



VALIDATION REPORT GUJARAT STATE ENERGY GENERATION LIMITED (GSEGL)

VALIDATION OF THE **351.43 MW Natural Gas Based Combined Cycle Power Plant at Hazira, Gujarat**

REPORT NO. INDIA-VAL/422.49/2012
REVISION No. 1


BUREAU VERITAS CERTIFICATION

62/71 Boulevard du Château
92571 Neuilly Sur Seine Cdx - France



VALIDATION REPORT

Date of first issue: 16/12/2012	Organizational unit: Bureau Veritas Certification Holding SAS
Client: Gujarat State Energy Generation Limited (GSEGL).	Client ref.: Mr. Shailesh Sivdasan
<p>Summary:</p> <p>Bureau Veritas Certification has made the validation of the “351.43 MW Natural Gas Based Combined Cycle Power Plant at Hazira, Gujarat” project of Gujarat State Energy Generation Limited (GSEGL). located at Haziar (Mora), Taluka Choryasi, District Surat, Gujarat, India, on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.</p> <p>The validation scope is defined as an independent and objective review of the project design document, the project's baseline study, monitoring plan and other relevant documents, and consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final validation report and opinion. The overall validation, from Contract Review to Validation Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.</p> <p>The first output of the validation process is a list of Clarification and Corrective Actions Requests (CL and CAR), presented in Appendix A. Taking into account this output, the project proponent revised its project design document.</p> <p>In summary, it is Bureau Veritas Certification's opinion that the project correctly applies the baseline and monitoring methodology AM 0029 version 03 and meets the relevant UNFCCC requirements for the CDM and the relevant host country criteria.</p>	

Report No.: INDIA-val/422.49/2012	Subject Group: CDM
Project title: 351.43 MW Natural Gas Based Combined Cycle Power Plant at Hazira, Gujarat	
Work carried out by: Mr. Hitesh Karandikar - Team Leader Mr. Sanjay Patankar – Team member Mr. Bhavesh Prajapati - Team member Mr. Rakesh Tripathi - Observer M/s. Sushil Budhia & Associates- Financial Expert Internal Technical Review carried out by: Mr. H.B. Muralidhar 	
Date of this revision: 27/12/2012	Rev. No.: 01
Number of pages: 221	

Indexing terms

Work approved by:

Mr. Flavio Gomes- Global Product Manager


☒ No distribution without permission from the Client or responsible organizational unit

☐ Limited distribution

☐ Unrestricted distribution



Table of Contents	Page
1 INTRODUCTION	6
1.1 Objective	6
1.2 Scope	6
1.3 Validation team	7
2 METHODOLOGY	7
2.1 Review of Documents	7
2.2 Follow-up Interviews	8
2.3 Resolution of Clarification and Corrective Action Requests	8
2.4 Internal Technical Review	9
3 VALIDATION CONCLUSIONS	10
3.1 Approval (49-50)	10
3.2 Participation (54)	11
3.3 Project design document (57)	11
3.4 Changes in the Project Activity	12
3.5 Project description (64)	12
3.6 Baseline and monitoring methodology	14
3.6.1 General requirement (76-77)	14
3.6.2 Project boundary (80)	19
3.6.3 Baseline identification (87-88)	21
3.6.4 Algorithms and/or formulae used to determine emission reductions (92-93)	30
3.7 Additionality of a project activity (97)	42
3.7.1 Prior consideration of the clean development mechanism (104)	42
3.7.1.1 Historical information on project timeline	48
3.7.2 Identification of alternatives (107)	48
3.7.3 Investment analysis (114)	48
3.7.4 Barrier analysis (118)	90
3.7.5 Common practice analysis (121)	90
3.8 Monitoring plan (124)	92
3.9 Sustainable development (127)	97
3.10 Local stakeholder consultation (130)	97
3.11 Environmental impacts (133)	98
4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS	99
5 VALIDATION OPINION	99



6	REFERENCES	100
7	CURRICULA VITAE OF THE DOE'S VALIDATION TEAM MEMBERS	103
	APPENDIX A: GUJARAT STATE ENERGY GENERATION LIMITED - CDM PROJECT VALIDATION PROTOCOL.....	105
	APPENDIX B:	
	COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS	214

Abbreviation used:

BCM	Billion Cubic Meters
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CER	Certified Emission Reductions
CERC	Central electricity Regulatory Commission
CL	Clarification Request
CO ₂	Carbon Dioxide
DNA	Designated National Authority
DOE	Designated Operational Entity
EIA	Environment Impact Assessment
GCV	Gross Calorific Value
GETCO	Gujarat Energy Transmission Company
GHG	Green House Gas(es)
GSEGL	Gujarat State Energy Generation Limited
GTG	Gas Turbine Generator
GUVNL	Gujarat Urja Vikas Nigam Limited
GW/GWh	Giga Watt /Gigawatt- Hour
HRSG	Heat Recovery Steam Generator
I	Interview
IETA	International Emissions Trading Association
IRR	Internal rate of return
JMR	Joint Meter Reading
kW/kWh	Kilowatt /Kilowatt-hour
MoEF	Ministry of Environment & Forests
M & P	Modalities and Procedure
MoP & G	Ministry of Petroleum & Natural Gas
MoV	Means of Verification
MP	Monitoring Plan
MW/MWh	Mega Watt/Megawatt-hour
NCV	Net Calorific Value
NGO	Non Government Organization
NEWNE	North East West and North-East
O & M	Operation and Maintenance
OM/ BM/CM	Operating Margin / Build Margin /Combined Margin
LNG	Liquefied Natural Gas
MMSCD	Million metric standard cubic meter per day
NG	Natural Gas
PCF	Prototype Carbon Fund



PDD	Project Design Document
PLF	Plant Load Factor
PP	Project Participant
PPA	Power Purchase Agreement
PSED	Program on Energy and Sustainable Development
SCM	Standard Cubic Meter
STG	Steam Turbine Generator
SLM	Straight Line Method
TCF	Trillion Cubic Feet
VVM	Validation and Verification Manual
UNFCCC	United Nations Framework Convention for Climate Change



1 INTRODUCTION

Gujarat State Energy Generation Ltd. (GSEGL) has commissioned Bureau Veritas Certification to validate its CDM project “**351.43 MW Natural Gas Based Combined Cycle Power Plant at Hazira, Gujarat**”¹ (hereafter called “the project”) at Village, Hazira (Mora) in the Taluka Choryasi, District Surat, within the state of Gujarat in India.

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

1.1 Objective

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

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

1.2 Scope

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

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

¹ During the validation it was identified that the Host Country Approval describes the Title of the project activity as “Natural Gas Based Combined Cycle Power Plant at Hazira, Gujarat”, instead of web hosted PDD title “351.43 MW Natural Gas Based Combined Cycle Power Plant at Hazira, Gujarat” Hence, the PDD title is now revised in line with Host Country approval. The validation team has raised CL-1. This has been explained in detail further in Section 3.1 of this report.



1.3 Validation team

The validation team consists of the following personnel:

FUNCTION	NAME	CODE HOLDER*	TASK PERFORMED
Lead Verifier	Hitesh Karandikar	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input type="checkbox"/> RI
Verifier	Sanjay Patankar	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input type="checkbox"/> RI
Verifier	Bhavesh Prajapati	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input type="checkbox"/> RI
Observer	Rakesh Tripathi	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input type="checkbox"/> RI
Financial Specialist	Sushil Budhia & Associates	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> DR <input type="checkbox"/> SV <input type="checkbox"/> RI
Work approved by	Flavio Gomes	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> DR <input type="checkbox"/> SV <input checked="" type="checkbox"/> RI
Internal Technical Reviewer (ITR)	H.B. Muralidhar	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> DR <input type="checkbox"/> SV <input type="checkbox"/> RI

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

2 METHODOLOGY

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

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

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

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

2.1 Review of Documents

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



To address Bureau Veritas Certification corrective action and clarification requests, the Project Participant revised the PDD and resubmitted it on December 2012 (Ref /4/)

The validation findings presented in this report relate to the project as described in the PDD version 03.

