India's frontline engineering, consultancy and contracting organization, offering full range of services required for setting up of Project from concept to commissioning including turnkey execution.

PP has used an internal document "Guidelines for formulation of investment proposal for appraisal" /36/, /37/ valid since 2000, as source for the input values: i) expenses during construction and ii) contingency cost, assumed in the investment analysis. These internal guidelines /36/, /37/ are followed by SAIL in the formulation of all new investment appraisals /61b/ to /61f/. This is confirmed with the approval /61a/ of the said document by SAIL's Chairman dated 30/10/2000. This was issued by the Project Directorate of SAIL in the year 2000, by the order /61g/ dated 27/11/2000. These guidelines are the latest available at the time of decision making, and the same is confirmed by validation team by verifying the SAIL projects directorate webpage available in SAIL's portal. These guidelines are consistently used by the PP since 2000 for decision making in all the project appraisals, as certified by the Chartered accountant vide certificate dated 16/05/2011 /61/. RINA further verified the projects taken up by SAIL after the year 2007 and found that these guidelines have been used till the year 2010 /61h/ after which there has been a revision to this guideline. SAIL being a public sector undertaking with public accountability, RINA accepted the guideline as a credible document available to the PP at the point of decision making. Further the Chartered accountant also certified /61/ that the values of the expenses during construction and the contingency cost assumed in the financial calculations by the PP are in line with the feasibility reports of other projects of SAIL after 2000 and also in line with those considered by registered projects of other Indian steel companies. Hence, RINA confirms that the document is appropriate and credible to be used as a source for input values used in the investment analysis.

Parameters	Unit	Value	Source	Validation justification
Date of decision making		21/05/2007	324 th meeting of the Board Of Directors of SAIL	Verified against the minutes of the Board meeting
Capacity Utilisation		Year 1-100% onwards 100%	Most conservative situation possible	Accepted as this is the most conservative estimate.
Basic Cost of the Waste Heat Recovery system	INR Lakhs	2271.5	Letter from MECON dated 12/06/2010	DPR was prepared during 2006 and issued on 10/11/2006 /08/ and available to the PP on the decision making date 26/05/2007. The breakdown of the cost of WHR has not been provided by MECON Ltd in the DPR; however they have issued a separate letter confirming the cost of the WHR system. RINA accepted the letter as the support of the

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				<p>project cost as it has been issued by MECON Limited, the consultants to the project this is considered as a third party document as it is a Government of India enterprise and authorised agency to prepare such reports with experts in the field. Also the actual cost of the WHR was INR 2530.47 lacs which is higher than the assumption used in this financial analysis /57/. The value assumed is the basic cost and hence not inclusive of tax. The value inclusive of tax is INR 2907.50 lacs.</p>
Expenses during construction @ 17% of total project cost	INR Lakhs	494.275	Annex - IV Guidelines for formulation of investment proposal for appraisal	<p>Verified against the guidelines mentioned herein. These internal guidelines followed by SAIL in the formulation of all new investment appraisals. This is issued by the Project Directorate of SAIL in the year 2000. These guidelines are the latest available guidelines at the time of decision making and are consistently used by the PP in decision making. This was confirmed during the site visit and found that it is valid.. Further the value assumed is certified by the chartered accountant vide certificate /61/ dated 16/05/2011, detailing that this guideline /36/ /37/ is used for formulation of investment proposals of various projects of SAIL /61b/ to /61f/ and that the value assumed 17% of total project cost is consistent with similar waste heat recovery projects registered with UNFCCC of other Indian Steel Companies. RINA verified that for the</p>

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				registered project from India, ref no: 0528, the EDC has been assumed as 18%, the value assumed by the PP is conservative hence considered accurate and appropriate.
Contingency @ 3% of total cost	INR Lakhs	87.225	Annex - III Guidelines for formulation of investment proposal for appraisal	<p>Verified against the guidelines mentioned herein. These internal guidelines followed by SAIL in the formulation of all new investment appraisals. This is issued by the Project Directorate of SAIL in the year 2000. These guidelines are available at the time of decision making and are consistently used by the PP in decision making.. However in order to ensure that the project continues to remain additional, we have considered the impact of removing the contingency costs entirely. Our own analysis reveals that the project IRR increases to 9.75% from 10.06% on removal of the contingency costs. Therefore the impact is not significant. Further the value assumed is certified by the chartered accountant vide certificate /61/ dated 16/05/2011, detailing that this guideline /36/, /37/ is used for formulation of investment proposals of various projects of SAIL /61b/ to /61f/ and that the value assumed 3% of total project cost is consistent with similar waste heat recovery projects registered with UNFCCC of other Indian Steel Companies. RINA verified that for the registered project from India, ref no: 2504, contingency cost has been assumed as 5%, the value assumed by the</p>

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				PP is conservative, hence considered accurate and appropriate.
Operation & Maintenance cost @ 5% of total cost	INR Lakhs	145	Communication from IISCO Steel Plant	The operations and maintenance of the WHR plant will be carried out by SAIL themselves and not by any external parties. Therefore there are no quotations from any suppliers for O&M costs. Given the size of the project, an estimate of 5% appears reasonable, this assumption was also compared with registered projects from India, ref no: 2504 and 2917 and found conservative, hence has been accepted. In order to confirm the impact of changes in operation and maintenance cost, we have considered the same as a parameter for sensitivity analysis. This assumption has also been supported by a certificate from the technology supplier/manufacturer.
TAX cost	INR Lakhs	636	Detailed Project Report prepared by MECON on 23/11/2006.	Verified against the assumptions on tax cost in the detailed project report. The tax costs comprise import duties, sales tax etc and are in accordance with Indian Tax Laws
Operating and Management costs	INR lakhs per annum	145	Based on certificate from the supplier	POSCO Engineering and Construction Co Ltd are responsible for the operation and maintenance of the WHR system. Initially during the performance guarantee period on successful completion of performance Guarantee Test, the system maintenance shall be carried out by SAIL. They have certified that annual operating and management costs are usually about 5% of the total project costs. This is also compared with other similar registered CDM projects 2504 and 2917

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				and found to be acceptable, Although the certificate is dated after the decision making date, we have accepted it on the grounds that the assumption of 5% of the project cost does not appear excessive and consistent with what is assumed as O&M costs by SAIL themselves after the performance guarantee period.
Residual Value	%	10	Estimated	The estimated residual value is 10% at the end of 20 years which is a conservative estimate hence acceptable. The PP and the DPR consider the residual value to be Nil. However PP has used 10% to demonstrate conservativeness. This is also comparable with similar registered projects 2504 and 2917.
Average cost of coal	INR / Kg	1.492	Monthly coal receipts from 2006 to 2007	A summary of the coal receipts for 2006-2007 has been provided to us. This has been certified by Mr. Prasao, Manager (Finance), IISCO Steel Plant. Since SAIL is a public sector undertaking with public accountability, RINA accepted this document as the source for fuel costs.
Average calorific value of coal	Kcal /kg	4125	Communication from IISCO Steel Plant to ISP 37.	The calorific value of coal varies widely /63/ and cost of coal depends on the grade / calorific value of coal used. SAIL uses non-coking Boiler grade coal for its thermal requirements. RINA confirmed this by cost versus calorific value of coal referring i) Coal India Limited letter dated 15/06/2004 /63a/, ii) Ministry of Coal, GoI, office memorandum dated 29/03/2007 /63b/, approved monthly linkage of coal for the period

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				<p>April-June of financial year 2007- 2008, and run of mine coal cost, iii) Boiler coal passed bill /63c/ and the debit for transfer of coal for Ramnagore /63d/ during the decision making period and preparation of the detailed project report, iv) the grade and calorific value of coal and the cost of coal as available in the Coal India website /63/, v). Table 2 of energy performance plan prepared by SAIL R& D centre, Ranchi /63e/. Thus for the cost of coal assumed in financial analysis, only coal with calorific value of 4125 kcal/kg is available. Cost of coal has been arrived as an average /48/ for a period of 3 years prior to the decision making date. Hence it is justified that the value assumed is accurate and appropriate.</p>
Heat exchange rate in BF gas heat exchanger	Gcal / hr	10.235	Calculated based on Manufacturer's specification	Calculation verified
Heat exchange rate in combustion air heat exchanger	Gcal / hr	9.193	Calculated based on Manufacturer's specification	Calculation verified
Operating days	Days	350	Technical specification of blast furnace	Verified against the technical specification.
Saving of coal per year	Kg / year	39562473	Calculated	Calculation verified
Cost savings per year	INR lakhs/year	590.2877192	Calculated	Calculation verified
CER revenue	Euros/t	10	http://www.carbonpositive.net/viewarticle.aspx?articleID=730	Carbon Positive is a communications services business in the greenhouse emissions abatement industry and associated carbon finance markets. They are a leading industry hub for carbon news, information and business intelligence in the shipping and forestry sectors. In their market report for April

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				2007, they have suggested the rate of Euros 10 as bids for projects at the validation stage. As this report was available at the time of decision making it is accepted.
Exchange rate for 1 euro	INR	56.49	Letter from IISCO	SAIL in their letter dated 9/3/2010 have confirmed that this is the rate used by them in calculating the cost of the project. We have cross verified this against the contract agreement dated 16/10/2007 between IISCO and POSCO, NCC consortium.

Composition of operating and management costs:

Operation and maintenance costs have been assumed by PP as 5% of total project costs based on their past experience. This has been taken as a parameter for sensitivity analysis and found that operation and maintenance cost has to be reduced by 80% for the project to reach the benchmark chosen. The Manufacturer (POSCO) confirmed through its letter dated 12/06/2010 /38/ the accuracy of value assumed by the PP. The value assumed was cross checked with other similar registered CDM projects 2504 and 2917 and found to be conservative. RINA accepted a few post decision dated documents as given below as they were submitted by the PP only to support the accuracy and appropriateness of the assumption of 5% of total projects costs as operation maintenance cost. The composition of operating and management costs is as under:

<u>Parameters</u>	<u>Unit</u>	<u>Value</u>	<u>Source</u>	<u>Validation justification</u>
Manpower Deployment cost	INR Lakhs	65.88	Letter from SAIL, ISP Finance, pay execution section, dated 30.04.2011 /62h/ and Letter from Plant engineering and development division dated 14.05.2011 /64a/	As per the letter from SAIL, ISP Finance, pay execution section dated 30.04.2011 /62h/ the pay scale as of 31.03.2007 is provided. As per letter from Plant Engineering and Development Division dated 14.05.2011 /64a/, the number of executives and non executives to be employed at site is given. The product of the above two data is assumed as the Manpower deployment cost. The accurateness and the suitability of this assumption have been certified by Deepak Agarwal Associates

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				Chartered Accountants /62/ dated 20/05/2011. Hence accepted.
Cost of Spares	INR Lakhs	16.0	Hot Blast stove general layout diagram No.ISP-POSCO E&C-V-007-400-50-BE-40002 /62c/ and certificate from POSCO received by PP on 13/05/2011 /62f/ and the breakdown for the value assumed with detailed list of equipments and its respective cost.	The Hot Blast stove general layout diagram No.ISP-POSCO E&C-V-007-400-50-BE-40002 /62c/ gives the list of spares and its location in the project activity and certificate from POSCO received by PP on 13/05/2011 /62f/ gives the breakdown for the value assumed with detailed list of equipments and its respective cost. Hence the complete breakdown of the value assumed is supported with manufacturer's certificate. The assumption is also verified by chartered accountant /62/ and certified to be inline with the practice of SAIL and has been envisaged by the PP and the supplier POSCO. Hence accepted.
Operational Expenditure	<u>INR Lakhs</u>	5.0	The P& I Diagram No.ISP-POSCO-E&C-V-007-400-01-BE-70036 /62d/, P& I Diagram NO .ISP-POSCO-E&C-V-007-4921-01-DE-72042 /62b/ Letter from power engineering department of SAIL dated 09/04/2010 /62g/	The P& I Diagram No.ISP-POSCO-E&C-V-007-400-01-BE-70036 /62d/, gives the list of monitoring equipments and the P& I Diagram NO .ISP-POSCO-E&C-V-007-4921-01-DE-72042 /62b/ gives the electricity consumption by the project activity, used for lighting and monitoring equipments, the letter from the power engineering department of SAIL dated 09/04/2010 /62g/ gives the cost of grid electricity from 2001-02 to 2009-10 till Feb 2010. Thus the value assumed as operational expenditure is arrived; this has been verified and certified by the chartered accountant dated by

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				certificate /62/ dated 20/05/2011. Hence accepted.
Repair & Maintenance	INR Lakhs	58.14 (2% of project cost)	No.FIN/02/PFA/Circular, dated 28/08/2008 /62e/	Circular from the Assistant General Manager Finance dated 28/08/2008 /62e/ gives that the normative repair and maintenance cost is to be taken as 2.5% of total capital cost for financial evaluation of capital projects; the value assumed by the PP is conservative to this guidance. Similar projects of SAIL have been verified and certified by the Chartered accountant /62/ vide certificated dated 20/05/2011.

Based on the information verified, RINA was able to confirm that the input parameters used in the financial analysis are reasonable and adequately represent the economic situation of the project activity at the time of the investment decision.

3.6.3.4 Calculation and conclusion

The assessment involves checking the data input taken from quotation/documents, adoption of correct accounting principle and arithmetical accuracy. We have checked the quotation/ documents and ensured that right input has been taken in the project cost and projections. The accounting principles adopted with respect computation of interest during construction, block of assets, pro rata expenses and tax computation are found to be in order. The arithmetical accuracy is also found to be correct. The principle adopted by the project developer for computing project IRR is in conformity with the "Guidance on the Assessment of Investment Analysis" issued by EB. IRR has been computed for 20 years. The residual value is 10% of equipment cost, which appears reasonable and is in line with prevailing practices.

The IRR calculations were provided in a spreadsheet /4/. The calculation were verified and found to be correct by RINA as well the assumptions used in the calculation were deemed to be correct. The pre tax project IRR thus computed is 9.75% without CDM revenue which confirms that the proposed project activity in absence of CDM benefits and compared to the benchmark IRR of 12.75% is not financially attractive, while the project IRR with CDM revenues is 15.85%. The PP has used the most conservative estimates possible and has carried out a fairly exhaustive sensitivity analysis. Considering these factors, we find the project to be additional and it continues to remain additional under all circumstances.

3.6.3.5 Sensitivity analysis

The Guidance on assessment of investment analysis requires that the investment analysis should contain a sensitivity analyses that supports the robustness of the conclusion arrived at by varying the critical assumptions to a reasonable variation ($\pm 10\%$). The project developer has identified the following parameters as the most critical assumptions. Total project cost, quantity of waste heat,

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Operation & Maintenance costs and Coal cost are identified as critical parameters and covers almost the total cost and revenues of the project, hence the analysis is considered sufficient.

Sensitivity Analysis					
Factor	-10%	-5%	0%	+5%	+10%
Quantity of waste heat	8.06%	8.92%	9.75%	10.55%	11.32%
Operation & Maintenance Costs	10.14%	9.94%	9.75%	9.54%	9.34%
Total project cost	11.08%	10.39%	9.75%	9.15%	8.59%
Coal Cost	8.06%	8.92%	9.75%	10.55%	11.32%
Benchmark	12.75%	12.75%	12.75%	12.75%	12.75%

The IRR does not cross the benchmark under any of the above circumstances. The following table shows the situations where the IRR crosses the benchmark.

Sensitivity Analysis				
Factor	Variation	IRR	Benchmark	Validation comments
Quantity of waste heat	+20%	12.81%	12.75%	The waste heat has been calculated taking into account the manufacturer's specification. Therefore an increase of 20% in the heat saved is not possible.
Operation & Maintenance Costs	-80%	12.77%	12.75%	The operating and management expenses have been estimated at 5% of the project costs and this has been supported by a certificate from the manufacturer. Besides the financial analysis does not take into consideration any increase in costs that can be attributed to inflation. Therefore given that the costs have been so conservatively estimated, a reduction of 80% is not possible.
Total project cost	-21%	12.84%	12.75%	The project costs have been computed on the basis of the DPR prepared by Mecon consultants who are experts in the field and a Government of India enterprise. Part of the costs has already been incurred and they are in line with the expectations. We have also been provided a copy of the purchase agreement with the suppliers and the costs are in line with the expectations. The actual cost of the WHR was INR 2530.47 lacs which is higher than the assumption INR 2271.5 lacs used in this financial analysis./57/ Therefore a reduction of 20% is not possible.

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Coal Cost	+20%	12.81%	12.75%	The PP has provided us the details of the coal prices since 2003-04. /48/. The actual cost of coal is about INR.1500 per MT and assumed as INR.1482 per MT in the investment analysis. The average increase in the price of coal has been less than 5%. Hence an increase of 20% is not likely to happen.
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RINA cross verified the Benchmark selected by the PP with the default values as given in the Guidelines on the assessment of investment analysis, version 5, dated 15/07/2011/49a/. The default value of 12.75% is fixed for sector 4 projects as per this new guidance document. Also, it can be noted from the sensitivity analysis table given above that the best Project IRR considering all possible scenarios is only 11.32%, which is less than the default value of 11.75% for a sector 1 project.

The result of IRR and sensitivity analysis shows that without the income from CERs sale, the proposed project activity is unlikely to be financially attractive.

3.6.4 Barrier analysis

Project participants earlier adopted the barrier analysis to demonstrate the additionality of the proposed project activity in the version 1 of the PDD /01/, but argument were not properly supported with concrete evidence and this was raised as an issues, in response to this PP has removed the barrier analysis and now has demonstrated additionality through investment analysis.

As discussed in the previous section of this report the investment analysis has been adopted and all the assumptions as well the IRR calculation were checked by the validation team and it has been demonstrated that the proposed project activity without the CDM revenues is not financially attractive.

3.6.5 Common practice analysis

According to the additionality tool the PP has demonstrated that proposed project activity is not a common practice in India by comparing the existing scenario of the Indian Integrated Iron and Steel industry at the time of decision making. Out of the 7 integrated Iron and steel plants in India during 2007, only four integrated steel plants i.e. TISCO, SAIL, RINL, JSW Steel Limited, were having Blast Furnace –BOF route of steel production. This information has been cross checked at with the presentation made by Ministry of Steel to APP Steel Task force on 26/11/2008. Since it is an official presentation from the ministry of steel, government of India, and publicly available /43/ (<http://www.asiapacificpartnership.org>) this is considered authentic and hence the team accepted the same.

Project Proponent	Project Name	Public source	CDM Status
TISCO	Installation of waste heat recovery system at the hot stoves of G Blast furnace	http://www.nedo.go.jp/english/activities/portal/gaiyou/p93050/p93050.html	No
RINL	No Installation	Letter from RINL dated 04/08/2010 /56/	NA
JSW	No Installation	Letter from JSW dated 03/08/2010 /56/	NA

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As per the additionality tool, the comparison should be done with specific project type. The project activity under consideration involves waste heat recovery from hot stove of blast furnace and hence an analysis comparing the hot stove waste heat recovery technology penetration among the above mentioned Iron and Steel industries reveals that only one Iron and Steel industry had implemented the hot stove waste heat recovery system during May 2007 (Decision making date).

Project Name	Public source	CDM Status
Installation of waste heat recovery system at the hot stoves of G Blast furnace (by Tata Steel) /55/	http://www.nedo.go.jp/english/activities/portal/gaiyou/p93050/p93050.html	No

As discussed above, only one project activity (TATA Steel) had been installed without CDM consideration. However this project activity at TATA steel had been funded and implemented as a part of the model project by NEDO, Japan under the Kyoto mechanism. Hence there is no project activity installed during May 2007 without CDM / external funding. Hence the proposed project activity is not a common practice in Indian Integrated Iron & Steel sector and therefore it is additional.

Thus the team confirms that the proposed project activity is not common practice in the Host Country.

3.6.6 Conclusion

RINA can confirm that all data, rationales, assumptions, justifications and documentation provided by the project participants to support demonstration of additionality are credible and reliable.

By assessing the evidences presented and cross-checking the information contained in, RINA considers the reasoning for the proposed project additionality demonstration is credible and reasonable i.e. the proposed project has the ability to reduce anthropogenic emissions of greenhouse gases by sources below those that would have occurred in the absence of the registered CDM project activity.

3.7 Monitoring Plan

The approved baseline and monitoring methodology “ACM0012”, “Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects”, version 3.2 of 04/12/2009 /05/ has been applied. The selected monitoring methodology is justifiably applicable for the project activity as it allows the usage of waste energy and heat generation and there is no change in the process from which the waste gas is generated

The monitoring plan is in accordance with the monitoring methodology; the monitoring plan will give opportunity for real measurement of achieved emission reductions.

RINA has checked all the parameters presented in the monitoring plan against the requirements of the methodology; no deviations relevant to the project activity have been found in the plan.

RINA confirms that the monitoring arrangements described in the monitoring plan are feasible within the project design, and the means of implementation of the monitoring plan are sufficient to ensure the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified.

3.7.1 Parameters determined ex-ante

The following ex ante values were provided for the estimation of the baseline emissions. The parameters reported in the updated project design document from the project proponent have been assessed in detail through Manufacturer's specification /16/.

- Quantity of waste energy carrying medium (flue gas) entering the heat exchanger (Q_{WECM})
- Quantity of BF gas entering the heat exchanger ($Q_{BF\ gas}$)
- Quantity of Combustion air entering the heat exchanger ($Q_{Comb\ Air}$)
- Temperature inlet of BF gas to the heat exchanger ($Temp\ inlet_{BF\ gas}$)

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- Temperature outlet of BF gas from the heat exchanger (Temp outlet_{BF gas})
- Temperature inlet of combustion air to the heat exchanger (Temp inlet_{Combustion air})
- Temperature outlet of combustion air from the heat exchanger (Temp outlet_{Combustion air})

The values on specific heat (BF gas and Combustion air), density (BF gas and Combustion air), are taken from website - http://www.engineeringtoolbox.com/gas-density-d_158.html. Team has verified the sources and found acceptable.

The values for quantity of Hot metal production and waste energy per unit of product generated by the process, are taken from DPR /08/

The Emission factor of coal has been taken as 94.6 CO₂/TJ.. The source for the EF is IPCC green house gas inventories 2006 which was verified and found appropriate. The number of operating days is taken as 350 from technical specification of blast furnace /15/. The calculations and assumptions were verified by the validation team and found to be correct and appropriate.

3.7.2 Parameters monitored ex-post

The monitoring plan makes provisions for the measurement of the following parameters which will allow for an ex-post assessment of emission reduction.

- **Q_{wcm, y}**: Quantity of Waste energy carrying medium (flue gas) used for preheating during year y (Nm³/hr) which is measured continuously through Orifice Plate and reported daily, archives electronically and papers.
- **Q_{BF gas, y}**: Quantity of BF gas heated during year y (Nm³/hr) which is measured continuously through Orifice Plate and reported daily, archives electronically and papers.
- **Q_{Combustion air, y}**: Quantity of combustion air heated during year y (Nm³/hr).
- **Temp inlet_{BF gas} and Temp outlet_{BF gas}**: Temperature inlet and outlet of BF gas entering and leaving the heat exchanger, which is measured continuously through Thermocouple/ pyrometer and reported daily, archives electronically and papers.
- **Temp inlet_{CA} and Temp outlet_{CA}**: Temperature inlet and outlet of Combustion air entering and leaving the heat exchanger, which is measured continuously through Thermocouple/ pyrometer and reported daily, archives electronically and papers.
- **Q_{Hot metal}**: Quantity of Hot metal production per day, which is measured and reported daily, archives electronically and papers.
- **OPR_{days}**: Number of Operating days, which is measured and reported daily, archives electronically and papers.
- **EF_{CO2,Coal}**: CO₂ emission factor of Coal, monitored yearly, the source proposed is in the following order of preference: Project specific data, country specific data or IPCC default values. IPCC default values will be used only when country or project specific data are not available or difficult to obtain.

The team confirms that the parameters monitored are in line with the requirements of the methodology and covers all the parameters required for correct and appropriate estimation of the emission reduction.

3.7.3 Management system and quality assurance

The monitoring plan provides information for the collection and archiving of all relevant data: The instrumentation system comprises of microprocessor-based instruments of reputed make with the best accuracy available. The above parameter will be monitored continuously via Orifice Plate and Thermocouple/ pyrometer with a 95% - 100% accuracy level. All these instruments will be calibrated by accredited agency once in a six month (Thermocouple/ pyrometer) and once in a year (Orifice Plate). The monitored data will be achieved in electronic & paper format.

The responsibility and authority for registration, monitoring, measurement and reporting activities have been properly addressed in the PDD. Also, RINA has verified that necessary procedures related to

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data handling, quality assurance, emergency preparedness plan and training of monitoring personnel are in place /27//34/.

All data will be archived for a period of two years following the end of the crediting period.

3.8 Estimation of GHG emissions

The emission reduction ER_y due to the project activity during the crediting period is estimated as the difference between the baseline emissions (BE_y) and project emissions (PE_y) and leakage (L_y) as follows /03/:

Project emissions (PE_y): As discussed during the site visit and the subsequent discussions had with the PP, the waste heat recovery system will consist of heat exchangers and thermic fluid is used as the heat exchange medium; the thermic fluid is heated in the heat exchanger by the stove flue gas at 400°C from the stove stack. The heated thermic fluid passes through two heat exchangers to impart the heat to combustion air and BF gas. The thermic fluid losses its energy and the cycle is repeated. The thermic fluid movement inside the heat exchanger occurs due to convection currents and no pumps are used for this purpose. BF gas fired in the hot stoves are cleaned prior to use, this activity is not affected by the proposed project as BF gas cleaning is a process requirement and independent of waste heat recovery project. Hence there is no electricity consumption on account of cleaning of gases and transfer/pumping of thermic fluid. The project activity is purely a waste heat recovery project and hence no auxiliary fuel is required to supplement waste heat. Hence for the emission reduction calculation, project emissions are regarded as zero.

Leakage (L_y): No leakage effects are required to be considered for the project activity as per the methodology. Hence leakage is taken as zero.

Baseline emissions (BE_y): Baseline emissions is computed as

$$BE_{ther,y} = f_{cap} * f_{wcm} * \sum_j \sum_i (HG_{j,y}) + (MG_{i,j,y,tur} / \eta_{mech,tur}) * EF_{heat,j,y}$$

Where

$$EF_{heat,j,y} = \sum_i WSi,j \frac{EFCO2,i,j}{\eta_{EP,i,j}}$$

$$EF_{CO2,j,y} = 94.6 \text{ tCO}_2/\text{TJ}$$

$$EF_{heat,j,y} = 94.6/1 = 94.6$$

$$HG_{j,y} = ((m_{BF\text{ gas}} * Cp_{BF\text{ gas}} * \Delta T_{BF\text{ gas}} * \rho_{BF\text{ gas}}) + (m_{CA} * Cp_{CA} * \Delta T_{CA} * \rho_{CA})) * PLF$$

Where,

$m_{BF\text{ gas}}$ = Mass of BF gas entering heat exchanger, $\text{Nm}^3 / \text{year}$
 $Cp_{BF\text{ gas}}$ = Specific heat of BF gas, $\text{KJ/kg.}^\circ\text{C}$
 $\Delta T_{BF\text{ gas}}$ = Temperature difference of BF gas entering and leaving the heat exchanger
 $\rho_{BF\text{ gas}}$ = Density of BF gas, Kg/m^3

m_{CA} = Mass of Combustion air entering heat exchanger, $\text{Nm}^3 / \text{year}$
 Cp_{CA} = Specific heat of Combustion air, $\text{KJ/kg.}^\circ\text{C}$
 ΔT_{CA} = Temperature difference of Combustion air entering and leaving the heat exchanger
 ρ_{CA} = Density of Combustion air, Kg/m^3

PLF = Plant load factor of heat exchanger

Therefore,

$$HG_{j,y} = ((2268 * 10^6 * 1.03 * 145 * 1.25) + (2016 * 10^6 * 1.01 * 155 * 1.205)) * 85\%$$

$$= 683.15 \text{ TJ /year}$$

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Fraction of total energy produced by the project activity is purely from the waste energy, hence

$$f_{wcm} = 1$$

f_{cap} = that would have been produced in project year y using waste gas/heat generated in base year expressed as a fraction of total energy produced using waste gas in year y. As per method 2 of ACM 0012 version 3.2 following equations has been used to estimate f_{cap} .

$$f_{cap} = Q_{WCM, BL} / Q_{WCM, y}$$

$$Q_{WCM, BL} = Q_{BL, product} * q_{wcm, product}$$

= 7700 tonnes of hot metal production per day * 1433.77 Nm³ of WCM (Flue gas) per tonne of hot metal production = 11040000 Nm³ / day

Therefore,

$$f_{cap} = 11040000 / 11040000$$

$$= 1$$

Baseline emissions from thermal energy during the year y in tons of CO₂

$$BE_{ther, y} = 1 * 1 * 683.15 * 94.6$$

$$= 64,626 \text{ tCO}_2\text{e/ year}$$

Emission Reductions(ER):

The emission reductions were calculated by subtracting the project emission from the baseline emissions. The estimations can be replicated using the data and parameter values provided in the PDD

/1/ and supporting file /3/ submitted for registration. In summary, the GHG emission reductions were calculated 64,626 tCO₂e/ year over the project's seven years renewable crediting period. The formula used is as follows:

$$ER_y = BE_y - PE - L$$

$$= 64,626 - 0$$

$$= 64,626 \text{ tCO}_2\text{e/ year}$$

In summary RINA confirms that the emission reductions are correct, reasonable and conservative.