2.2 Follow-up Interviews

On 04/01/2012 to 05/01/2012, Bureau Veritas Certification performed a site visit and interviews with project stakeholders and representatives of GSEGL (see References). The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
GSEGL	<ul style="list-style-type: none"> • Project Design and implementation • Technical Equipment and operation • Compliance with National Laws and regulations. • CDM consideration • Benchmark Analysis • Additionality • Monitoring Plan
Local Stakeholders	<ul style="list-style-type: none"> • Views and concerns about the project activity
Price Waterhouse Coopers [CDM consultant]	<ul style="list-style-type: none"> • Baseline Determination • Additionality • Benchmark Analysis • Monitoring Plan • GHG Calculation • Environmental Impacts

2.3 Resolution of Clarification and Corrective Action Requests

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

Corrective Action Requests (CAR) is issued, where:

- a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- b) The CDM requirements have not been met;



- c) There is a risk that emission reductions cannot be monitored or calculated.

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

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

2.4 Internal Technical Review

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

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

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

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

- The validation activity has been performed by the team by exercising utmost diligence and complete adherence to the CDM rules and requirements.
- The review encompasses all aspects related to the project which includes project design, baseline, additionality, monitoring plans and emission reduction calculations, internal quality assurance systems of the project participant as well as the project activity, review of the stakeholder comments and responses, closure of CARs, CLs and FARs during the validation exercise, review of sample documents.

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

After the agreement of the responses on the 'Clarification Request' from the Lead Verifier as well as the PP(s) the finalized validation report is



accepted for further processing such as uploading on the UNFCCC webpage.

3 VALIDATION CONCLUSIONS

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

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

The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in Appendix A. The validation of the Project resulted in 15 Corrective Action Requests (CARs) and 17 Clarification Requests (CLs).

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

The number between brackets at the end of each section correspond to the VVM paragraph

3.1 Approval (49-50)

The only party involved in the project activity at this stage is India, which is the host party for the project activity. The project participant has obtained a letter of approval (Ref /5/) from the Ministry of Environment and Forests, which is the DNA of India. The following supporting documentation was also received:

1. Application made by the Project Participant to the DNA for Host Country Approval (HCA) (Ref /6/)
2. Invitation from DNA for HCA meeting (Ref /7/)

The validation team confirmed the authenticity of the approval from the website of DNA of India. The project activity is listed under I.D.no. 291/10/2010 in the large scale project activities list on the Indian DNA's web site. The title of the project activity in the web hosted PDD was not same as in the letter of approval from the DNA. Hence, validation team raised CL-1. The PP in response provided the revised Host Country Approval issued from the DNA of India (Ref /5/). The validation team reviewed it and found that the title of the project activity is now consistently described in the revised PDD and in the Host Country Approval, hence the CL is closed.



The Project ID no. also matches with the ID mentioned in DNA's invitation letter to the PP for HCA meeting (Ref /7/). Hence, it is confirmed that the HCA accorded by DNA of India with project ID 291/10/2010² is for the project activity titled "351.43 MW Natural Gas Based Combined Cycle Power Plant at Hazira, Gujarat" as stated in webhosted PDD.

The DNA's letter of approval (Ref /5/) having file number 4/21/2011-CCC dated 25/10/2012 (a revised Letter of Approval) clearly states that India has ratified the Kyoto Protocol and the approval is for voluntary participation in the CDM project activity. Also, the letter of approval mentions that the project activity contributes to sustainable development. The DNA approval refers to the precise proposed CDM project activity title in the PDD being submitted for registration. The letter is unconditional with respect to party to the Kyoto Protocol, voluntary participation, contribution to sustainable development and title of project activity. The validation team confirms that this letter is in accordance with paragraphs 45 – 48 of VVM version 1.2.

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

3.2 Participation (54)

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

The participation is approved by DNA and is accepted. The validation team concluded this by reviewing the Host Country Approval (HCA), which describes the participation of the project participant being approved by the Government of India. The project activity was webhosted on the UNFCCC website for global stakeholder comments as per CDM requirements during 16/10/2011 to 14/11/2011³. The comments were received from the global stakeholders for the project activity during this webhosting period. The same has been responded to by the Project Participant and the responses form a part of this report. This is described at the end of this report in Appendix B.

3.3 Project design document (57)

The validation team hereby confirms that the PDD complies with the latest forms of the guidance documents for completion of the PDD. The PDD is

² MoEF Link: http://cdmindia.gov.in/project_details_view.php?id=340

³ <http://cdm.unfccc.int/Projects/Validation/DB/PVFRY8JNY0A7EMDU4XEGRD3O0GKDQL/view.html>



as per Guidelines for Completing the Project Design Document (CDM-PDD) (Ref /B1/)

3.4 Changes in the Project Activity

During the site visit following changes were observed in project as compared to details mentioned in the webhosted PDD. The final PDD, has the following major changes with respect to version 01 which was webhosted.

1. The name of the project participants mentioned in section A.3 and Annex I of the PDD is consistent in the revised PDD as a result of CAR-1 raised during the validation.
2. The title of the project activity mentioned in the HCA was not consistent with the Webhosted PDD. The PP had sought revised HCA from the DNA, as a result of CL-1.
3. The alternative scenario description was corrected as a result of CL-3.
4. In the investment analysis, the PP had not followed the guideline of approved methodology for 'benchmark' calculations. The same was carried out as a result of CL-5.
5. The Operation and maintenance structure was revised as a result of CL-7
6. In the monitoring plan, in section B.7.2, Emergency procedure are clearly described now as a result of CL-8.
7. Overview of emission sources included or excluded from the project boundary is revised in the section B.3 of the PDD as a result of CL-11.
8. Common practice analysis is revised as a result of CL-12
9. Use of secondary fuel used (if any) and auxiliary fuel arrangement (if any) for HRSG. Was clarified as a result of CL-17.
10. The village name where project activity would take place is corrected in the PDD, as a result of CAR-1.
11. Use of latest Tools are stated as a result of CAR 6.
12. The project boundary was corrected as a result of CAR-8.
13. The emission reduction calculation sheet was corrected as a result of CAR-9.
14. The monitoring section was corrected as a result of CAR-12.

Details of the CARs raised, the responses of the project participant and the closure of the CARs are provided in Annex 1 of this report. The closure remarks explain the project participant's responses and their assessment by the validation team.

3.5 Project description (64)

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



The project activity is the construction and operation of a new natural gas based 351.43 MW power plant. It includes one Gas Turbine of 222.43 MW capacity, One steam turbine generator of 129 MW and one HRSG. This was confirmed from the technology supplier's (BHEL) offer of June 2007, vide EPC specification no. TCE.4915A-H-500-001 (Ref /8/) described in section F2 of Schedule of performance guarantee. This was further cross verified from the contract documents date 29/12/2007 executed between the project participant and the technology supplier. (Ref /9/)

In accordance with the requirements specified in paragraph 62 of the VVM ver. 1.2, Bureau Veritas Certification conducted a physical visit to the project site from 04.01.2012 to 05.01.2012 and confirmed the installation of these equipments at the site. The power plant is expected to be commissioned in the month of January 2013 and confirm the work progress for the installation of the project.