3.9 Environmental Impacts

As per the notification of MoEF and also mentioned in PDD, the stated project does not fall under the thirty- eight categories of the projects as per MoEF, Govt. of India, hence exempted from conducting an EIA. This was verified by means of EIA notification dated 14/09/2006 of MoEF /14/ and found the same as mentioned in the PDD.

Further RINA has as verified all the statutory clearance like Consent to Establish (NOC) and Grant of Authorization under the provisions of the Hazardous Waste /10/. RINA confirms that all the clearances obtained are in accordance with the procedures required by the host party.

Although Environmental Impact analysis has been carried out in and around the project site by the PDD and documented in the PDD in section D.1. There are no negative impacts on Environment from the Project activity. A synopsis on effect of project activity analysed in 10km radius around the project

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site under the topics Water, Ambient Air, Soil and Ambient noise, proves that the project does not have any negative impact on the environment.

3.10 Local stakeholders consultation

Prior to the publication of the PDD on the UNFCCC website, from 12/03/2009 to 10/04/2009, the Project owner has organized local stakeholder consultation meeting on 04/02/2008 at the plant premises. Invitations were sent on 31/01/2008 to the following categories of stakeholders to attend the meeting to brief them on the environmental and socio-economic benefits accrued due implementation of the project activity:

- IISCO Steel Plant Employees representative
- Representatives from Asansol Municipal Corporation
- Representatives from Trade units
- Representatives from Women's Voluntary Services
- Representatives from Animal Welfare
- Representatives from Mahila Samaj

The team noted that relevant stake holders were involved in the consultation process. The proposed project activity received unanimous support from the wide range of audience present during the meeting as no significant negative impacts from the project activity had been identified. A summary of comments is provided and has been verified by RINA /21/.

RINA can confirm that the process is adequate and credible for local stakeholder consultation.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD version 01 of 15/12/2008 /01/ was made publicly available on the CDM UNFCCC website and Parties, stakeholders and NGOs through the CDM website (<http://cdm.unfccc.int/Projects/Validation/DB/ECCE7PJITJIAMZDMU558Y5HYN1PO/view.html>) invited to provide comments during a 30 days period from 12/03/2009 to 10/04/2009.

One comment was received and is given in the text box below.

Compilation of submitted inputs and PP's response to each comment:

Date of the comment: 12/03/2009 – 10/04/2009

Submitted by: Shyam

Comment [unedited]	Response by the project participants	Explanation on how account is taken by the DOE
Page-2 of document indicates CER of 62551 t/yr against the claimed CER of 134099 t. Even emission reduction calculated at page no 21 indicates reduction of CO ₂ is 62551 t/yr.	Mention of 62551 and 134099 t/yr of CER is a typographical error. The actual value is 64,626 t/yr.	The latest PDD /1/ and Excel sheet /3/ are consistent and has the one and same value, hence this comments is accepted now.
2. Page No 5 : waste gas flow rate indicated in the table is 193 Nm ³ /hr is very low.waste gas outlet temperature seems to	Mention of waste gas flow rate of 193 Nm ³ /hr is a typographical error. The corrected value is 460000 Nm ³ /hr.	The value is now evident in the latest PDD /1/

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be very high i.e. 185 C		
3. Use of ACM0012 and actual heat calculation is not matching.	Use of ACM0012 and actual heat calculation is matching in the revised PDD.	The revised PDD /1/ is now matched with the project and methodology requirements.
4. Page 14: In the table, The unit of amount of waste heat recovered mentioned is TJ/t of coke, it seems it is TJ/tonne of hot metal. The quantity of 5484 TJ/thm is also very high. It looks like 5484 TJ but again it needs to be checked for gas generation, its calorific value.	Mention of TJ/t of coke is a typographical error. The actual parameter is TJ/tonne of hot metal. Also mention of 5484 TJ/thm is a typographical error. The actual value is 0.000253 TJ/thm.	The corrections are evident in the latest PDD /1/ and hence this issue is closed now.
5. Page 14: In the table, production of processes shown is 270000 t coke but it is actually hot metal.	Mention of coke is a typographical error. The actual parameter is hot metal.	The corrections are evident in the latest PDD /1/ and hence this issue is closed now.
6. Page 14: Table indicating heat exchanged for gas and air seem to be very high i.e 281 TJ/yr and 210 TJ/yr as per the flow and temperature mentioned in table at page 5. Validator needs to assess the actual heat recovered. Both the recovery can be 7.5 Gcal/hr (65 TJ/yr) and 5.5 Gcal/hr (TJ/yr) as mentioned in the table at page 5.	The waste gas flow mentioned in the table at page 5 was a typographical error. Hence considering the revised values the heat exchanged for gas and air heat exchanger is 683.15 TJ/year.	The corrections are evident in the latest PDD /1/ and hence this issue is closed now.
7. Page 18 : what is the role of CO ₂ emission factor of coke as indicated in the table	Mention of CO ₂ Emission factor of coke is a typographical error.	The corrections are evident in the latest PDD /1/ and hence this issue is closed now.
8. Page 20: How CO ₂ emission factor of 102 t CO ₂ /TJ for coke has been involved in the calculation. It's all about Blast furnace gas waste heat recovery, It seems there is serious calculation and methodology problem and validator has not really gone into details or not aware of the	Mention of CO ₂ Emission factor of coke is a typographical error. Emission factor of coke has been removed from the revised PDD.	The corrections are evident in the latest PDD /1/ and hence this issue is closed now.

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system		
9. Page 22: Net quantity of heat supplied is missing	Net quantity of heat supplied has been incorporated in the revised PDD.	The corrections are evident in the latest PDD /1/ and hence this issue is closed now.

The comment received while web-hosting, has already been communicated to project participants and the comments' were already included in the draft validation report as CARs or CLs. The PP has responded to each of the points in the comment and the correct action taken to take due account of the comments has been provided in the PDD submitted for registration.

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5 VALIDATION OPINION

RINA Services Spa (RINA) has performed validation of the project activity “Waste heat recovery at blast furnace of IISCO, SAIL” in India, with regard to the relevant requirements for CDM activities.

The review of the project design document and the subsequent follow-up interviews have provided RINA with sufficient evidence to determine the fulfillment of the stated criteria.

The host Party is India which fulfils the participation criteria and has approved the project and authorized the project participant Steel Authority of India (SAIL). The DNA from India confirmed that the project assists in achieving sustainable development.

The project correctly applies the approved baseline and monitoring methodology “ACM0012”, “Consolidated baseline methodology for GHG emission reductions from energy recovery projects”, version 3.2 of 04/12/2009.

Installation of waste heat recovery system at the hot blast stoves of blast furnace that recovers the waste heat in flue gases from hot stoves and the recovered heat is then utilized for the pre-heating of the combustion air and BF gas, the project results in reduction of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project 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.

The total emission reductions from the “Waste heat recovery at blast furnace of IISCO, SAIL” are estimated to be on an average 64,626 tCO_{2e} per year over the selected 7 years renewable crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

The monitoring plan provides for the monitoring of the project’s emission reductions. The monitoring arrangements described in the monitoring plan will be feasible within the project design and it is RINA’s opinion that the project participants will be able to implement the monitoring plan.

In conclusion, it is RINA’s opinion that the project activity “Waste heat recovery at blast furnace of IISCO, SAIL” in India, as described in the PDD, version 06 of 14/10/2011, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology “ACM0012”, “Consolidated baseline methodology for GHG emission reductions from energy recovery projects”, version 3.2 of 04/12/2009.

RINA thus requests registration of the project as a CDM project activity.

APPENDIX A

VALIDATION PROTOCOL

TABLE 1 MANDATORY REQUIREMENTS

Requirement	Reference	Conclusion	Cross Reference / Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reductions commitment under Art. 3.	Kyoto Protocol Art.12.2	OK	Table 2, Section, B.6.3, B.6.4 No Annex I party has yet been identified.
1. The project shall assist non Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, Marrakesh Accords, CDM Modalities §40a	OK	Table 2, Section A.2.3
2. The project shall assist non Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	CL 14 OK	Table 2, Section B.6.3, B.6.4
3. The project shall have the written approval of voluntary participation from the designated national authorities of each party involved.	Kyoto Protocol Art.12.5a, Marrakesh Accords, CDM Modalities §40a, § 28	OK	Table 2, Section A.2.3
4. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	CL 14 OK	Table 2, Section A.4.4, B.6.3, B.6.4
5. Reductions in GHG emissions shall be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	Kyoto Protocol Art. 12.5c, Marrakesh Accords, CDM Modalities §43 and § 44	CAR 14 CL 8 CL 9 CL 10 OK	Table 2, Section B.5 Please provide us the documented proof on that no other similar project activities are being carried out in the similar steel plants in SAIL at present or in India.
6. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance (ODA) and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK	Table 2, Section A.4.5 The project will not receive any public funding from Parties included in Annex I. Please mention the same in the Annex
7. Parties participating in the CDM shall designate a national authority for the CDM.	Marrakech Accords, CDM Modalities §29	OK	The Designated National Authority (DNA) of India is the “National Clean Development Mechanism (CDM) Authority” (Ministry of Environment and Forests - MoEF).
8. The host country and the participating Annex I Party shall be a Party to the Kyoto Protocol.	Marrakech Accords, CDM Modalities §30	OK	India has ratified the protocol on 26 August 2002. http://maindb.unfccc.int/public/country.pl?country=IN
9. The participating Annex I Party's assigned amount shall	CDM Modalities and	OK	No Annex I party has yet been identified.

Requirement	Reference	Conclusion	Cross Reference / Comment
have been calculated and recorded.	Procedures §31b		
10. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	OK	No Annex I party has yet been identified.
11. Comments by local stakeholders shall be invited, a summary of these provided.	Marrakech Accords, CDM Modalities §37b	CL-19 CL-20 OK	Table 2, Section E A local stakeholder's consultation meeting was organized on 04 February 2008. Evidences of invitation letters, minutes of meeting, questionnaires and an understandable summary of stakeholders comments (all with dates) are requested.
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	Marrakech Accords, CDM Modalities §37c	CL-19 OK	Table 2, Section D As per the EIA notification dated 14 September 2006 issued by the Ministry of Environment and Forests, the project activity doesn't fall under purview of EIA notification. There is no Host Party requirement for an EIA.
13. Baseline and monitoring methodology shall be previously approved by the CDM Methodology Panel.	Marrakech Accords, CDM Modalities §37e	CAR-8 CAR-9 CAR-10 OK	Table 2, Section B Although mentioning ACM0012 version 03.1 in PDD's Section B.1, the following has to be corrected/clarified: - ACM0012 version 2 is mentioned in PDD's section B.4; - mentioned title of ACM0012 version 03.1 has to be corrected as well as data/parameters and methodology formulas- references which are related to ACM0012 version 2.
14. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	Marrakech Accords, CDM Modalities §37f	CAR-15 CAR-16 OK	Table 2, Section B.7 From the section B.7.2 and annex-3 of the PDD, it is not clear that which Monitoring Methodology has been chosen for monitoring the parameters.
15. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly	Marrakech Accords, CDM Modalities, §40	CL-20 OK	The PDD of 15 December 2008, version 01, was made publicly available on the UNFCCC website. Parties, stakeholders and UNFCCC accredited non-governmental organizations were invited through

Requirement	Reference	Conclusion	Cross Reference / Comment
available.			the CDM website to provide comments during a 30 days period from 12 March 2009 to 10 April 2009. One comment was received and is mentioned in detail on following section of this report.
16. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	Marrakech Accords, CDM Modalities, §45 b, c, d, e	<u>CAR 11</u> OK	Table 2, Section B.4
17. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	Marrakech Accords, CDM Modalities, §47	<u>CAR 8</u> OK	Table 2, Section B.4
18. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	Marrakech Accords, CDM Modalities, Appendix B, EB Decisions	OK	PDD is in accordance with CDM-PDD (version 03 of 28 July 2006).

TABLE 2 REQUIREMENTS CHECKLIST

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A. General Description of Project Activity. The project design is assessed.					
A.1. Title of the project activity.					
A.1.1. Title of the project activity, version number and date of document (PDD).	<u>/1/ /4/</u>	DR	The title of the project is “Waste Heat Recovery at Blast Furnace Stoves at IISCO, SAIL”, PDD Version 01 of 15 December 2008. However the project title in PDD does not match with the title in the Host country approval dated 16/01/2009.	<u>CAR-1</u>	OK
A.2. Description of project activity.					
A.2.1. Is the purpose of the project activity included?	<u>/1/ /4/</u>	DR	Yes, The project activity involves the installation of waste heat recovery system that recovers the waste heat in flue gases from blast furnace hot stoves. The recovered heat is then utilized for the pre-heating of the combustion air and blast furnace gas.	OK	OK
A.2.2. Is it explained how the project activity reduces greenhouse gas emissions, i.e. technology, measures?	<u>/1/ /4/</u>	DR	Yes, the project activity involves the usage of waste heat from blast furnace for pre-heating of combustion and blast furnace gas, thereby reducing the combustion of coke in the blast furnace that otherwise would have been used in the baseline scenario. The existing scenario prior to the start of the implementation of the project activity is not transparent in PDD.	OK <u>CAR-2</u>	OK OK
A.2.3. Contribution to Sustainable Development. Table 1 - Error! Reference source not found.					
A.2.3.1. Is the project in line with relevant legislation and plans in the host country?	<u>/1/ /4/ /8/</u>	DR	Yes, Indian legislation allows usage of waste heat recovery at blast furnace. There is no restriction on use of waste heat gas.	OK	OK
A.2.3.2. Is the project in line with host-country specific CDM requirements?	<u>/1/ /2/</u> Error !	DR	Letter of Approval from Ministry of Environment & Forests is obtained. The document number (4/15/2008-CCC) dated 16 January 2009 was	OK	OK

	Referen ce source not found.		verified in the official website of the Indian DNA.		
A.2.3.3. Is the project in line with sustainable development policies of the host country?	<u>/1/ /2//8/</u>		See A.2.3.1.	OK	OK
A.2.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	<u>/1/ /4/</u>	DR	<p>Yes, the project activity leads to improved working conditions by reducing the consumption of coal, hence reducing the generation of SO₂ and NO₂ emissions and associated environmental degradation.</p> <p>Please clarify/further elaborate the following points regarding other environmental or social benefits than GHG emission reductions created by the project activity:</p> <ul style="list-style-type: none"> - employment opportunities for unskilled people; - social well being of nearby area, as per HCA criteria; - economic well being of the people (by reducing dependence of import of fossil fuel); - documented evidences to support the assumption that the project is the first of its kind among other steel manufacturing industries of India. <p>Furthermore, please note that, as per HCA Eligibility criteria, “<i>The CDM projects should also be oriented towards improving the quality of life of the poor from the environmental standpoint</i>”.</p> <p>Please clarify/further elaborate the following points regarding other environmental or social benefits than GHG emission reductions created by the project activity:</p> <ul style="list-style-type: none"> - employment opportunities for unskilled people; - social well being of nearby area, as per HCA criteria; - economic well being of the people (by reducing dependence of import of fossil fuel); 	<u>CL-1</u>	OK

			<p>- documented evidences to support the assumption that the project is the first of its kind among other steel manufacturing industries of India.</p> <p>Furthermore, please note that, as per HCA Eligibility criteria, “The CDM projects should also be oriented towards improving the quality of life of the poor from the environmental standpoint”.</p>		
A.3. Project participants. Annex 1					
A.3.1. Are Party (ies) and private and / or public entities involved in the project activity listed?	<u>/1/ /4/</u>	DR	<p>Yes.</p> <p>The Party involved is mentioned as India. But it is not indicated if India is the host (Section A.3 table).</p>	CAR-3	OK
A.3.2. Is the contact information provided in Annex 1 of the PDD, using the (proper table) tabular format?	<u>/1/</u>	DR	<p>Yes, Dr. R K Agrawal, <i>Executive Director</i> EMD, +91 33 22 37 4330/22234 5291</p>	OK	
A.4. Technical description of the project activity.					
A.4.1. Is the location of the project activity clearly defined, including details of the physical location and information allowing the unique identification of this project activity (ies)?	<u>/1/ /4/</u>	DR	<p>The Proposed project will be implemented at the IISCO Steel Plant, located at Burnpur (near Asansol), in the Burdwan district of West Bengal state (between 23° 42' N latitude and 87° 01' E longitude), in Eastern India, and is an initiative of the Steel Authority of India Limited (SAIL).</p> <p>Please confirm project location as 23° 42' N latitude and 87° 01' E longitude also mentioning the project location number.</p>	CAR-4	OK
A.4.2. Is (are) the category (ies), type(s) and sectoral scope(s) of the proposed project activity specified?	<u>/1/ /3/ /4/</u>	DR	<p>The proposed large scale project activity falls under Project category “waste energy recovered” and Sectoral Scopes 1- Energy industries (renewable/non-renewable sources) and 4- Manufacturing industries.</p> <p>Please clarify why sectoral scope 1 is not also mentioned in Section A.4.2.</p>	CL-2	OK
A.4.3. Technology to be employed.					
<i>Validation of the project technology focuses on the project engineering, choice of technology competence/ maintenance needs. The Validator</i>					

<i>should ensure that environmentally safe and sound technology and know how is used / transferred.</i>					
A.4.3.1. Does the project design engineering reflect current good practices?	<u>/1/ /3/</u>	DR	Yes, the project design engineering reflects current good practices. The project design engineering reflects current good practices. However, considerations about how environmentally safe and sound is the chosen technology and about a possible technology and/or know how transfer; need to be addressed in the PDD.	CAR-5	OK
A.4.3.2. Does the project use the state of the art technology or could the technology result in a significantly better performance than any commonly used technologies in the host country?	<u>/1/ /4/</u>	DR	Please address in the PDD whether the applied technology is considered state of the art or could result in a significantly better performance than host country commonly used technologies.	CL3	OK
A.4.3.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	<u>/1/ /4/</u>	DR	It is not likely that the project technology will be substituted by other or more efficient technologies within the project period.	OK	OK
A.4.3.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	<u>/1/ /4/</u>	DR	The PDD is not transparent on initial training and maintenance needs for the project activity.	CAR-6	OK
A.4.3.5. Does the project make provisions for meeting training and maintenance needs?	<u>/1/</u>	DR	See A.4.3.4.	CAR-6	OK
A.4.4. Estimated amount of emission reductions over the chosen crediting period. Table 1 - 4					
A.4.4.1. Is the chosen crediting period, total and annual estimated reductions defined and presented in a (proper table) tabular format? <i>(check these figures against item B.6.4 figures)</i>	<u>/1/ /4/</u>	DR	Yes. The project is expected to reduce CO ₂ emissions to the extent of 938,693tCO ₂ e (134,099 tCO ₂ e / year average) over the fixed of 7 years crediting period. The year format of crediting period needs to be revised as 2009-2010.... not 2009. There is no explanation on why the annual GHG emission reductions on page 2 (62,551 tCO ₂ e) is different from page 6 (134,099 tCO ₂ e).	CAR-7	OK
A.4.5. Public funding of the project activity. Table 1 - 6 & Annex 2					

A.4.5.1. Is it indicated whether public funding from Parties included in Annex 1 is involved in the proposed project activity?	<u>/1/ /4/</u>	DR	The project will not receive any public funding from Parties included in Annex I.	OK	OK
A.4.5.2. If public funding is involved, is information on sources of public funding for the project activity is provided in Annex 2, including an affirmation that such funding does not result on a diversion of official development assistance (ODA) and is separate from and is not counted towards the financial obligations of those Parties?	<u>/1/ /4/</u>	DR	See A.4.5.1.	OK	OK
B. Project Baseline Application (methodologies). The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario. Table 1 - 13 & Annex 3					
B.1. Baseline Methodology. It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the baseline methodology previously approved by the CDM Methodology Panel? (<i>correctly quoted and interpreted?</i>)	<u>/1/ /3//4/</u>	DR	The project activity applies the approved consolidated baseline methodology Error! Reference source not found. , “Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects” – version 3.1 of 16/08/2008. Although it is mentioned of ACM0012 version 03.1 in section B.1 of PDD, the following has to be clarified; -ACM0012 version 2 is mentioned in the PDD’s section B.4 of the PDD; -Mentioned title of ACM0012 version 03.1 is not matching with that of the approved methodology –further, data/parameters and methodology formulas-references mentioned are related to ACM0012 version 2 which is already expired-	<u>CAR-8</u>	OK
B.1.2. Are other methodologies or tools drawn up by the approved methodology mentioned? (<i>correctly quoted and interpreted?</i>)	<u>/1/ /3//4/</u>	DR	ACM0012 mentions the following tools: “ <u>Tool for the demonstration and assessment of additionality</u> ” and “ <u>Tool to calculate the emission</u> ”		

			<p>factor for an electricity system”.</p> <p>The project applies the “Tool for the demonstration and assessment of additionality”, version 05.2.</p> <p>The other methodologies or tools (and versions) used in the project activity implementation (calculations) are not mentioned in PDD.</p>	CAR-9	OK
B.2. Description of how the methodology is applied in the context of the project activity.					
B.2.1. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	<u>/1/ /3//4/</u>	DR	<p>Regarding ACM0012 applicability, please address/explain and/or further elaborate (clear justifications-used criteria) in the PDD, as per the latest approved methodology, the following points are not transparently discussed in the PDD;</p> <ul style="list-style-type: none"> - definition/identification of type/criteria and/or conditions applicable for the project activity; - definition/identification of applicable methods and/or cases; - existing facilities and after project implementation capacities; - PDD assumptions (possible contradictions) like: “The project activity involves the installation of NEW BF Stoves with waste heat recovery” and “The project activity involves a NEW installation of waste heat recovery system from BF stoves” (Section B.2 table and other locations in the PDD); - gas captured and utilized in the project activity that was flared or vented in the absence of the project activity; - Demonstration 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 	CAR-10	OK

			facility. CL <ul style="list-style-type: none"> Please provide the documented proof that the waste gas/pressure released in the abnormal operation of the plant is not accounted for the emission reduction. Please provide us the documented proof on the regulations which states that regulations does not constrain the industrial facility generating waste gas from using the fossil fuels being used prior to the implementation of the project activity. Please clarify why last section of methodology applicability (page 4 of methodology) is not considered / discussed? Clarification required on “Project activity does not involve any generation of electricity”. Please provide us supporting document on “Project activity does not involve the cogeneration of energy”. 	CL-4	
B.2.2. Background information or documentation, including tables with time series data, documentation of measurement results and data sources are properly addressed? (<i>check Annex 3</i>)	<u>/1/ /3/</u>	DR	No, nothing is mentioned in this section. Clarification is required on keeping Annex 3 blank.	CL-5	OK
B.2.3. If comparable information is available from sources other than that used in the PDD, cross check the PDD against the other sources to confirm that the project activity meets the applicability conditions.	<u>/1/ /3//4/</u>	DR	See B.2.1.	CL-5	OK
B.3. Description of the sources and the gases included in the project boundary (<i>physical delineation of the proposed CDM project activity</i>).					
B.3.1. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	<u>/1/ /3//4/</u>	DR	Yes, the project boundary includes the industrial facility where waste heat is generated and facility where process heat is used.	OK	OK
B.3.2. Are all emission sources and significant GHGs included in the project boundary clearly identified and described in the appropriate table? Are the	<u>/1/ /3//4/</u>	DR	Clarify why Gas blower and Air blower are not included in the project boundaries. Table 1 of ACM0012	CL-6	OK

demonstration / justification (also for exclusions) adequate and sufficient?					
B.3.3. If GHG emissions occurring within the proposed CDM project activity boundary (not addressed by the applied methodology), as a result of project's implementation, are expected to contribute more than 1% of the overall expected average annual emissions reductions, are they informed in the PDD?	<u>/1/ /3//4/</u>	DR	See B.3.2	<u>CL-6</u>	OK
B.4. Description of how baseline scenario is identified. Baseline Determination. Table 1 - 16, 17 The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.					
B.4.1. Is the application of the methodology and the discussion and determination of the chosen baseline scenario transparent?	<u>/1/ /3//4/</u>	DR	It is mentioned (PDD Section B.4) that baseline scenario 1 of ACM0012 version 02 was selected. However the version 2 is already expired and the current version is 3.1. The assumptions/definitions, clearly specifying which baseline scenario (alternative scenarios, options, cases) of the methodology has been chosen to calculate the baseline and project emissions and justifications for the same are not transparent in the PDD and not supported with evidences. Furthermore, please clarify the following: - the unit on section 6 of table of page 14. It is mentioned as TJ/ton of coke, whereas it should be TJ/ton of hot metal; - the quantity of 5,484 TJ/thm looks very high and the unit seems that should be TJ (for gas generation, its calorific value to be checked); - the unit on section 7 of table of page 14. It is mentioned as T of coke/year, whereas it should be Tonnes of hot metal; - heat exchanged of gas and air seems to be very high i. e. 281 TJ/yr and 210 TJ/yr as per the	<u>CAR-11</u>	OK

			flow & temperature mentioned in PDD Section A.4.3 tables; - waste gas flow rate of 193 Nm ³ /hr looks very low while the waste gas outlet temperature seems to be very high, i.e. 180 °C (PDD Section A.4.3 tables).		
B.4.2. Has the baseline been determined using conservative assumptions where possible? (confirm that any procedure contained in the methodology to identify the most reasonable baseline scenario, has been correctly applied)	<u>/1/ /3//4/</u>	DR	It is not clear from the PDD The use of conservative assumptions in the determination of baseline scenario. Needs to be demonstrated.	CAR-12	OK
B.4.3. Has the baseline been established on a project-specific basis?	<u>/1/ /3//4/</u>	DR	See B.4.1.	CAR-11	OK
B.4.4. Does the baseline scenario sufficiently take into account relevant national and / or sectoral policies, macro-economic trends and political aspirations?	<u>/1/ /3//4/</u>	DR	See B.4.1.	CAR-11	OK
B.4.5. Is the baseline determination compatible with the available data?	<u>/1/ /3//4/</u>	DR	See B.4.2.	CAR-12	OK
B.4.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	<u>/1/ /3//4/</u>	DR	See B.4.1.	CAR-11	OK
B.4.7. Have the major risks to the baseline been identified? (Are uncertainties in the GHG emission estimates properly addressed in the documentation?)	<u>/1/ /3//4/</u>	DR	CAR Discussion on the major risks identified to the baseline is not evident in PDD.	CAR-13	OK
B.4.8. Is all literature and sources clearly referenced?	<u>/1/ /3//4/</u>	DR	Please provide all the references and sources used.	CL-7	OK
B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (Assessment and demonstration of additionality). Table 1 - 5					
B.5.1. Does the PDD follow all the steps required in the methodology to determine the additionality? (Is an approved additionality tool required / used? - Note: the guidance in the methodology shall supersede the tool)	<u>/1/ /3//4/ /10/</u>	DR	Yes. Approved Additionality tool “Tool for the demonstration and assessment of additionality”, version 05.2 has been used. Please clarify the difference between project alternatives 2 and 3.	CL-8	OK
B.5.2. Is the discussion on the additionality clear and have	<u>/1/ /3//4/</u>	DR	In technological barrier discussions, it is not clear	CAR-14	OK

all assumptions been conservative, supported by transparent and documented evidence for all steps?	<u>/10/</u>		<p>on the training needs, and infrastructure requirement.</p> <p>The common practice analysis is not complete and not followed the step wise approach as said in additionality tool</p> <p>CL</p> <p>Please clarify why barriers due to prevailing practice and other barriers are not considered.</p> <p>Please clarify what you mean by “the technology barrier for this project activity is operational barrier.</p> <p>Please provide us the documented proof for the claim that no other similar project activities are being carried out in similar steel plants in SAIL at present or in India.</p>	CL-9	
B.5.3. Is it demonstrated / justified that the project activity itself is not a likely baseline scenario? (e.g. through (a) a flow-chart or series of questions that lead to a narrowing of potential baseline options, (b) a qualitative or quantitative assessment of different potential options and an indication of why the non-project option is more likely, (c) a qualitative or quantitative assessment of one or more barriers facing the proposed project activity or (d) an indication that the project type is not common practice in the proposed area of implementation, and not required by a Party's legislation/regulations)	<u>/1/ /3//4/</u>		See B. 5.1	<u>CL-9</u>	OK
B.5.4. If the starting date of the project activity is before 2 August 2008, for which the start date is prior to the date of publication of the PDD for global stakeholder consultation, evidence to demonstrate that the CDM was seriously considered in the decision to implement the project activity, was provided, adequate and sufficient to justify it? (If starting date is on or	<u>/1/ /3//4/</u> <u>/5/ /7/</u>	DR	<p>The project's starting date is defined as 16/10/2007.</p> <p>The serious consideration of the CDM in the decision to implement the project activity is demonstrated with the document “324th Adjourned Meeting of the Board of Directors, dated 26 May 2007, where the appointment of consultant for CDM projects was finalized.</p>		OK

after 2 August 2008, see C.1.1.2)			The PDD is not transparent on the complete chronology of events from the decision making date to the date of appointment of validator. Provide documented evidences to support each of the events in the chronology.	<u>CL-10</u>	
B.5.5. Is the above evidence based on official, legal and / or other corporate document that was available at, or prior to, the start of the project activity?	<u>/1/ /3//4/ /5/ /7/</u>	DR	See B.5.4.	<u>CL-10</u>	OK
B.5.6. If investment analysis has been used to demonstrate the additionality of the proposed CDM project activity, evidences that the proposed CDM project activity would not be: (a) The most economically or financially attractive alternative; or (b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs); were provided? ("Guidance on the Assessment of Investment Analysis")	<u>/1/ /3//4/</u>	DR	NA. Investment analysis (Step 2) was not selected/used.	OK	OK
B.6. Emission Reductions. Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
B.6.1. Explanation of methodological choices.					
B.6.1.1. Have the project, baseline and leakage emissions and emission reductions been properly explained and determined using the same appropriate methodology and conservative assumptions?	<u>/1/ /3//4/</u>	DR	It is not clear why the auxiliary consumption of different equipments employed is not included in project activity diagram. No leakage is applicable under this methodology.	<u>CL-11</u>	OK
B.6.1.2. Does the proposed project clearly state which equations for the calculation of emission reductions are used, as given by the approved / applied methodology?	<u>/1/ /3//4/</u>	DR	Please clarify whether $BE_{ther,y}$ and BE_y are the same or different.	<u>CL-12</u>	OK
B.6.1.3. Are the demonstration / justification for the choice of the chosen scenario (for example, in ACM0006) or case, option / method (for example	<u>/1/ /3//4/</u>	DR	See B.6.1.1	<u>CL-11</u>	OK