As described above the validation team has confirmed the Plant capacity of 351.43 MW from the technology supplier's offer letter and the contract between project participant and technology supplier. The name plate ratings were found as STG: 190000 kVA, manufactured by Siemens and GTG as 222,390 KW, manufactured by BHEL. The site personal have explained that the name plate ratings are different than the documents, as site capacity is described in the documents, although capacity described on the name plate is designed capacity. However, the capacity of the site condition is guaranteed as 351.43 MW by the technology supplier i.e. BHEL. This was verified from the document "Schedule of Performance Guarantee" provided by the technology supplier i.e. BHEL vide SPEC NO. TCE4915A-H500-001.

CL 15 was raised, as the webhosted PDD stated plant capacity as 351.43 MW, however, the board decision dated 25/09/2007 (Ref /10/) described it as 350 MW. Also the loan sanction of REC (Lender for the project activity) dated 05/11/2007 vide no. REC/VAD/8/14/2007-08/687 and subsequent revisions of 11/12/2007 and 18/01/2008 which described the plant capacity as 350 MW. The PP in response clarified that, while considering the plant capacity at the time of preparing DPR it was considered as 350 MW. Accordingly, the board has taken decision of 350 MW and has applied for the environmental clearance to the ministry of environment and forest, Government of India. At the time of invitation for bids, the PP has invited the bid for 350 MW. However, the technology supplier i.e. M/s. BHEL, while providing quotation has described the plant capacity as 351.43 MW, which is technically available. Accordingly the PP has stated the plant capacity as 351.43 MW in the webhosted PDD. It is also clarified by the PP that all the financial calculations are also worked out on this 351.43 MW capacity. The validation team verified the contract document between the PP and technology supplier dated 29/12/2007 (Ref /9/),



which also describes the project capacity as 351.43 MW. Hence, from the above description, the validation team confirms that the rated capacity of the equipments installed at the project site is 351.43 MW hence, CL 15 is closed.

Bureau Veritas Certification (BVC) hereby confirms on the basis of its site visit observations and the review of all supporting documentation that the project description in the revised PDD is accurate and complete in all respects and that there are no changes to the project activity/design or boundary as compared to the webhosted PDD.

3.6 Baseline and monitoring methodology

3.6.1 General requirement (76-77)

The steps taken to assess the relevant information contained in the PDD against each applicability condition of the AM 0029 methodology applied to the project activity are described below.

Applicability condition 1:

The project activity is the construction and operation of a new natural gas fired grid-connected electricity generation plant."

Validation team justification: The gas based power plant set up by Gujarat State energy Generation Limited (GSEGL) at the village Mora (Hazira) is a newly constructed power plant. This was confirmed from various evidences such as, contract between the PP and the technology supplier i.e. BHEL, New Delhi vide contract dated 29/12/2007 (Ref /9/). The contract is for design & engineering, manufacture, fabrication, assembly, shop testing, packing & forwarding of equipments/ system for the project activity on EPC basis. The same was also confirmed from the REC loan sanction letter ref. No. REC/VAD/8/14/2007-08/687 dated 05/11/2007 (Ref /11/). The confirmation of power plant running on gas is also confirmed from the Gas supply agreement between the PP and the Gas supplier viz. Gujarat State Petroleum Corporation Limited dated 25/03/2008 Clause No. C (Ref /12/) which describes that "*the buyer is primarily engaged in the business of generation of Power and wishes to add new generation facilities of 351 MW at its existing 156.1 MW power plant at village Mora, Post Bhata*". For the grid connectivity, the validation team referred the Power Purchase agreement between PP and GUVNL dated 18/06/2008 (Ref /13/). Having reviewed the above documents, the validation team confirms that the project activity is the construction of a new natural gas fired grid-connected electricity generation plant.

The observations at the project site by the validation team, has also confirmed that the plant runs on natural gas as the fuel. The 'consent to establish the power plant' (Ref /2/) dated 11/06/2007 issued by Gujarat Pollution Control Board has also specified that natural gas/R-LNG (i.e. re-



gassified liquefied natural gas) would be the only fuel to be used. The project activity therefore meets the applicability condition of the AM 0029 methodology which stipulates that natural gas should be the primary fuel to be used.

At the time of the site visit, it was confirmed by the validation team that the arrangements of connection of the power plant with the grid is going on. The power generated by the plant would be evacuated through the switchyard at the site directly to the state grid at the grid voltage of 220 kV. The validation team had visited the switchyard and carried out a physical inspection to confirm that the project activity would be grid connected. Documentary evidence for grid connection was confirmed from the PPA between PP and Gujarat Urja Vikas Nigam Ltd. (GUVNL) dated 18/06/2008 (Ref /13/), from which it is understood that the project activity is connected to the grid.

Applicability condition 2:

"The geographical/physical boundaries of the baseline grid can be clearly identified and information pertaining to the grid and estimating baseline emissions is publicly available"

Validation team justification: The project activity is located in the Western region of India i.e. in the Gujarat state.. The electricity grid system in India is divided into two grids, viz., the NEWNE Grid comprising of the grids in the northern, eastern, north-eastern & western states and the Southern grid which extends to the Southern states of Tamil Nadu, Andhra Pradesh, Karnataka and Kerala. The information on the grid system in India is available on the Ministry of Power Central Electricity Authority (CEA) database which is made publicly available on the CEA web site⁴. (http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm)

The project activity is connected to the NEWNE grid. Therefore, as per the methodology, AM 0029 (Ref /B3/), the NEWNE grid is also the baseline grid for the project activity.

The geographical/physical boundaries of the baseline grid, i.e. the NEWNE grid, are clearly identifiable as extending to the northern, western and the north-western states in India. Information pertaining to the baseline grid is also available on the, publicly available; website of CEA as referred in the footnote.

Thus, this applicability condition of the methodology is met by the project activity.

⁴ <http://www.cea.nic.in/planning/c%20and%20e/government%20of%20india%20website.htm>

Applicability condition 3:

“Natural gas is sufficiently available in the region or country, e.g. future natural gas based power capacity additions, comparable in size to the project activity, are not constrained by the use of natural gas in the project activity”

Validation team justification: The webhosted PDD did not explain how this applicability criterion was met with. In particular, the actual consumption rate of natural gas in the project activity is described as 0.42 MMTPA was not correctly demonstrated. Hence, CL [9.a] was raised. Also, sources provided for the values of gas requirement and gas consumption were not appropriate. Hence CL [9.h] was raised. In response, the PP demonstrated the gas availability in the western region as 39,914.29 MSCM/year against the candidate CDM project requirement of 491.83 MSCM/year, also the demand scenario demonstrated for all the plants existing and proposed in 11th Five Year plan, in the western region is derived as 4,919.24 Million SCM/year. In addition, PP has also considered the fuel requirement of 156.1 MW gas based power plant of PP's own requirement. This plant has a fuel requirement of 218.46 million SCM/year. Although, this plant was not included in the 11th five year plan by government of India, the PP on its own to be conservative on the values has considered this plant, which is accepted by the validation team. The clear position of gas availability and demand is as listed in the table below:

Fuel requirement of the Plant	Quantity of Fuel (Million SCM/Year)
Candidate CDM project fuel requirement	491.83
As per 11 th Five year plan of government of India fuel requirement for plants in the western region = 4,919.24 MSCM/year + GSEGL's Phase 1 project i.e. 156.1 MW gas based power plant's requirement of 218.46 Million SCM/year gas = 5137.70 Million SCM/year	5137.70
Gas availability in the region, where plant is located	39,914.29