in ACM0002) adequate and sufficient?					
B.6.1.4. Are the demonstration / justification for the chosen default values adequate and sufficient?	<u>/1/ /3//4/</u>	DR	See B 6.1.1	<u>CL-11</u>	OK
B.6.2. Data and parameter those are available at validation. Data that is calculated with equations provided in the methodology or default values specified in the methodology should not be included in the compilation.					
B.6.2.1. Is the list of the <i>ex-ante</i> data and parameters used by the project -including data from other sources- complete, transparent, documented and available? (<i>measurements after the implementation of the project activity should not need to be included here but in the tables in section B.7.1</i>)	<u>/1/ /3//4/</u>	DR	Please provide the source for all the data and parameters mentioned the table B.6.2 of PDD.	<u>CL-13</u>	OK
B.6.2.2. Is the chosen value or, where relevant, the qualitative information for each supporting data or parameter(s) provided in a (proper table) tabular form and the choice for the source of data explained / justified with clear and transparent references or additional documentation? (<i>check Annex 3</i>)	<u>/1/ /3//4/</u>	DR	See B.6.2.1	<u>CL-13</u>	OK
B.6.2.3. If values were measured, a description of measurement methods and procedures (standards), indicating the responsible(s) for carrying out the measurement(s), dates and results of measurement(s) was provided? (<i>check Annex 3</i>)	<u>/1/ /3//4/</u>	DR	See B.6.2.1	<u>CL-13</u>	OK
B.6.3. Ex-ante calculation of emission reductions. Table 1 - Error! Reference source not found., Error! Reference source not found., 4					
B.6.3.1. Is the <i>ex-ante</i> calculation of the expected project, baseline and leakage emissions transparent, conservative, accurate, and documented and as per the approved / applied methodology (equations) of the project activity?	<u>/1/ /3//4/</u>	DR	Please provide us the justification how total emission reduction per year 62,551.74391 t CO ₂ /year (calculated) is different from what has come under <i>ex-ante</i> estimation.	<u>CL-14</u>	OK
B.6.3.2. Sufficient background information and / or data to	<u>/1/ /3//4/</u>	DR	Detailed spreadsheets for all calculations	<u>CL-15</u>	OK

assess the calculation(s) and enable its reproduction, including electronic files (i.e. spreadsheets), was provided? (<i>check Annex 3</i>)			(project/baseline emissions, emission reductions <i>ex-ante</i> & <i>ex-post</i>) must be provided, indicating formulas and/or default values/data sources.		
B.6.4. Summary of <i>ex-ante</i> estimation of emission reductions. Table 1 - Error! Reference source not found., Error! Reference source not found., 4					
B.6.4.1. Is all <i>ex-ante</i> estimation of emission reductions summarized in a (proper table) tabular form for all years of the crediting period? (<i>Check against A.4.4.1 figures</i>)	<u>/1/ /3//4/</u>	DR	Yes, all <i>ex-ante</i> estimation of emission reductions is summarized in a (proper table) tabular form for the fixed 7 years of the crediting period.	OK	OK
B.7. Application of monitoring methodology and description of the monitoring plan. <i>Compliance of the monitoring plan with the approved methodology and Implementation of the plan</i> Table 1 - 14 & Annex 4					
B.7.1. Data and parameters monitored. (<i>background documentation in Annex 4</i>)					
B.7.1.1. Specific information on how the data and parameters that need to be monitored would actually be collected during monitoring for the project activity is provided? (<i>measurements after the implementation of the project activity should be included here</i>)	<u>/1/ /3//4/</u>	DR	<p>The proponent is requested to address all the data and parameters associated required to be monitored as per the approved monitoring methodology. Following data/parameters are not transparent in the PDD;</p> <ul style="list-style-type: none"> — Monitoring frequency is not mentioned in any of the Section B.7.1 tables. — Please mention the Quantity of waste gas $QW_{G,y}$ used for energy generation during year y (Nm^3) — Please mention the Net quantity of heat ($HG_{j,y}$) supplied. — Please mention fraction of total heat ($ws_{i,,j}$) used. — Please mention Net Calorific Value (NCV_{wg}) of waste gas. — Please mention the sources, value, measurement method and QA/QC procedure of Pressure of steam (P_{steam}), Temperature of steam (T_{steam}), Pressure of condensate ($P_{condensate}$), and Temperature of condensate (T 	CAR-15	OK

			<i>condensate</i>) used in the PDD.		
B.7.1.2.	Are all the parameters and its sources of data reliable, specified and documented in a (proper table) tabular form?	<u>/1/ /3//4/</u>		See section B.7.1.1	CAR-15 OK
B.7.1.3.	Where data or parameters are supposed to be measured, are measurement methods and procedures, including a specification of which accepted industry standards or national or international standards will be applied, specified?	<u>/1/ /3//4/</u>		See section B.7.1.1	CAR-15 OK
B.7.1.4.	Are the measuring instruments / equipments, measurement methods, accuracy and interval, measurement responsible(s) and calibration procedures specified?	<u>/1/ /3//4/</u>		See section B.7.1.1	CAR-15 OK
B.7.1.5.	Are the QA / QC procedures applied described and complying with existing good practice? (The parameters related to the performance of the project will be monitored using meters and standard testing equipment, which will be regularly calibrated following standard industry practices)	<u>/1/ /3//4/</u>		See section B.7.1.1	CAR-15 OK
B.7.2. Description of monitoring plan. <i>The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.</i>					
B.7.2.1.	Is the monitoring methodology previously approved by the CDM Methodology Panel?	<u>/1/ /3//4/ /10/ /11/</u>	DR	From the section B.7 and annex-3 of the PDD, it is not clear that which Monitoring Methodology has been chosen for monitoring the parameters.	CAR-16 OK
B.7.2.2.	Is the monitoring methodology the one deemed most applicable for this project and is the appropriateness justified?	<u>/1/ /3//4/ /10/ /11/</u>	DR	See B.2.1.	CAR-16 OK
B.7.2.3.	Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	<u>/1/ /3//4/ /10/ /11/</u>	DR	The monitoring plan is not transparent on the following: Collection and archiving of all relevant data necessary for measuring of greenhouse gas emissions and leakage determination.	CAR-17 OK
B.7.2.4.	Does the monitoring plan provide for the collection and archiving of all relevant data	<u>/1/ /3//4/ /10/ /11/</u>	DR	See B.7.2.3	OK OK

necessary for determining leakage?					
B.7.2.5. Is the authority and responsibility of project management clearly described?	<u>/1/ /3//4/ /10/ /11/</u>	DR	Yes the authority and responsibility of project management clearly described.	OK	OK
B.7.2.6. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	<u>/1/ /3//4/ /10/ /11/</u>	DR	See B. 7.2.5	OK	OK
B.7.2.7. Are procedures identified for training of monitoring personnel?	<u>/1/ /3//4/</u>	DR	The monitoring plan is not transparent on the training procedures identified for monitoring personnel and the documentary evidence.	CL-16	OK
B.7.2.8. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	<u>/1/ /3//4/</u>	DR	Monitoring plan is not transparent on emergency preparedness plan, where emergencies can cause unintended emissions.	CAR-18	OK
B.7.2.9. Does the monitoring plan reflect good monitoring and reporting practices?	<u>/1/ /3//4/</u>	DR	Monitoring plan is not transparent on the action taken during uncertainties like inconsistency/discrepancy of data/parameters.	CAR-19	OK
B.7.2.10. Is the discussion and selection of all required monitoring parameters and / or data variables (for example, project emissions, project electricity generation, baseline grid / captive power emission factor) of the monitoring plan according to the approved / applied methodology transparent?	<u>/1/ /3//4/ /11/</u>	DR	See section B.7.1.1	CAR-16	OK
B.8. Date of completion of the application of the baseline and monitoring methodology and the name of responsible person(s) / entity (ies).					
B.8.1. Is the date of completion of the application of the methodology to the project activity provided and mentioned in the format DD / MM / YYYY?	<u>/1/ /3//4/</u>	DR	The date of completion of baseline and monitoring methodology is not mentioned in the correct format. Kindly correct date format DD/MM/YYYY. Please also clarify why this date does not match with the PDD's version date mentioned on page 2.	CAR-20	OK
B.8.2. Is the contact information of the person(s) / entity (ies) responsible for the baseline and monitoring methodology to the project activity provided? If applicable, are they indicated as project participants in Annex 1?	<u>/1/ /3//4/</u>		The contact information of the person(s) / entity(ies) responsible for the baseline and monitoring methodology to the project activity is provided and the responsible is Asia carbon Emission management India Pvt. Ltd.	OK	OK

C. Duration of the Project activity / Crediting Period. It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1. Duration of project activity.					
C.1.1. Starting date of project activity.					
C.1.1.1. Is the project's activity starting date (the earliest date at which either the implementation or construction or real action of a project activity begins implementation, construction or real action - <i>project participant has committed to expenditures related to the implementation or related to the construction of the project activity</i>) clearly defined and reasonable?	<u>/1/ /3//4/ /9/</u>	DR	The project's starting date is defined as 16/10/2007. Evidence for the project's starting date is the contract between M/s. Steel Authority of India Limited and the consortium of M/s POSCO Engineering, Construction Company Ltd. and M/s Nagarjuna Construction. Ltd, dated 16/10/2007 that was assessed and found in order.	OK	OK
C.1.1.2. If the project activity started on or after 2 August 2008, were the Host Party DNA and/or the UNFCCC secretariat informed in writing of the commencement of the project activity and of the intention to seek CDM status? (If starting date is before 2 August 2008, see B.5.4)	<u>/1/ /3//4/</u>	DR	See B.5.4	OK	OK
C.1.2. Expected operational life time of the project.					
C.1.2.1. Is the project's operational lifetime (mentioned in years and months) clearly defined and reasonable? (<i>check against crediting period and equipment lifetime</i>)	<u>/1/ /3//4/ /9/</u>	DR	The expected operational lifetime of the project is 50 years (0 months), and deemed reasonable. Documented evidence of the project's operational lifetime is requested.	<u>CL-17</u>	OK
C.2. Choice of crediting period. <i>The crediting period may only start after the date of registration of the proposed activity as a CDM project activity.</i>					
C.2.1. Is the chosen crediting period clearly defined (mentioned in years and months) and its starting date mentioned in the format DD / MM / YYYY? (<i>renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal</i>)	<u>/1/ /3//4/</u>	DR	A fixed crediting period of 7 years is selected and the mentioned starting date is (PDD's section C.2.2.1) "01- 10 -2008 or a date not earlier than the date of registration of the small scale project activity". CL Please confirm if the fixed crediting period should be of 7 years or 10 years and clarify/correct the statement about the "registration of the small	<u>CL-18</u>	OK

			scale project activity”. Furthermore, the crediting period starting date should be corrected to a feasible one (PDD version date is 15/12/2008) and presented in the right format, DD/MM/YYYY.		
D. Environmental impacts.					
Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the Validator. Table 1 - 12					
D.1. Documents on Environmental impacts, including transboundary impacts.					
D.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/ /3//4/	DR	As per the notification of MoEF and also mentioned in PDD, the stated project does not fall under the thirty- eight categories of the projects as per MoEF, Govt. of India, Hence does not require any environmental impact assessment study. CL Please provide us the documented proof of the same.	CL-19	OK
D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/ /3//4/	DR	See D.1.1	CL-19	OK
D.1.3. Will the project create any adverse environmental effects?	/1/ /3//4/	DR	See D.1.1	CL-19	OK
D.1.4. Are transboundary environmental impacts considered in the analysis?	/1/ /3//4/	DR	See D.1.1	CL-19	OK
D.1.5. Have identified environmental impacts been addressed in the project design?	/1/ /3//4/	DR	See D.1.1	CL-19	OK
D.1.6. Does the project comply with the environmental legislation in the host country?	/1/ /3//4/	DR	See D.1.1	CL-19	OK
E. Stakeholders' comments.					
The Validator should ensure that stakeholders' comments have been invited and that due account has been taken of any comments received.					
E.1. Description of how comments by local stakeholders have been invited and compiled.					

The local stakeholder process <u>shall be completed before submitting</u> the proposed project activity to a DOE for validation.						
E.1.1.	Have relevant stakeholders been adequately consulted / invited for comments?	<u>/1/ /3//4/</u>	DR	A local stakeholder's consultation meeting was organized on 04 February 2008. Evidences of invitation letters, minutes of meeting, questionnaires and an understandable summary of stakeholders comments (all with dates) are requested.	<u>CL-20</u>	OK
E.1.2.	If a stakeholder consultation process is required by regulations / laws in the host country, has the stakeholders' consultation process been carried out in accordance with such regulations / laws?	<u>/1/ /3//4/</u>	DR	Not required under legislation.	OK	OK
E.1.3.	Was the stakeholders' consultation process conducted, within a reasonable time for comments submission, in an open and transparent manner to facilitate comments and properly described?	<u>/1/ /3//4/</u>	DR	See E 1.1	<u>CL-20</u>	OK
E.2. Summary of comments received.						
E.2.1.	Are the stakeholders who made comments identified (addresses provided / available)?	<u>/1/ /3//4/</u>	DR	Yes identified stakeholders are representatives of IISCO Steel plant employees, Asansol Municipal Corporation, Trade units, women's Voluntary services Animal welfare and Mahila Samaj.	OK	OK
E.2.2.	The summary of the stakeholders' comments received is provided / available?	<u>/1/ /3//4/</u>	DR	See E 1.3.	<u>CL-20</u>	OK
E.3. Report on how due account was taken of any comments received.						
E.3.1.	Has due account been taken of any stakeholders' comments received?	<u>/1/ /3//4/</u>	DR	See E 2.2		OK
Annex 1. Contact information on project participants						
•	Are the Names of all organization given? (as listed in section A.3)	<u>/1/ /3//4/</u>	DR	Yes, the name of the organization is Steel Authority of India Limited (SAIL)	OK	OK
•	Name of contact person, Street, City, Post fix / ZIP, Country, Telephone Fax or e-mail <u>mandatory fields</u> are filled?	<u>/1/ /3//4/</u>	DR	Yes, Dr. R K Agrawal is the contact person. Address is 6, Ganesh Chandra Avenue (5 th floor), kolkata, West Bengal, 700013, India.	OK	OK

Annex 2. Information regarding public funding Table 1 – 6 & Table 2, A.4.5					
<ul style="list-style-type: none"> Is information from Parties included in Annex I on sources of public funding for the project activity provided? 	<u>/1/ /3//4/</u>	DR	Please mention that no public funding of any kind is involved in the project activity.	<u>CL-21</u>	OK
<ul style="list-style-type: none"> Does the information provided above include an affirmation that such funding does not result in a diversion of ODA and is separate from and is not counted towards the financial obligation of those Parties? 	<u>/1/ /3//4/</u>	DR	See above.	<u>CL-21</u>	OK
Annex 3. Baseline information Table 1 - 13, 16, 17 & Table 2, B					
<ul style="list-style-type: none"> Is any needed further background information used in the application of the baseline methodology, i.e. tables with time series data, documentation of measurement results and data sources, provided? 	<u>/1/ /3//4/</u>	DR	No, Information is not made available on this section.	<u>CL-21</u>	OK
Annex 4. Monitoring information Table 1 - 14 & Table 2, B.7					
<ul style="list-style-type: none"> Is any needed further background information used in the application of the monitoring methodology, i.e. tables with time series data, documentation of measurement results and data sources, provided? 	<u>/1/ /3//4/</u>	DR	No, Information is not made available on this section.	<u>CL-21</u>	OK

TABLE 3 RESOLUTION OF CORRECTIVE ACTION REQUESTS AND CLARIFICATION REQUESTS

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
CAR 1 The project title in PDD does not match with the title in the Host country approval dated 16/01/2009.	A.1.1	The title mentioned in the PDD is wrong due to typographical error. Revised project titles as per the HCA approval have been incorporated in the PDD.	The project title “Waste heat recovery at blast furnace of IISCO, SAIL” as mentioned in the revised PDD, version 2, dated 04/02/2010 is cross checked with the Title of HCA, India given to PP, found the matching. The same has also been cross checked at Indian DNA site, project ID is 1057-08 . Hence the CAR 1 is closed.
CAR 2 The existing scenario prior to the start of the implementation of the project activity is not transparent in PDD.	A.2.2	This is a Greenfield project activity; there is no system available prior to the start of the project activity. The same has been incorporated in the revised PDD.	The project activity is Greenfield project and the same was verified from the revised PDD, version 2 of 04/02/2010. Henceforth the CAR 2 is closed.
CAR 3 The Party involved is mentioned as India. But it is not indicated if India is the host (Section A.3 table).	A.3.1	Host has been mentioned in the revised PDD.	The revised PDD, version 2 of 04/02/2010 confirms that India is a host country. Hence this CAR is closed.
CAR 4 Please confirm project location as 23°42' N latitude and 87°01' E longitude also mentioning the project location number.	A.4.1	The exact project location is 23° 40' 33.89" N, 86° 55' 21.68" E. PIN number is 713 325. Source for GPS location is Google earth. Snap shot of Google earth image has been incorporated in the PDD.	The PP to provide the sources of GPS and Project location number. Hence this CAR is not closed. The team has checked the snap shot of google earth for GPS coordinates and confirms the same as mentioned in the revised PDD hence this CAR is closed.
CAR 5 The project design engineering reflects current good practices. However, considerations about how environmentally safe and sound is the chosen technology and about a possible technology and/or know how transfer, need to be addressed in the PDD.	A.4.3.1	Consideration about environmentally safe and sound technology and the possible technology transfer has been addressed in the revised PDD. Supporting document to show “This technology is state of the art when compared to the conventional practice in the Indian steel sector” has been provided.	As said in the revised PDD that project activity is a transfer of technology from Germany. The PP to provide the supporting documents and comparative study which substantiate the statement “This technology is state of the art when compared to the conventional practice in the Indian steel sector”. For detail please see CL 3 Hence this CAR is not closed. The PP has submitted a third part document, which substantiate that proposed project activity

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
			<p>is one of the “State of the Art Clean Technologies”. This handbook on The State-of-the-Art Clean Technologies (SOACT) for Steel making by Asia Pacific Partnership for Clean Development and Climate, December 2007, page 46 of the report. The web link - http://www.asiapacificpartnership.org/english/pr_steel.aspx#steel_project_5</p> <p>The proposed technology is transfer from Germany, to substantiate this, PP has submitted contract agreement between POSCO E&C and Kuttner, the technology supplier dated June 2008.</p> <p>Hence CAR 5 is closed.</p>
CAR 6 The PDD is not transparent on initial training and maintenance needs for the project activity.	A.4.3.4 A.4.3.5	Initial training and maintenance needs for the project activity has been described transparently in the revised PDD.	The revised PDD, version 2 dated 04/02/2010 is verified and found acceptable. Hence This CAR is closed.
CAR 7 The year format of crediting period needs to be revised as 2009-2010 not 2009. There is no explanation on why the annual GHG emission reductions on page 2 (62,551 tCO ₂ e) is different from page 6 (134,099 tCO ₂ e).	A.4.4.1	<p>The year format has been revised as 2010 – 2011.</p> <p>Mention of 62551 tCO₂e in page no 2 and 134099 tCO₂e in page 6 is a typographical error. The corrected value is 64,626 tCO₂e</p>	<p>The PDD is revised with crediting period starting 2010-201, hence this CAR is closed.</p> <p>In the revised PDD the annual GHG emission reduction found consistent i.e. 64,626 tCO₂e. Hence this CAR is closed.</p>
CAR 8 Although it is mentioned of ACM0012 version 03.1 in Section B.1 of PDD, the following has to be clarified: - ACM0012 version 2 is mentioned in PDD's section B.4 of PDD; - mentioned title of ACM0012 version 03.1 is not matching with that of the approved methodology. Further, data/parameters and methodology formulas- references mentioned are related to ACM0012 version 2 which is already expired.	B.1.1	<ul style="list-style-type: none"> Version number has been revised to ACM 0012 3.2 under section B.4 of the PDD. Title has been corrected as per the latest methodology ACM 0012 version 3.2. Data/parameters and methodology formulas- references mentioned has been corrected as per the latest methodology ACM 0012 version 3.2 	<ul style="list-style-type: none"> The revised PDD has applied latest version i.e. 3.2. Section B.4 of revised PDD confirms the latest version. Data/parameters and methodology formulas- references mentioned has been corrected as per the latest methodology ACM 0012 version 3.2 <p>Hence this CAR is closed.</p>
CAR 9 The other methodologies or tools (and versions)	B.1.2	There were no other tools except Tool for demonstration and assessment of	Tool for demonstration and assessment of additionality, version 5.2 has been used to

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
used in the project activity implementation (calculations) are not mentioned in PDD.		additionality has been used. The same has been incorporated in the revised PDD.	demonstrate additionality, has been incorporated in section B.1 of the revised PDD. Hence, The CAR 9 is closed.
CAR 10 Regarding ACM0012 applicability, please address/explain and/or further elaborate (clear justifications-used criteria) in the PDD, as per the latest approved methodology, the following points are not transparently discussed in the PDD; - definition/identification of type/criteria and/or conditions applicable for the project activity; - definition/identification of applicable methods and/or cases; - existing facilities and after project implementation capacities; - PDD assumptions (possible contradictions) like: “The project activity involves the installation of NEW BF Stoves with waste heat recovery” and “The project activity involves a NEW installation of waste heat recovery system from BF stoves” (Section B.2 table and other locations in the PDD); - gas captured and utilized in the project activity that was flared or vented in the absence of the project activity; - Demonstration 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.	B.2.1	<ul style="list-style-type: none"> Definition/identification of type/criteria and/or conditions applicable for the project activity has been incorporated in the revised PDD. Definition/identification of applicable methods and/or cases has been incorporated in the revised PDD. Since it is a Greenfield project activity, this is not applicable All contradicting statements have been corrected in the revised PDD Project activity does not involve utilization of waste gas for energy generation hence it is not applicable Demonstration 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 has been incorporated in the PDD. The waste energy is used for generation of heat in elemental process. The same has been incorporated in the revised PDD. As per the criteria 4 of the methodology, there is no electricity generation in the project activity hence this scenario is not applicable. The same has been incorporated in the revised PDD. The project activity does not involve 	As per the revised PDD, the project category falls under Type -1. However based on the revised PDD, dated 04/02/2010, version 02. The PP to provide corrective action on following; Project activity is not clear whether waste energy is an energy source for; (a) Cogeneration; or (b) Generation of electricity; or (c) Direct use as process heat; or (d) For generation of heat in elemental process (e.g. steam, hot water, hot oil, hot air). (e) For generation of mechanical energy The PP to provide the correct justification in the PDD against criteria 4 of the methodology The PP to provide the source for the applicability condition used in the PDD i.e. “Cogeneration of energy is from combined heat and power and not combined cycle mode of electricity generation”. Hence this CAR is not closed. The revised PDD, version 3 of 04/08/2010 has addressed the issues and found acceptable. Hence this CAR is closed.

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		cogeneration and hence this scenario is not applicable.	
CAR 11 It is mentioned (PDD Section B.4) that baseline scenario 1 of ACM0012 version 02 was selected. However the version 2 is already expired and the current version is 3.1. The assumptions/definitions, clearly specifying which baseline scenario (alternative scenarios, options, cases) of the methodology has been chosen to calculate the baseline and project emissions and justifications for the same are not transparent in the PDD and not supported with evidences. Furthermore, please clarify the following: - The unit on section 6 of table of page 14. It is mentioned as TJ/ton of coke, whereas it should be TJ/ton of hot metal; - the quantity of 5,484 TJ/thm looks very high and the unit seems that should be TJ (for gas generation, its calorific value to be checked); - the unit on section 7 of table of page 14. It is mentioned as T of coke/year, whereas it should be Tonnes of hot metal; - heat exchanged of gas and air seems to be very high i. e. 281 TJ/yr and 210 TJ/yr as per the flow & temperature mentioned in PDD Section A.4.3 tables; - waste gas flow rate of 193 Nm ³ /hr looks very low while the waste gas outlet temperature seems to be very high, i.e. 180 °C (PDD Section A.4.3 tables).	B.4.1 B.4.3 B.4.4 B.4.6	<ul style="list-style-type: none"> Methodology version number has been revised to ACM 0012 version 3.2 in the revised PDD. Mention of TJ/ton of coke in page 14 was a typographical error Mention of 5,484 TJ/thm was a typographical error Under section 7 of table of page 14 mention of T of coke/year was a typographical error Heat exchanged value has been revised as per the manufacturer specification Mention of waste gas flow rate of 193 Nm³/hr was a typographical error. Methodology version number has been revised to version 3.2 under section B.6.1 of the PDD. 	Revised PDD still has utilized old version of methodology as ACM 0012, version 3.1 on page number 18 under B.6.1. Revised PDD does not have corrected information. Hence this CAR is not closed. The revised PDD has used latest version of methodology (version 3.2), hence this CAR is closed.
CAR 12 It is not clear from the PDD The use of conservative assumptions in the determination of baseline scenario. Needs to be demonstrated.	B.4.2	A conservation assumption in the determination of baseline scenario has been incorporated in the PDD. Baseline scenario has been identified and described till step 4 of the methodology ACM	The PP to describe and define identification of baseline scenario till Step 4 of the methodology ACM 0012, version 3.2.

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		0012, version 3.2 in the revised PDD.	<p>This CAR is not closed.</p> <p>The revised PDD, version 3 of 04/08/2010 has described baseline identification till step 4 of the methodology and found acceptable. Hence this CAR is closed.</p>
CAR 13 Discussion on the major risks identified to the baseline is not evident in PDD.	B.4.7	There is no major risk identified to the baseline	The latest PDD has now addressed major issues. Hence this CAR is closed.
CAR 14 In technological barrier discussions, it is not clear on the training needs, and infrastructure requirement. The common practice analysis is not complete and not followed the step wise approach as said in additionality tool	B.5.2	<p>Technological barrier discussions have been removed from the revised PDD since the project additionality is proved by Investment analysis.</p> <p>Common practice analysis has been revised as per the Additionality tool.</p> <p>As per Para 7 Annex 13 of EB 50, Barriers that can be mitigated by additional financial means can be quantified and represented as costs and should not be identified as a barrier for implementation of project while conducting the barrier analysis, but rather should be considered in the framework of investment analysis. Hence technological barrier arguments have been removed from the PDD.</p>	<p>Since PP has removed technological barrier discussion now the project additionality is proved by invest analysis.</p> <p>See CL 9 This CAR is not closed.</p> <p>The latest PDD has addressed the common practice analysis by comparing the existing integrated steel plant. The PP has also proved that there are only four Iron and Steel industry in India (SAIL, TISCO, RINL, and JSW) having the BF-BOF route of steel production. Out of which only one project activity (TATA Steel) had been installed without CDM consideration.</p> <p>Therefore proposed project activity is not a common practice in Indian Integrated Iron & Steel sector and therefore it is additional.</p> <p>Hence this CAR 14 is close.</p>

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
CAR 15 The proponent is requested to address all the data and parameters associated required to be monitored as per the approved monitoring methodology. Following data/parameters are not transparent in the PDD; <ul style="list-style-type: none"> Monitoring frequency is not mentioned in any of the Section B.7.1 tables. Please mention the Quantity of waste gas $QW_{G,y}$ used for energy generation during year y (Nm^3) Please mention the Net quantity of heat ($HG_{j,y}$) supplied. Please mention fraction of total heat ($ws_{i,,j}$) used. Please mention Net Calorific Value (NCV_{wg}) of waste gas. Please mention the sources, value, measurement method and QA/QC procedure of Pressure of steam (P_{steam}), Temperature of steam (T_{steam}), Pressure of condensate ($P_{condensate}$), and Temperature of condensate ($T_{condensate}$) used in the PDD. 	B.7.1.1 B.7.1.2 B.7.1.3 B.7.1.4 B.7.1.5 B.7.2.10	<ul style="list-style-type: none"> Monitoring frequency has been mentioned in section B.7.1 Quantity of waste gas $QW_{G,y}$ used for energy generation during year y (Nm^3) has been mentioned in the revised PDD Net quantity of heat ($HG_{j,y}$) supplied has been mentioned in the revised PDD The fraction of total heat used is 1, since the heat generation is purely from use of waste energy. The same has been incorporated in the revised PDD. Net Calorific Value of waste gas is not a part of the monitoring parameters hence it is not mentioned. There is no steam generation in the project activity hence it is not mentioned. 	<ul style="list-style-type: none"> Revised PDD addresses the monitoring frequency of the date used. Quantity of waste gas $QW_{G,y}$ used for energy generation during year y (Nm^3) is not mentioned in the revised PDD. The PP to use and revised the monitoring parameters as mentioned the methodology. The parameters EF_{coal} emission factor of coal is a constant value, the PP to omit it from here. <p>Hence this CAR is not closed.</p> <hr/> <p>The revised PDD has addressed the parameters as mentioned in the methodology. Hence this CAR is closed.</p>
CAR 16 From the section B.7 and annex-4 of the PDD, it is not clear that which Monitoring Methodology has been chosen for monitoring the parameters.	B.7.2.1 B.7.2.2	Section B.7 and Annex 4 of the PDD have been revised to incorporate the monitoring methodology chosen for monitoring the parameters.	The inclusion of monitoring methodology (ACM0012) in the section B.7 and Annex -4 is corrected. Hence this CAR is closed.
CAR 17	B.7.2.3	Monitoring plan has been revised to	The revised monitoring plan has retention time