The project participant has quoted authentic sources of information which indicate that the present supply of natural gas in the country as well as the likely future supplies are sufficient to cater to the gas consumption



requirements of future gas based power plants, such as those proposed in the 11th five year plan. The supply-demand statistics also indicate that the magnitude of the expected gas supply would be able to cover the requirements of these plants in addition to the consumption of gas by the project activity. The validation team from the information provided by the PP, and after its verification concluded that future natural gas based power capacity additions would not be constrained as a result of the use of gas in the project activity. Having reviewed the description in the revised PDD and the calculations provided by the PP, for the availability of gas in the region against the requirement of the gas quantity (Excel sheet is provided by the PP), the validation team agreed that Natural gas is sufficiently available in the region or country, i.e. future natural gas based power capacity additions, comparable in size to the project activity, are not constrained by the use of natural gas in the project activity, hence CL [9.a] and CL [9.h] are closed. From the above description, the validation team concluded on the basis of this supply-demand balance that the gas availability is sufficient enough to cover the future projected demand. The team therefore concluded that the supply-demand balance in the region in which the project activity had been set up was favourably tilted towards abundant availability of gas and that gas supplies drawn by the project activity itself would in no way constrain the availability of gas to future projects of similar size or scale and hence, the project activity meets the applicability condition of the methodology pertaining to the gas availability.

The validation team confirmed that fuel (natural gas) supply arrangements for the project activity have been put in place by the PP by means of dedicated gas supply agreements (GSA) with gas supplier viz. Gujarat State Petroleum Corporation Limited ⁵(GSPCL) dated 25/03/2008 (Ref /12/). The Gas supply agreement para 7.1.a states that *“Daily Contract Quantity shall be equal to 68.219 Billion BTU’s which is approximately equal to 1.74 MMSCMD of gas having a gross heating value of 9880 Kcal/SCM. Built up of volumes shall be mutually agreed at least 365 days prior to the commencement date”* and para 7.1.b states that *“if on any day, the buyer requires Gas in excess of daily contract quantity, the seller may supply the same subject to seller’s Operational Flexibility”*. The validation team also referred in the section A.2 of the PDD that GSEGL (PP) is SPV formed by GSPCL, who is primarily in the business of oil and gas exploration, development and production companies in India and one of the largest gas trading companies in India (http://www.gspcgroup.com/company_detail.php?CID=1).

From the above description; the validation team concludes that the gas availability in the country would primarily be sufficient to meet the

⁵ Gujarat State Petroleum Corporation Limited (GSPCL) is a Gas supplier; Gujarat State Petronet Limited (GSPL) is a Gas transporter for the project activity.



expected demand and hence, the project activity would not constrain future power capacity additions of comparable size.

The validation team hereby confirms that the selected baseline and monitoring methodology AM 0029 version 03 and the tool referred by the methodology, viz., the Tool for the demonstration and assessment of additionality version 06.0.0 of EB 65 Annex 21 is previously approved by the CDM Executive Board, and is applicable to the project activity, which complies with all the applicability conditions therein.

The methodology AM 0029 (Ref /B3/) also refers to the Tool to calculate the emission factor for an electricity system version 02.2.1 of EB 63 Annex 19 (Ref /B12/). The Build margin (BM) and Operating margin (OM) emission factors used to compute the combined margin (CM) emission factor are based on the CEA database. The BM & OM available in the CEA database are calculated using the procedures specified in this tool. For this project activity, version 06 of the CEA database was used and the same is based on version 2.2.1 of the "Tool to calculate the emission factor of an electricity system". The validation team has confirmed that this version of the database was the latest available at the time of the start of validation and hence, use of the CEA database version 06 is regarded as appropriate by the team.

The "Tool to calculate the emission factor for an electricity system" has undergone four updates since the date of publication of the PDD for global stakeholder comments. The revision 2 in particular, pertains to the option available to the Project Participant of including off-grid power plants in the computation of the grid emission factor. However, the CEA database used by the Project Participant for calculating the combined margin and build margin includes only the grid connected power plants and thus, the Project Participant has not exercised the option of including the off-grid plants in the calculation.

Also, revision 02.2.1 of the tool allowed to consider the Emission factor of an electricity system as zero if the connected electricity system is located fully or partially in a Annex I country. The project activity is connected to the NEWNE electricity grid of India and hence, this provision of the tool is not applicable.

The validation team has therefore accepted the use of version 6 of the CEA database based on an earlier version of the "Tool to calculate the emission factor for an electricity system", as use of this version of the database is still in line with the latest version of the tool, viz., version 2.2.1.

The AM 0029 methodology has specified CO₂ as the main emission source in both baseline as well as the project activity. The PDD has also



considered the same GHG and other gases are excluded for simplification. This is as per the methodology. During the site visit, the validation team also confirmed that there are no other emission sources apart from CO₂ generated in the project activity, as project emissions. The main fuel used is natural gas and its combustion gives rise to only CO₂ gas as an exhaust.

CL 11 was raised as, webhosted PDD in section B.3 did not describe overview of emission sources included or excluded from the project boundary, In response, the PP revised the PDD, hence CL is closed.

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

3.6.2 Project boundary (80)

The validation team validated the project boundary in the following manner:

- a. The spatial extent of the project boundary is assessed through the description in the PDD and the grid structure in India as known from the official data available from the Central Electricity Authority (CEA) The project activity boundary therefore includes the project plant and also all power plants connected physically to the NEWNE electricity grid of India that the CDM project power plant itself is connected to. The grid connectivity of the project plant was verified by the validation team by means of PPA executed between the PP and GUVNL dated 18/06/2008. The page number 5 of the PPA describes that:
 - a) The procurer intends to procure generation capacity and purchase electricity in bulk.
 - b) The seller has offered the generation capacity of its gas based combined cycle power plant at village Mora (Hazira) in aggregate of 351.43 MW and sell and supply of electricity in bulk from there to the procurer.
 - c) The seller being a state government PSU; it has been exempted from competitive bidding as per the government of India guidelines

Further, the grid connectivity was confirmed from the construction activity of switchyard; observed during the site visit by the validation team. The electricity evacuation is intended at 220 kV voltage by



means of two transmission lines. The project activity is a new plant that has been set up and the validation team confirms from the site visit observations that the following equipment are being installed as a part of the project activity :

- a) Gas turbine and generator (GTG)
- b) Heat recovery steam generator (HRSG)
- c) Steam turbine generator

The project participant in the revised PDD has described that CO₂ emission will take place due to the project activity. The validation team from the site visit and documents review confirms that the power plant uses natural gas as a fuel. As the combustion of natural gas gives rise to CO₂ emissions, the consideration of this gas as an emission source by the PP is regarded as appropriate by the validation team. These emissions are accounted for in the project emissions calculations presented in section B.6.1 & B.6.3 of the PDD and validated by the validation team in section 3.6.4 of this report.

The consideration of only CO₂ gas for the baseline emissions is conservative and is in line with the methodology and hence appropriate. In the absence of the project activity, an equivalent of energy generated by the project activity would be produced in the grid. The power plants connected to the grid are mainly fossil fuel fired plants, as the NEWNE grid of India is dominated by such plants and hence, the emissions taking place in the baseline would also be CO₂ emissions.

CAR 7 was raised as "Description of all sources and gases included in the project boundary in the table was provided, however, the justification for not including CH₄ as a source for transportation of fuel to project site was not transparently explained. In response to this, the PP corrected the sources of the gases in line with the approved baseline methodology AM0029 version 03. Hence CAR 7 is closed. The validation team hereby confirms that there are no other sources of GHG emissions in the project boundary, other than the CO₂ emissions referred to above as project emissions.

The electricity imported by the project activity is accounted by means of subtracting it from the exported energy. Hence, the energy parameter i.e. net electricity supplied to the Grid ($EG_{PJ,y}$) is correctly worked out.



CAR 8 was raised as “The spatial extent of the project boundary did not include all the power plants connected physically to the baseline grid as defined in “Tool to calculate emission factor for an electricity system”. In response the PP corrected the diagram, which now includes all the power plants physically connected to the grid, hence the CAR is closed.

The project design is sound and the geographical and temporal boundaries of the project activity are clearly defined (Village: Mora (Hazira) Taluka: choryasi, district: Surat, State: Gujarat, India). The Project participant has considered a lifetime of 23 years for the project plant. The same is worked out from the Tool to determine the remaining lifetime of equipment, Annex 15 of EB 50 meeting report (Ref /B13/), where the default technical lifetime of gas turbine is 200,000 hours \approx 23 years, whereas that of boiler is 25 years. Hence, the default technical lifetime of gas based power plant is worked out as 23 years conservatively.

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

3.6.3 Baseline identification (87-88)

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

The AM 0029 methodology mandates the determination of the baseline for the project activity on the basis of the identification of alternative scenarios. In the PDD, the Project participant has identified various plausible scenarios as alternatives to the project activity. The following scenarios were identified:

1) Power generation using natural gas as fuel and combined cycle technology without CDM revenues (Project activity).

The applied methodology AM0029 requires the project activity to be considered as a plausible alternative and the same has been considered in the PDD. Hence, this is a plausible scenario.

2) Power generation using NG as fuel but with technologies other than the project activity.

As described in the PDD, apart from the combined cycle mode of operation (as discussed above), the power, using natural gas as fuel, can be generated in following two ways.



2.1) Power generation in Open (simple) Cycle mode

For an Open (simple) cycle mode of operation, the turbine's energy conversion efficiency typically remains low (@ 25-30%)⁶. As the option has lower system efficiency in comparison to the power generation using Combined Cycle mode of operation (@ 50%)⁷, it is not a realistic and credible alternative to the project proponent to opt for open cycle mode of operation for high capacities such as the case of project activity. Therefore this alternative is not a plausible baseline scenario.

2.2) Power generation in Co-generation cycle mode

As described in the PDD, this type of mode of operation is mainly used to provide electricity and steam for industrial facility and the project activity's purpose is to deliver only the power to the grid. Thus, this option does not deliver the similar output/ services comparable to the project activity. Hence, this is also not a credible and realistic alternative for the Project Proponent and therefore this alternative is not plausible baseline scenario.

3) Power generation technologies using energy sources other than natural gas.

3.1) Power generation using coal as fuel (sub-critical technology)

Such kind of power generation technology (sub-critical) using coal/lignite as fuel is most commonly available in size of 200 MW/210MW/250MW sets and 500 MW and above sets. Thus, for comparison with project activity a coal based power plant of 400 MW (2 units of 200 MW each) has been considered. Fossil fuel-fired (coal) power plants use steam to provide the mechanical power to electrical generators. The detail explanation on generation of electricity by means of coal has been explained in the revised PDD. The power plant efficiency is typically around 25% to 30%⁸. This has been considered as a plausible scenario, and is accepted by the validation team.

3.2) Power generation using coal as fuel with super-critical technology (using Imported coal):

The super-critical technology is commercially available in turbine capacity of 500MW, 660MW, 800 MW and above. Since no supercritical turbine of less than 500 MW is commercially available, PP has considered 660 MW as the next commercially available size, and has been used for

⁶ Page 2 of 13 of Chapter 6 in CEA general performance review - refer website:
http://www.cea.nic.in/reports/yearly/general_review_rep/0304/chap-6.pdf

⁷ http://books.google.co.in/books?id=KJOoQm3fbEoC&pg=PT433&lpg=PT433&dq=efficiency+of+open+cycle+power+plant&source=web&ots=HRYT81RY0h&sig=yRBE5betwGqHsZ6RQVpjrYZoQWQ&hl=en&sa=X&oi=book_result&resnum=6&ct=result (Chapter 22.2.4, Page 7)

⁸ Page 2 of 13 of Chapter 6 in CEA general performance review - refer website:
http://www.cea.nic.in/reports/yearly/general_review_rep/0304/chap-6.pdf



comparison of levelized tariff. The detailed description of generation of electricity by super critical power plant is explained in PDD. The power plant efficiency typically remains around 36 to 40%.⁹ Hence, the same has been considered as one of the plausible baseline alternatives.

3.3) Power generation using lignite as fuel

The power generation technology (sub-critical) using coal/lignite as fuel is commonly available in size of 125 MW units each. Thus, for comparison with project activity a lignite based power plant of 400 MW (2 units of 200 MW each) has been considered. Fuel combustion in Circulating Fluid Bed ("CFB") system takes place in a vertical chamber referred to as the Combustor, in which the fluidisation of the fuel and the fuel combustion takes place. The detail description of this technology using lignite as a fuel has been described in detail in the revised PDD. Since this kind of power plant has a plant efficiency around 25 to 30%.¹⁰ This has been considered as one of the plausible baseline alternatives.

3.4) Power generation using naphtha as fuel

The power generation technology using Naphtha as fuel is same as that of the proposed project activity. Thus, for comparison with project activity a naphtha based power plant of 351.43 MW has been considered. The fuel, naphtha is introduced and ignited to produce a high temperature, high-pressure gas that enters and expands through the turbine section. The turbine section powers both the generator and compressor. The simple cycle efficiency can be increased by installing a waste heat recovery boiler onto the turbine's exhaust known as heat recovery steam generators ("HRSG"). The overall energy cycle efficiency of the naphtha based power plant is around 50%.¹¹ Hence, this has been considered as one of the plausible baseline alternatives.

3.5) Power generation using run of river hydro power

Power generation using hydro power can be in two ways:

1. run-of-river plants: these deliver base-load power
2. reservoir storage based plants: these deliver peak load power

The reservoir storage based hydro power plants cater to the peak load power requirements of the grid. Thus they are not considered as an alternative to the project activity, since the project activity (i.e. gas based power plant) is aimed to cater the base load requirement of the grid.

⁹ http://www.cea.nic.in/reports/articles/thermal/committee_recommend_thermal.pdf

¹⁰ http://www.cea.nic.in/reports/yearly/general_review_rep/0405/ch6.pdf

¹¹ http://books.google.co.in/books?id=KJOoQm3fbEoC&pg=PT433&lpg=PT433&dq=efficiency+of+open+cycle+power+plant&source=web&ots=HRYT81RY0h&<sig=yRBE5betwGqHsZ6RQVpIrYZoQWQ&hl=en&sa=X&oi=book_result&resnum=6&ct=result (Chapter 22.2.4, Page 7)



Hence, this has not been considered as one of the plausible baseline alternatives.

The power generation facility delivering same services as the candidate CDM project would be thus run-of-river based hydel power stations.

The project participant has justified in the revised PDD by means of providing data that in last five years the number of hydel power plants added to the western grid are of reservoir type thereby catering to the peak-in load rather than base load of the grid. The validation team reviewed the references provided by the PP and details therein and confirm that the description is correct. Hence, accepted that “Run of the river plants” is not a plausible one.