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
<p>The monitoring plan is not transparent on the following: Collection and archiving of all relevant data necessary for measuring of greenhouse gas emissions and leakage determination.</p>	B.7.2.4	<p>incorporate collection and archiving of all relevant data necessary for measuring of greenhouse gas emissions and leakage determination.</p> <ul style="list-style-type: none"> • Mention of statement “plant has been divided into two divisions namely Blast furnace zone and hot stove zone. The waste heat recovery comes under the hot stove zone” is a typographical error. Hot stove and waste heat recovery system comes under blast furnace department. • Mention of “Flue gas flow rate is calculated” is a typographical error. Flue gas flow rate is monitored continuously using the orifice plate. The accuracy level of the orifice plate has been incorporated in the PDD. 	<p>as 2 year after the end of the last crediting period for collection and archiving of all relevant data. However the PP to provide correction/justification of the following;</p> <ul style="list-style-type: none"> • In the page 31 of B.7.2, it is said that plant has been divided into two divisions namely Blast furnace zone and hot stove zone. The waste heat recovery comes under the hot stove zone. On the other hand on page 32 under head Monitoring roles and responsibility- it is appeared that this comes under Blast furnace department. • Annex 4; in table 1, it said value for parameter “Flue gas flow rate” is calculated, whereas in table 2, it is monitored by instrument called Orifice Plate that is again without accuracy level. <p>Hence this CAR is not closed.</p> <p>The corrections as mentioned in the revised PDD are acceptable hence this CAR is closed.</p>
<p>CAR 18 Monitoring plan is not transparent on emergency preparedness plan, where emergencies can cause unintended emissions.</p>	B.7.2.8	<p>Monitoring plan has been revised to incorporate emergency preparedness plan, where emergencies can cause unintended emissions.</p> <p>Emergency preparedness plan has been incorporated under section B.7.2 of the PDD.</p>	<p>In the revised PDD, it is mentioned that emergency preparedness will be as per the IISCO emergency preparedness plan. The PP to provide the emergency preparedness plan for the same. Hence this CAR is not closed.</p> <p>The PP has provided the copy of the disaster management plan of SAIL-ISP, Burnpur. The team has reviewed the plan and confirms it is in line with the safety requirement of the plant. Hence this CAR is closed.</p>
<p>CAR 19 Monitoring plan is not transparent on the action taken during uncertainties like inconsistency/discrepancy of data/parameters.</p>	B.7.2.9	<p>Monitoring plan has been revised to incorporate action taken during uncertainties like inconsistency/discrepancy of data/parameters.</p>	<p>It is not reflected in the revised PDD. Hence this CAR is not closed.</p> <p>Revised PDD addresses on the uncertainties and found acceptable. Hence This CAR is</p>

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		Monitoring plan has been revised to incorporate action taken during uncertainties like inconsistency/discrepancy of data/parameters.	closed.
CAR 20 The date of completion of baseline and monitoring methodology is not mentioned in the correct format. Kindly correct date format DD/MM/YYYY. Please also clarify why this date does not match with the PDD's version date mentioned on page 2.	B.8.1	The date of completion of baseline and monitoring methodology has been mentioned in the correct format in the revised PDD.	The date of completion of baseline and monitoring methodology has been verified in the revised PDD and found satisfactory.
		Mismatch of date mentioned in page 2 and the date mentioned in the baseline completion was a typographical error.	Still there is a mismatch of the date on page 2 and date mentioned in the baseline completion. Hence this CAR is not closed.
		Mismatch of date on page 2 and date mentioned in the baseline completion has been corrected in the revised PDD.	The revised PDD, the corrections is acceptable. Hence this CAR is closed.
CL 1 Please clarify/further elaborate the following points regarding other environmental or social benefits than GHG emission reductions created by the project activity: <ul style="list-style-type: none"> - employment opportunities for unskilled people; - social well being of nearby area, as per HCA criteria; - economic well being of the people (by reducing dependence of import of fossil fuel); - documented evidences to support the assumption that the project is the first of its kind among other steel manufacturing industries of India. Furthermore, please note that, as per HCA Eligibility criteria, <i>“The CDM projects should also be oriented towards improving the quality of life of the poor from the environmental standpoint”</i> .	A.2.3.4	Sustainable development criteria have been elaborated in the revised PDD. And necessary documented evidence as per HCA eligibility criteria has been provided.	The revised PDD and supporting document for social development in terms of corporate social responsibility is verified and found satisfactory.
		Statement on first of its kind has been removed from the PDD	Hence this CL is closed.
CL 2 Please clarify why sectoral scope 1 is not also mentioned in Section A.4.2.	A.4.2	No mention of sectoral scope 1 in section A.4.2 is a typographical error. Sectoral scope 1 has been incorporated in the revised PDD.	Correction updated and verified in the revised PDD version 2 of 04/02/2010. Hence this CL is closed.

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
CL 3 Please address in the PDD whether the applied technology is considered state of the art or could result in a significantly better performance than host country commonly used technologies.	A.4.3.2	<p>The applied technology is considered state of the art and could result in a significantly better performance than host country commonly used technologies, since the project activity involves the transfer of technology from Germany and not a common practice in Indian steel sector. The same has been addressed in the revised PDD.</p> <ul style="list-style-type: none"> Documents that substantiate the statement “state of the art” and transfer of technology from Germany and not a common practice in Indian steel sector has been provided. Supporting documents for heat exchangers design data has been provided. 	<ol style="list-style-type: none"> Correction found in the revised PDD. The PP to provide the documents that substantiate the statement “state of the art” and transfer of technology from Germany and not a common practice in Indian steel sector. The PP to provide the supporting documents for heat exchangers design data. <p>Hence this CL is not closed.</p> <hr/> <p>The PP has provided the supporting document for heat exchangers design data. Hence CL 3 is closed.</p>
CL 4 <ul style="list-style-type: none"> Please provide the documented proof that the waste gas/pressure released in the abnormal operation of the plant is not accounted for the emission reduction. Please provide us the documented proof on the regulations which states that regulations does not constrain the industrial facility generating waste gas from using the fossil fuels being used prior to the implementation of the project activity. Please clarify why last section of methodology applicability (page 4 of methodology) is not considered / discussed? Clarification required on “Project activity does not involve any generation of electricity”. Please provide us clarification on “Project activity does not involve the cogeneration of energy”. 	B.2.1	<ul style="list-style-type: none"> Documented proof that the waste gas/pressure released in the abnormal operation of the plant is not accounted for the emission reduction will be provided. There is no regulation which constrains the industrial facility generating energy using fossil fuels. The last section of the methodology for type 1 project activities is not applicable to our project activity since ours is a Greenfield project activity. The project activity involves the utilization of waste heat from the flue gases of hot stove for pre heating the BF gas and combustion air; hence there is no generation of electricity in the project activity. The project activity involves the utilization of waste heat from the flue gases of hot stove for pre heating the BF gas and combustion air; hence there is no 	<ul style="list-style-type: none"> A self declaration letter from the PP has been provided as proof that the waste gas/pressure released in the abnormal operation of the plant is not accounted for the emission reduction, dated 16/02/2010. Clarification provided satisfies the team. Clarification on applicability (page 4) is not accepted. Clarification accepted on “project activity does not involve generation of electricity” Clarification accepted on “no cogeneration of electricity”. <p>However CL is not closed.</p> <hr/> <p>The revised PDD has addressed the applicability conditions of the methodology and found acceptable. Hence this CL is closed.</p>

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		cogeneration of electricity in the project activity.	
		Clarification on applicability page 4 has been revised and incorporated in the revised PDD.	
CL 5 Clarification is required on keeping Annex 3 blank.	B.2.2 B.2.3	Annex 3 has been referred by section B.6.3 of the PDD.	In the revised PDD it is mentioned “there is no baseline information available since it is a Greenfield project activity” and here in response it is mentioned “Annex 3 has been referred by section B.6.3 of the PDD”. The PP to provide clarification on the contradict statement. Hence this CL is not closed. The PP has incorporated the correction in the revised PDD and found acceptable. Hence this CL is closed.
		Mention of “there is no baseline information available since it is a Greenfield project activity” in the PDD is a typographical error. The corrected sentence is “Please refer to section B.6.3”.	
CL 6 Clarify why Gas blower and Air blower are not included in the project boundaries.	B.3.2 B.3.3	Gas blower and Air blower is required even in the absence of the project activity. Hence it has not been incorporated in the project boundary.	The clarification satisfies the team and hence this CL is closed.
CL 7 Please provide all the references and sources used.	B.4.8	All reference and sources used have been provided/	This CL is not closed. See CAR 4
CL 8 Please clarify the difference/s between project alternatives 2 and 3.	B.5.1	Project alternatives have been revised as per the latest methodology.	Project alternatives should be as per the latest version of “Tool for the demonstration and assessment of additionality” not per the latest methodology. The response on clarification is not accepted and hence CL is not closed. The clarification satisfies the team and hence this CL is closed.
		Mention of alternative 3 is a typographical error. Project alternatives have been revised as per the latest version of “Tool for the demonstration and assessment of additionality”	
CL 9 Please clarify why barriers due to prevailing practice and other barriers are not considered. Please clarify what you mean by “the technology	B.5.2 B.5.3	Since the project activity comes under the large scale methodology, Tool for assessment and demonstrations of additionality version 5.2 have been used for	The latest PDD is now addressed the addionality through investment analysis and common practice. The letter provided is not authentic, in support of

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
<p>barrier for this project activity is operational barrier.</p> <p>Please provide us the documented proof for the claim that no other similar project activities are being carried out in similar steel plants in SAIL at present or in India.</p>		<p>justifying the additionality arguments. As per the tool, Investment analysis & Common practice analysis have been considered for this project activity additionality justification.</p> <p>Mention of operation barrier is a typographical error.</p> <p>Documented proof from MECON Limited have been provided for the claim that no other similar project activities are being carried out in similar steel plants in SAIL at present or in India.</p> <ul style="list-style-type: none"> • The IRR has been revised to incorporate the envisaged cost of INR 2271.5 Lakhs based on the letter from MECON dated 12/06/2010. • As a conservative approach, Prime lending rates of public sector banks have been used a benchmark. • Since the benchmark has been shifted from WACC to Prime lending rates of public sector banks as a conservative approach, there is no need for benchmark calculation in the PDD. • As a conservative approach, Prime lending rates of public sector banks have been used a benchmark. • Expenses during construction based on Annex - IV Guidelines for formulation of investment proposal for appraisal dated 2000 has been provided. • Contingency cost based on Annex - III Guidelines for formulation of investment proposal for appraisal- 	<p>the claim that no other similar project activities are being carried out in similar steel plants in SAIL at present or in India.</p> <p>The PP to clarify on;</p> <ul style="list-style-type: none"> • Costs are based on the contract with the supplier which was signed after the decision making date. i.e Project cost based on Contract agreement between IISCO and POSCO, NCC consortium- dated 2008.06. • Beta value has been computed for a different period to the other parameters in the calculation of the WACC. Why is this? Beta at 1.54 appears to be very high. • The PP has not explained the calculation of the benchmark in the PDD. The PDD does not describe the financial indicator clearly ie is it Project IRR or Equity IRR and rationale behind choosing the financial indicator. • PP to justify why they chose internal WACC as the benchmark when a benchmark such as BPLR of public sector banks are available • Expenses during construction based on Annex - IV Guidelines for formulation of investment proposal for appraisal-dated 2008.06 • Contingency cost based on Annex - III Guidelines for formulation of investment proposal for appraisal- dated 2008.06 • O&M cost based on Communication from IISCO Steel Plant- support is not dated • Average calorific value of coal Communication from IISCO Steel Plant- email dated Jan 2010. Source not mentioned • Heat rate exchange calculated based on Manufacturer's specification

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		<p>dated 2000 has been provided</p> <ul style="list-style-type: none"> O&M cost based on letter from POSCO (Supplier) dated 12/06/2010 has been provided. Average calorific value of coal Communication from IISCO Steel Plant-email dated 12/02/2010 along with source has been provided. <p><u>Under Step 4 of Common Practice Analysis.</u></p> <ul style="list-style-type: none"> Since the HATCH report is in draft stage, the arguments based on that document have been removed from the revised PDD. The source provided under step 4b is www.greenbusinesscentre.org/grn/mmbase/.../JSW_Steel_final.pdf 	<ul style="list-style-type: none"> Technical specification of blast furnace <p><u>Under Step 4 of Common Practice Analysis.</u></p> <ul style="list-style-type: none"> The PP has referred the some report prepared by HATCH for the APP steel Task force, where it is mentioned that penetration rate of the project activity is 17.6%. However, the report is Draft. Sources of the Link provided under step 4b needs to be provided. <hr/> <p>The PP has submitted the following documents:</p> <ul style="list-style-type: none"> The revised IRR has now incorporated the envisaged cost of INR 2271.5 Lakhs based on the letter from MECON dated 12/06/2010. This is in line with the requirements and hence team has accepted this letter. As a conservative approach, Prime lending rates of public sector banks have been used a benchmark, which is accepted as conservative approach. Since the benchmark has been shifted from WACC to Prime lending rates of public sector banks as a conservative approach, there is no need for benchmark calculation in the PDD, the revised PDD and IRR sheet is now having benchmark as PLR which is in line with the requirement, hence team has accepted tis approach. As a conservative approach, Prime lending rates of public sector banks have been used a benchmark. Expenses during construction based on

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
			<p>Annex - IV Guidelines for formulation of investment proposal for appraisal dated 2000 has been provided, the team has verified the documents as has accepted this approach.</p> <ul style="list-style-type: none"> Contingency cost based on Annex - III Guidelines for formulation of investment proposal for appraisal- dated 2000 has been provided the team has verified the documents as has accepted this approach. O&M cost based on letter from POSCO (Supplier) dated 12/06/2010 has been provided, the team has verified the documents as has accepted this approach. Average calorific value of coal Communication from IISCO Steel Plant- email dated 12/02/2010 along with source has been provided, since SAIL is large public sector undertaking (PSU), Government of India, the documents provided by the PP on average calorific value of coal is quite acceptable and hence team has accepted this approach. <p>The Latest PDD is having a discussion on the common practice based on the comparison study with the existing integrated Steel plant. The source on step 5b is now provided in the PDD.</p>
<p>CL 10 The PDD is not transparent on the complete chronology of events from the decision making date to the date of appointment of validator. Provide documented evidences to support each of the events in the chronology</p>	<p>B.5.4 B.5.5</p>	<p>Chronology of events from the decision making date to the date of appointment of validator have been incorporated in the revised PDD.</p> <hr/> <p>The following documents have been provided,</p> <ul style="list-style-type: none"> Work order between SAIL & CDM 	<p>As per EB 49, Annex-22. The PP is requested to furnish the evidences for PP's awareness to CDM prior to start date.</p> <p>The PP to furnish the supporting documents with exact dates on;</p> <ul style="list-style-type: none"> Work order between SAIL & CDM consultant for CDM services-November