3.6) Power generation using nuclear power

This alternative, though listed in the PDD, it is accepted by the validation team that there is no private player involved in the nuclear power generation as the current policies and regulatory framework supports NPCIL (Nuclear Power Corporation of India Limited), a government owned entity to install and operate nuclear power generating stations. Hence, the alternative is not considered as plausible baseline scenario

3.7) Power generation using wind energy

Wind power generation has a very low PLF. Also, the power generated is of infirm nature due to varying wind speed conditions. Hence, this alternative would not be able to fulfil the requirement of being able to provide base load power comparable to the project activity and was therefore excluded from comparison with the proposed project activity by the project participant and also accepted by the validation team.

4) Import of electricity from connected grids, including the possibility of new interconnections

The methodology mandates the consideration of this alternative. The same is also discussed in the PDD. The validation team however agrees that imports from connected grids in India are not realistic because those grids themselves are deficient in power. The statistics provided in the CEA CO₂ baseline database (Ref /B9/) illustrate this fact. As per the database available through the web link http://www.cea.nic.in/archives/exec_summary/mar07.pdf, the power deficit in the NEWNE region is as follows:

1. Northern region is 11.3%
2. Western region is 15.2%
3. Eastern region is 3%
4. North-eastern region is 9.6%.

Hence, the validation team accepts the exclusion of this alternative from consideration.



5) New power plants based on Diesel

There are no diesel power plants of comparable capacity. The same has been checked from the CEA database version 07 (http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm). Hence, electricity generation based on diesel technology has not been considered as a baseline alternative.

6) New power plants based on Solar

Solar power generation is not a continuous source of power generation, as solar energy is not available for 24 Hours and also there are no solar power plants of comparable capacity. The same has been checked from the CEA database version 07 (http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm). Hence, electricity generation based on solar technology has not been considered as a baseline alternative.

From the above analysis of alternatives, following options are remaining for the further consideration:

1. Project activity implemented in combined cycle mode with Natural gas as a fuel without CDM revenue.
2. Power generation using coal as fuel (sub-critical)
3. Power generation using coal as fuel with super-critical technology (Imported coal)
4. Power generation using lignite as fuel
5. Power generation using naphtha as fuel

The validation team accepts these alternatives for the determination of the baseline due to the following reasons:

- It is technically possible to set up these alternatives. The capacity of 351.43 MW can be set up as a gas based plant (project activity itself). The capacities of coal and lignite plants are explained and justified in section 3.6.4 of this report. Thus, all the alternatives remaining are realistic.
- The power generation capacity added to the grid would comprise of thermal power plants. This is evident from the CEA database version 6.0 which provides data on the installed capacities of power plants in India. The Table 1: Sector- wise installed capacity (MW) as on 31.03.2010..is described as 64% of the installed capacity which is from thermal power plants. All the remaining baseline alternatives are thermal power plants and hence they are credible alternatives.
- The alternatives are capable of providing base load power to the grid. Hence, the type of service provided by the alternatives is the same as that of the project activity



- All alternatives considered are large scale plants having capacities comparable to the project activity's capacity.
- The alternatives identified for baseline selection are available to project participant within the grid boundary which is also as per the methodology requirement.
- All relevant power plant technologies have been considered in the analysis and their efficiencies and technical lifetime are also included in the revised PDD.
- The alternatives selected are in compliance with legal and regulatory requirements in the host country

CAR 3 was raised, as while identifying the baseline scenario overall efficiency of the CCPP, PLF value, fuel supply arrangement, technical specification for GTG, STG, HRSG were not transparently described in the webhosted PDD. In response the PP has provided details on efficiency of all the alternative with supporting evidences, source of PLF as DPR, which was cross verified with CERC regulation and technical specification were supported by means of supplier specification which were cross checked with the contract document with the technology supplier and physical site visit on 4th and 5th Jan 2012.

CL 3 point 2 was raised, as while comparing the project capacity with other alternative, PP has stated that 210 MW is commonly available size for power generation from coal/Lignite. This was not substantiated by the supporting. In response, PP has provided the references for the statement as (http://www.cercind.gov.in/13042007/Terms_and_conditions_of_tariff.pdf). The same was reviewed by the validation team and find it appropriate. Hence, the CL 3 point 2 is closed.

CL 5 point 1 was raised as while identifying the baseline scenario, PP had not considered the partial generation of the capacity through the project activity and partially through other means. In response, the PP clarified that the plausible baseline alternatives have been identified in line with the approved methodology AM0029, version 03. All the plausible scenarios have been considered; hence similar alternative was not required to be considered. Validation team reviewed this and find it appropriate and inline with AM0029 version 03. Hence, CL 5 point 1 is closed

The validation team therefore confirms that the selection and short listing of baseline alternative scenarios is in line with the **Step 1** of the AM 0029 methodology.

The validation team checked the following information stated in the PDD:

Information	in	Source used in the PDD	Cross-Checking/
-------------	----	------------------------	-----------------



VALIDATION REPORT

PDD		validation team justification for acceptance
Combined cycle plant efficiency of 50%	The book authored by Dennis Snow titled "Plant Engineers Reference book", which is a third party, publically available document. http://books.google.co.in/books?id=KJOoQm3fbEoC&pg=PT433&lpg=PT433&dq=efficiency+of+open+cycle+power+plant&source=web&ots=HRYT81RY0h&sig=yRBE5betwGqHsZ6RQVpirYZoQWQ&hl=en&sa=X&oi=book_result&resnum=6&ct=result	This is a third party publicly available document.
Open cycle plant efficiency- 25%-35%	http://books.google.co.in/books?id=KJOoQm3fbEoC&pg=PT433&lpg=PT433&dq=efficiency+of+open+cycle+power+plant&source=web&ots=HRYT81RY0h&sig=yRBE5betwGqHsZ6RQVpirYZoQWQ&hl=en&sa=X&oi=book_result&resnum=6&ct=result (Chapter 22.2.4, Page 7)	This is a third party publicly available document.
Efficiency of coal & lignite based power plant-28% to 35%	Page 2 of 13 of Chapter 6 in CEA general performance review http://www.cea.nic.in/reports/yearly/general_review_report/0304/chap-6.pdf .	CEA being the sole authority who publishes for electricity in India, and a government of India department, hence the source is found credible.
Overall efficiency of naphtha based power plant. (50%)	The book authored by Dennis Snow titled "Plant Engineers Reference book", which is a third party, publically available document.	A third party, publicly available document, hence, acceptable by the validation team.



	http://books.google.co.in/books?id=KJOoQm3fbEoC&pg=PT433&lpg=PT433&dq=efficiency+of+open+cycle+power+plant&source=web&ots=HRYT81RY0h&sig=yRBE5betwGqHsZ6RQVpirYZoQWQ&hl=en&sa=X&oi=book_result&resnum=6&ct=result (Chapter 22.2.4, Page 7)	
Life time of coal & lignite based power plant-25 years	As per Annex 15, EB 50, http://cdm.unfccc.int/EB/050/eb50_repan15.pdf	As per EB guideline. No cross checking required.
Life time of gas & naphtha based power plants-23 years	As per Annex 15, EB 50, http://cdm.unfccc.int/EB/050/eb50_repan15.pdf	As per EB guideline. No cross checking required.

Step 2 of the methodology requires the identification of the economically most attractive scenario among the selected alternatives as the baseline scenario, by using investment analysis. The project participant has carried out the investment analysis in line with the guidance provided by the “Tool for the demonstration and assessment of additionality” version 6.0, EB 65, Annex 21 (Ref /B4/).

The project participant has demonstrated an investment comparison analysis. The validation team regards this as appropriate since the Step 2 requires the baseline identification to be done on the basis of the economically most attractive scenario and for that purpose a comparison will have to be made between the short listed alternatives to determine which of the alternatives is economically more attractive option; hence, an investment comparison analysis is appropriate in this case.

The financial indicator chosen for the investment analysis is the levelised cost of electricity generation. The validation team accepts this is an appropriate indicator for the purpose of the analysis as it gives the cost per unit of service delivered (i.e. kWh or unit of electricity produced) and is therefore as per the Sub-Step 2 (b) of the Additionality tool. This is also approved by CERC and accepted by the financial expert of the validation team.

The project participant has presented the investment comparison analysis for all the alternatives in the form of MS-excel spreadsheets in which the levelised cost of generation for each of the alternatives is worked out (Ref /14/). Section 3.7.3 of this report provides details of the critical

 VALIDATION REPORT

techno-economic parameters and assumptions (such as capital costs, fuel price projections, lifetimes, the load factor of the power plant and discount rate) applied in the analysis and the validation justification for the assumptions made by the project participant. The investment analysis is presented in a transparent manner and all the relevant assumptions have been provided in the PDD also. From all of the above, the validation team could reproduce the analysis and arrive at the results.

The PDD summarises the results of the investment comparison analysis, viz, the levelised cost of generation for each of the alternatives. The levelised cost computed is as follows:

Sr. No.	Alternative	Levelised cost of generation per kWh (in INR)
1.	Power generation using natural gas as fuel and combined cycle technology without CDM revenues (Project activity)	4.7749
2.	Power generation using coal as fuel (sub critical technology)	3.0960
3.	Power generation using coal as fuel with super-critical technology (using Imported coal)	2.6921
4.	Power generation using lignite as fuel	3.0010
5.	Power generation using naphtha as fuel	7.4464

From the above table, it can be visualized that, the levelised cost of generation for the alternative of power generation using imported coal as fuel with super critical technology is lowest among all the alternatives. This implies that power generation using coal is economically a more attractive alternative than the project activity using natural gas as a fuel and combined cycle set up without any CDM benefits.

The project participant has also carried out a sensitivity analysis for all the alternatives, to confirm that the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions made in the analysis. The validation team's assessment of the results of the financial analysis and sensitivity is included in the section 3.7.3 of this report. The sensitivity analysis also confirms that the levelised cost of generation for alternative - 4, viz., Power generation using imported coal with -supercritical critical technology as an economically more attractive option than the project activity implemented without CDM benefits.



On the basis of the same, the baseline scenario is identified as the “Power generation using coal as fuel”. The validation team agrees that the baseline is correctly identified and is in line with the AM 0029 methodology requirements and the EB 65 Annex 21 Tool for the demonstration and assessment of Additionality.

The identified baseline scenario is also as per paragraph 81 of the VVM (Ref /B11/) and is the scenario that reasonably represents the anthropogenic emissions by sources of GHGs that would occur in the absence of the proposed CDM project activity.

Based on the above assessment, BVCH hereby confirms that:

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

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

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

The project participant has used the algorithms and formulae in accordance with the methodology applied viz. AM 0029 version 03 (Ref /B3/) and *Tool to calculate emission factor for an electricity system* (Ref /B6/). The detailed algorithms and/or formulae used in the calculations of baseline emissions, project emissions, and leakage emission reductions are explained in section B.6.1 of the PDD. The validation team confirms that the formulae have been applied correctly in line with the applied methodology AM 0029 Version 03.

Baseline emissions (BE_y)

The PP has calculated the baseline emissions by multiplying the electricity generated in the project plant ($EG_{PJ,y}$) with the baseline CO₂ emission factor ($EF_{BL,CO_2,y}$). This is as per the requirement of applied methodology AM 0029 Version 03 for the calculation of baseline



emissions. The project participant has calculated the baseline CO₂ emission factor for the NEWNE grid, which is the baseline grid as reported in section 3.6.3 above.

The AM 0029 methodology requires the project participant to calculate the baseline CO₂ emission factor as the lowest among three options:

Option 1: The build margin, calculated according to “Tool to calculate emission factor for an electricity system” (Version -2.0, EB – 50)

The value of build margin emission factor has been taken directly by the Project Participant from the CEA database version 6 for the NEWNE grid. This value is 0.8123 tCO₂e/ MWh. The validation team referred to the CEA database and verified that the value has been correctly worked out by CEA by using “Tool to calculate emission factor for an electricity system” and methodology ACM 0002.

Option 2: The combined margin, calculated according to “Tool to calculate emission factor for an electricity system” (Version -2.0, EB - 50), using a 50/50 OM/BM weight.

The project participant has used data from the CEA database version 06 to arrive at the value of the combined margin emission factor. The combined margin emission factor is a weighted average of the Operating Margin (OM) and Build Margin (BM) emission factors. The build margin is directly specified by the CEA database version 06. The operating margin is calculated as the simple average for the recent 3 years preceding the year in which the CDM –PDD was submitted to the DOE for validation, i.e. 2007-08, 2008-09 & 2009-10. The PP has taken these values from the CEA database and calculated the combined margin from those values as a weighted average, applying 50/50 OM/BM weight, as prescribed by the methodology.

The value of CM calculated in the above manner was verified by the validation team and confirmed to be 0.9035 tCO₂e/MWh.

Option 3: The emission factor of the technology (and fuel) identified as the most likely baseline scenario under “Identification of the baseline scenario”

This option specified in the methodology requires the project participant to compute the emission factor for the technology and fuel identified for use in the baseline scenario. An assessment of the baseline scenario is presented in section 3.6.3. The baseline scenario, as validated by the validation team, is “Power generation using coal (supercritical) as fuel”. The Project participant has therefore computed the emission factor for the

baseline i.e. super critical power plant using imported coal according to the equation (3) specified in the methodology.

$$EF_{BL,CO_2} (tCO_2/MWh) = \{(COEF_{BL})/\eta_{BL}\} * 3.6 \text{ GJ/MWh}$$

The fuel emission coefficient $COEF_{BL}$ in tCO_2/GJ is the value of emissions in tCO_2 per GJ of energy generation by the baseline fuel, i.e. coal. The project participant has taken this value from Table 1.4 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories. This value is 0.8690 tCO_2e/GJ . The value considered by the Project Participant is according to the methodology, hence acceptable.

The energy efficiency of the technology used in the baseline is the thermal efficiency (η_{BL}) of the super critical power plant using imported coal that would generate the same of amount of power ($EG_{PJ,y}$) as the proposed project activity plant. The value of efficiency for a super critical power plant using imported coal plant is already discussed in above section, the project participant has considered the efficiency of the plant as 39.69%.

It is agreed by the validation team that the energy efficiency of thermal power plants operating on super critical power plant using imported coal would serve as a credible proxy for the energy efficiency η_{BL} to be calculated for the baseline i.e. super critical power plant using imported coal for this project activity

The value of baseline CO_2 emission factor calculated with the above option (Option III) as described above is 0.8690 tCO_2e/ MWh .

From the above three options value of CO_2 emission factor is as tabulated below:

OPTION	DESCRIPTION	VALUE (Emission factor tCO_2/MWh)
Option 1	The build margin, calculated according to "Tool to calculate emission factor for an electricity system" (Version -2.0, EB – 50)	0.8123
Option 2	The combined margin, calculated according to "Tool to calculate emission factor for an electricity system" (Version -2.0, EB - 50), using a 50/50 OM/BM weight	0.9035
Option 3	The emission factor of the technology (and fuel) identified as the most likely baseline scenario	0.8690



	under "Identification of the baseline scenario"	
--	---	--

From the above it can be seen that the CO₂ emission factor for Option I (Build margin) is the lowest of the three options. As stipulated by the methodology, therefore, the project participant has taken the lowest value (0.8123 tCO₂e/MWh) among the three options as the baseline CO₂ emission factor for the project activity (EF_{BL,CO₂,y}).