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		<p>consultant for CDM services- November 2007</p> <ul style="list-style-type: none"> • Invitation sent to stakeholders for Stakeholder meeting (January 2008) • Stakeholder meeting conducted in IISCO Steel Plant, SAIL (February 2008) • Submission of PDD to Ministry of Environment & Forests, Government of India for HCA- June 2008. • Grant of Consent to Establish by the West Bengal State Pollution Control Board- June 2008. • Host country approval received for the project activity-January 2009 • Appointment of the validators – January 2009 	<p>2007</p> <ul style="list-style-type: none"> • Invitation sent to stakeholders for Stakeholder meeting (January 2008) • Stakeholder meeting conducted in IISCO Steel Plant, SAIL (February 2008) • Submission of PDD to Ministry of Environment & Forests, Government of India for HCA- June 2008. • Grant of Consent to Establish by the West Bengal State Pollution Control Board- June 2008. • Host country approval received for the project activity-January 2009 • Appointment of the validators – January 2009 <p>The team has verified the documents, submitted as proof of chronology of the event, found it in line with requirement. Hence CL 10 is closed.</p>
<p>CL 11</p> <p>It is not clear why the auxiliary consumption of different equipments employed is not included in project activity diagram.</p>	<p>B.6.1.1 B.6.1.3 B.6.1.4</p>	<p>There is no auxiliary consumption because of this project, so it has not been incorporated in the project activity diagram.</p> <p>The statement mentioned in the PDD under section B.6.1 was a typographical error.</p>	<p>Response to clarification accepted.</p> <p>However based on the revised PDD, the PP to provide clarification on the statement “<i>waste heat recovery device has been used to waste heat from the flue gas of hot stove</i>”.</p> <p>Hence this CL is not closed.</p> <p>The clarification satisfies the team and hence this CL is closed.</p>
<p>CL 12</p> <p>Please clarify whether $BE_{ther,y}$ and BE_y are the same or different.</p>	<p>B.6.1.2</p>	<p>Since the project activity involves only thermal energy generation, $BE_{ther,y}$ and BE_y are same.</p> <p>Notation has been revised to $q_{wcm,product}$ in the revised PDD under section B.6.1</p>	<p>Response to clarification accepted.</p> <p>However, PP to use the same notation as used in the methodology i.e. $q_{wg,product}$ has been used whereas in the methodology it mentioned as $q_{wcm,product}$.</p> <p>Hence This CL is not closed.</p> <p>Notation has been revised to $q_{wcm,product}$ in the revised PDD under section B.6.1. The same was</p>

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
			verified & found ok. Hence this CL is closed.
CL 13 Please provide the source for all the data and parameters mentioned the table B.6.2 of PDD.	B.6.2.1	Source for all the data and parameters has been mentioned in the table B.6.2 of PDD.	The PP to provide the manufacture specifications.
	B.6.2.2 B.6.2.3	Manufacturer's specification has been provided	Hence This CL is not closed. The Contract specification of heat exchanger has been provided and hence CL 13 is closed.
CL 14 Please provide us the justification how total emission reduction per year 62551.74391 t CO ₂ /year (calculated) is different from what has come under <i>ex-ante</i> estimation	B.6.3.1	Mention of 62551.74391 is a typographical error. The revised emission reduction is 64,626 tCO ₂ /year.	Response to clarification accepted. Hence this CL is closed.
CL 15 Detailed spreadsheets for all calculations (project/baseline emissions, emission reductions ex-ante & ex-post) must be provided, indicating formulas and/or default values/data sources.	B.6.3.2	Detailed spreadsheets for all calculations (project/baseline emissions, emission reductions ex-ante & ex-post) have been provided, indicating formulas and/or default values/data sources.	The spread sheet submitted by PP is verified and still need some clarification on; 1. Sources for the value as 26,928 and 37,699 T/CO ₂ e for years as August 2010-December 2010 and January 2017 – July 2017 respectively. This CL is not closed.
		The expected commissioning date of this project activity is December 2010. So as a conservative approach the CER crediting period has been accounted from 01/01/2011. Mention of '26,928 and 37,699 T/CO ₂ e for years as August 2010-December 2010 and January 2017 – July 2017 respectively' is a typographical error. The revised figures as per the CER spreadsheet have been incorporated in the revised PDD.	The figure of emission reduction as mentioned in the PDD is matched with the CER spread sheet. Hence this CL is closed.
CL 16 The monitoring plan is not transparent on the training procedures identified for monitoring personnel and the documentary evidence.	B.7.2.7	Monitoring plan has been revised to incorporate the training procedures identified for monitoring personnel. Documentary evidence for the same has been provided.	The monitoring plan is not transparent and the PP to provide the Supporting document as mentioned in the response. Hence This CL is not closed.
		Monitoring plan has been revised to incorporate the training procedures identified for monitoring personnel. Documentary evidence for the same has been provided.	Revised PDD has addressed the training requirements and this is substantiated with the training schedule provided by PP. hence this CL is closed.
CL 17	C.1.2.1	Mention of operation lifetime as 50 years was	PP to provide the Supporting document as

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
The operational lifetime is mentioned as 50 years and 0 months; Documented evidence of the project's operational lifetime is requested.		a typographical error. Actual project operational lifetime is 20 years and the documented evidence for the same has been provided. Supporting document for operation lifetime of the project has been provided.	mentioned in the response. Hence This CL is not closed. The document on operational lifetime of the project has been provided, hence this CL is closed.
CL 18 Please confirm if the fixed crediting period should be 7 years or 10 years and clarify/correct the statement about the “ <i>registration of the small scale project activity</i> ”. Furthermore, the crediting period starting date should be corrected to a feasible one (PDD version date is 15/12/2008) and presented in the right format, DD/MM/YYYY.	C.2.1	Project activity involves renewal crediting period and the first crediting period will be 7 years. Same has been incorporated in the revised PDD. Mention of “ <i>registration of the small scale project activity</i> ” is a typographical error. The same has been corrected in the revised PDD. The crediting period start date has been corrected and presented in the right format as 01/06/2010. Mention of date 01/06/2010 in response to clarification is a typographical error. The corrected date is 01/01/2011.	Revised PDD is now clear and transparent on crediting period. However the date mentioned in response to Clarification as 01/06/2010 does not match with date as 01/08/2010 mentioned in the PDD. Hence This CL is not closed. The correct date 01/01/2011 is verified from the revised PDD, hence this CL is closed.
CL 19 As per the notification of MoEF and also mentioned in PDD, the stated project does not fall under the thirty- eight categories of the projects as per MoEF, Govt. of India, Hence does not require any environmental impact assessment study. Please provide us the documented proof of the same.	D.1.1 D.1.2 D.1.3 D.1.4 D.1.5 D.1.6	Link for EIA not required have been incorporated in the revised PDD. Link for EIA not required have been incorporated in the revised PDD.	The link is not evident / incorporated in the revised PDD. This CL is not closed. The link has been incorporated in the PDD hence this CL is closed.

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
CL 20 A local stakeholder's consultation meeting was organized on 04 February 2008. Evidences of invitation letters, minutes of meeting, questionnaires and an understandable summary of stakeholders comments (all with dates) are requested.	E.1.1 E.1.2 E.1.3	Evidences of invitation letters, minutes of meeting, questionnaires and an understandable summary of stakeholder's comments have been provided.	The PP to provide the supporting documents as mentioned in the response. Hence This CL is not closed.
		Evidences of invitation letters, minutes of meeting, questionnaires and an understandable summary of stakeholder's comments have been provided.	The PP has provided the invitation letter sent, minutes of meeting hence this CAR is closed.
CL 21 If sections of the CDM-PDD (for instance, C.2.1.1, C.2.1.2 and Annexes 2 to 4) are not applicable, it shall be explicitly stated that the section is left blank on purpose or further background information used should be provided (Annexes 3 and 4).	Annex 2 Annex 3 Annex 4	Sections C.2.1.1, C.2.1.2 & Annexes 2 to 4 of the CDM PDD have been provided with necessary background information.	The revised PDD has inclusion of the information relevant to the sections. Hence CL 21 is closed.

TABLE 4 FORWARD ACTION REQUEST

Forward action request	Reference to Table 2	Response by project participants Validation Conclusion
FAR 1		
No FAR		



RINA

CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Marcello Manno

è qualificato come¹:
is qualified as:

**CDM-VAL, CDM-VER, CDM-TL, VCS-VAL, VCS-VER, VCS-TL,
GS-VAL, GS-VER, GS-TL, SCS-VAL, SCS-VER, SCS-TL, CDM-
FIN-EXP**

per le seguenti aree tecniche:
for the following technical areas:

4.3, 4.6

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
4.3	Iron and Steel	4
4.6	Electrical/Electro technical products	4

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	31-01-2008	-
1	04-05-2009	Annual Revision
2	14-12-2009	Changes in module structure
3	26-05-2010	Annual Revision
4	18-10-2010	Changes in certificate module
5	04-01-2011	Removed TAs taken through ETS/EPD verifications/validations
6	17-03-2011	Changes due to new accreditation standard
7	27-06-2011	Annual Revision, extension to CDM/VCS/GS/SCS verifier

Il Responsabile di Schema
Scheme Manager

Il Resp. Tecnico della Divisione
Head of CRT

¹ Legend:

VAL: Validator
VER: Verifier
TEC: Technical Expert
TL: Team Leader
FIN-EXP: Financial Expert
DET: Determiner

CDM: Clean Development Mechanism
VCS: Verified Carbon Standard
GS: Gold Standard
SCS: SocialCarbon Standard
JI: Joint Implementation

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RINA

CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:

Deepankar Chowdhury

We declare that Mr/Mrs/Ms:

è qualificato come¹:
is qualified as:

CDM-TEC, CDM-VAL, CDM-VER

per le seguenti aree tecniche:
for the following technical areas:

1.2, 2.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.2	Energy generation from renewable energy sources	1
2.1	Electricity Distribution	2

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	31-01-2008	-
1	03-06-2009	Annual revision
2	17-02-2010	Changes in module structure
3	03-05-2010	Annual revision
4	18-10-10	Changes in certificate module
5	17-03-2011	Changes due to new accreditation standard
6	06-06-2011	Annual Revision
7	08-09-2011	Changes due to extension to CDM-VER qualification

Il Responsabile di Schema
Scheme Manager

Il Resp. Tecnico della Divisione
Head of CRT

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RINA

CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:

A. Cyril Augustus Arokiasamy

We declare that Mr/Mrs/Ms:

è qualificato come¹:
is qualified as:

**CDM-TEC, CDM-VAL, CDM-VER, CDM-TL, CDM-FIN-EXP,
GS-VAL, GS-VER, GS-TL, SCS-VAL, SCS-VER, SCS-TL**

per le seguenti aree tecniche:
for the following technical areas:

1.1, 1.3, 2.2, 3.1, 4.5, 4.10, 5.1, 11.1, 13.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation from fossil fuel and biomass including thermal electricity from solar	1
1.3	Waste heat/gas/pressure recovered and utilization for power generation at manufacturing industries	1
2.2	Heat Distribution	2
3.1	Energy Demand	3
4.5	Rubber and Plastics	4
4.10	Fuel switching and/or energy efficiency and/or waste heat/gas/pressure recovered and utilization for power generation at manufacturing industries	4
5.1	Chemical process industries	5
11.1	Chemical process industries	11
13.1	Waste Handling and Disposal	13

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	30-06-2010	-
1	18-10-2010	Changes in certificate module
2	17-03-2011	Changes due to new accreditation standard
3	13-05-2011	Changes due to updating of qualification to TL
4	06-06-2011	Annual Revision
5	23-08-2011	Changes due to updating of qualification to verifier

Il Responsabile di Schema
Scheme Manager

Il Resp. Tecnico della Divisione
Head of CRT

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RINA

CERTIFICATO DI QUALIFICA GHG GHG QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Nisha Raghavan

è qualificato come¹:
is qualified as:

CDM-FIN-EXP

per le seguenti aree tecniche:
for the following technical areas:

-

AREA TECNICA TECHNICAL AREA	CODICE RINA RINA CODE	SCOPO SETTORIALE SECTORAL SCOPE	CODICE RINA RINA CODE
-	-	-	-

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	20-10-2010	-
1	04-04-2011	Changed module structure

Il Responsabile di Schema
Scheme Manager

Il Resp. Tecnico della Divisione
Head of CRT

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VER: Verifier
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TL: Team Leader
TEC-FIN: Financial Expert
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RINA

CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Paolo Teramo

è qualificato come¹:
is qualified as:

CDM-TEC, CDM-VAL, CDM-VER
VCS-VAL, VCS-VER
GS-VAL, GS-VER

per le seguenti aree tecniche:
for the following technical areas:

1.1, 4.4, 5.1, 8.2, 10.2, 11.1, 13.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal Energy generation from fossil fuels and biomass including thermal electricity from solar	1
4.4	Refinery	4
5.1	Chemical process industries	5
8.2	Oil and gas industry, coal mine methane recovery and use	8
10.2	Oil and gas industry, coal mine methane recovery and use	10
11.1	Chemical process industries	11
13.1	Waste Handling and Disposal	13

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	31-01-2008	-
1	27-05-2009	Annual revision
2	25-09-2009	Added validation qualification
3	13-11-2009	Added qualification in C103
4	14-12-2009	Changes in module structure
5	06-05-2010	Annual revision
6	18-10-2010	Changes in certificate module
7	04-01-2011	Removed TAs taken through ETS/EPD verifications/validations
8	17-03-2011	Changes due to new accreditation standard
9	14-07-2011	Annual Revision

Il Responsabile di Schema
Scheme Manager

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Head of CRT

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RINA

CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Rita Valoroso

è qualificato come¹:
is qualified as:

**CDM-TEC, CDM-VAL, CDM-VER, CDM-TL, CDM-FIN-EXP
VCS-VAL, VCS-VER, VCS-TL
GS-VAL, GS-VER, GS-TL
SCS-VAL, SCS-VER, SCS-TL**

per le seguenti aree tecniche:
for the following technical areas:

1.2, 13.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.2	Energy generation from renewable Energy sources	1
13.1	Waste Handling and Disposal	13

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	18-01-10	-
1	03-05-10	Annual Revision
2	18-10-10	Changes in certificate module
3	04-01-11	Removed TAs taken through the ETS/EPD verifications/validations
4	17-03-11	Changes due to new accreditation standard
5	14-07-11	Annual Revision

Il Responsabile di Schema
Scheme Manager

Il Resp. Tecnico della Divisione
Head of CRT

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