The expected electricity generation by the project activity, on the basis of the plant load factor assumed (80%) and the plant capacity (351.43 MW) works out to 24,62,821 MWh. However, part of this generation would also be consumed by the plant itself for the running of auxiliary equipment of the plant (auxiliary consumption). This is assumed to be at 3% of the plant capacity (also justified in the table in section 3.7.3 of this report). The net generation by the project activity is therefore estimated as 23,88,937 MWh [(24,62,821 - (3% * 24,62,821)) = (24,62,821 - 73885) = 23,88,937]. This is the electricity that the project activity would export to the grid for every year of its operation and corresponds to the parameter EG_{PJ,y} of the methodology.

The values of Plant Load Factor (PLF) and auxiliary consumption have been validated by the validation team and a justification for the same is presented in section 3.7.3 of this report.

With the estimated net generation (EG_{PJ,y}) of 23,88,936 MWh, the baseline emissions were calculated by the project participant using equation (2) of the methodology.

$$BE_y = EG_{PJ,y} * EF_{BL,CO_2,y}$$

The baseline emissions are calculated as:

$$\begin{aligned} & 23,88,937 \text{ MWh} * 0.8123 \text{ tCO}_2/\text{MWh} \\ & = 19,40,533 \text{ tCO}_2 \text{ per year.} \end{aligned}$$

Project Emissions (PE_y)

The project activity involves the generation of power using natural gas or R-LNG as the fuel. As natural gas is a fossil fuel, its consumption in the project activity as a fuel will lead to CO₂ emissions that will need to be accounted for as project emissions.

The project emissions are calculated as per equation (1) of the methodology

$$PE_y = \sum FC_{f,y} * COEF_{f,y}$$



$FC_{f,y}$: is the total volume of natural gas or other fuel 'f' combusted in the project plant or other startup fuel (m3 or similar) in year(s) 'y'

$COEF_{f,y}$: is the CO2 emission coefficient (tCO2/m3 or similar) in year(s) for each fuel and is obtained as:

$$COEF_{f,y} = \sum NCV_y * EF_{CO_2,f,y} * OXID_f$$

The detail explanation of the above formula's parameters is as described below:

The gas consumed in the project activity has been estimated on the basis of

- i) Expected gross electricity generation in the plant (GWh)
- ii) Station heat rate value of the plant (kcal/kWh) &
- iii) The net calorific value (N.C.V.) of the natural gas (kcal/SCM)

Expected Gross electricity generation

This is calculated on the basis of the plant's installed capacity of 351.43 MW and the expected PLF (assumed as 80%). A detailed justification of the PLF is provided in the following section 3.7.3 of this report. This value is calculated as 24,62,821 MWh/year. [Gross Generation = (351.43 MW * 24 hours * 365 days * 80% PLF)/1000 = 24,62,821 MWh/year]. A detailed calculation of gross generation is also given in the worksheet of emission reduction spreadsheet (Ref /15/) submitted by the Project Participant.

Station Heat Rate (SHR)

The station heat rate assumed by the project participant was validated by the team and its justification of the same is included in section 3.7.3 of this report. This value is taken as 1850 Kcal/kWh.

Net Calorific Value (N.C.V.) of fuel

The project activity will use mainly natural gas (NG) as a fuel. The Net Calorific value (N.C.V.) of natural gas considered is 8421.7 kcal/SCM.

A detailed justification for the chosen N.C.V. values is provided by the validation team in section 3.7.3 of this report.

From these values, the gas consumption can be calculated. The project participant has calculated this to be 491.83 Mcum, which is the quantity $FC_{f,y}$ [detailed calculation is presented by the PP in the worksheet CER of the ER spreadsheet] (Ref /15/)

$$FC_{f,y} = \frac{[EG_{PJ,y} (23,88,936 \text{ GWh/year}) * (1850/1.1 \text{ kcal/kWh}) * (10^3/10^6)]}{8421.7 \text{ kcal/SCM}}$$

$$[NCV (8421.7 \text{ Mcal}/1000 \text{ SCM})]$$

$$= 491.83 \text{ Mcum/ Year}$$

$COEF_{f,y}$ is the emission coefficient of the natural gas used as the fuel. It is calculated as specified by equation (1a) of the methodology

$$COEF_{f,y} = \sum NCV_y * EF_{CO2f,f,y} * OXID_f$$

- The value of NCV_y is the net calorific value of natural gas in kcal/SCM or $((8421.7 \times 4.1868)/10^9)$ tJ/SCM
- The CO_2 emission factor $EF_{CO2,NG,y}$ (since natural gas is the fuel, $EF_{CO2f,f,y} = EF_{CO2,NG,y}$) for natural gas is based on the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (Ref /B10/). This value is 56.1t CO_2 /TJ.
- $OXID_f$ is the oxidation factor of natural gas is taken as 1. The assumption indicates a complete combustion of the fuel and can be considered as valid.

On the basis of these values, the $COEF_{f,y}$ is calculated as

$$COEF_{f,y} = (8421.7 \times 4.1868)/10^9 \text{ (tJ/SCM)} * 56.1 \text{ tCO}_2/\text{TJ} * 1$$

$$= 1978.08 \text{ t CO}_{2e}/\text{Mcum}$$

Hence, Project emission works out to be as follows :

$$PE_y = \sum_f FC_{f,y} * COEF_{f,y}$$

$$PE_y = 491.83 \text{ (Mcum)} * 1978.08 \text{ tCO}_{2e}/\text{Mcum}$$

$$PE_y = 9,72,875 \text{ tCO}_{2e}/\text{year}$$

The project emissions calculated with the above values and by applying the equation (1) of the methodology, works out to 9,72,875 tCO_{2e}/year. This value is for project emissions resulting from the combustion of fuel in the project activity.

Leakage (LE_y)

According to the AM 0029 methodology, leakage emissions need to be taken into account to calculate the emission reductions. The leakage emissions are due to

a) Fugitive CH₄ emissions associated with fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of natural gas

used in the project plant and fossil fuels used in the grid in the absence of the project activity [$LE_{CH_4,y}$] &

b) In case LNG is used in the project plant: CO_2 emissions from fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression into a natural gas transmission or distribution system. [$LE_{LNG,CO_2,y}$]

The fugitive CH_4 emissions ($LE_{CH_4,y}$) are calculated net of those that would have occurred in the baseline scenario. This is allowed by the methodology as per the equation (5)

$$LE_{CH_4,y} = [FC_y \cdot NCV_y \cdot EF_{NG,upstream,CH_4} - EG_{PJ,y} \cdot EF_{BL,upstream,CH_4}] \cdot GWP_{CH_4}$$

FC_y is the quantity of natural gas combusted in the project activity and is estimated to be 491.83 Mcum (this is as per the detailed calculations presented in the Emission Reduction spreadsheet (Ref /15/), which was validated by the team and also explained in the paragraphs above).

The calculations of $EG_{PJ,y}$ is also explained in the preceding paragraph of "Project emissions"

$EF_{NG,upstream,CH_4}$ is the emission factor for fugitive upstream emissions for natural gas. As reliable and accurate national data on fugitive upstream emissions associated with the production, transportation and distribution of natural gas is not available, the project participant has opted to use the default value specified under Table 2 of the AM 0029 methodology (Ref /B3/). This value is 296 tCO₂/PJ; applicable to rest of the world countries other than the USA/Canada, Eastern Europe/Formal USSR and Western Europe.

$EF_{BL,upstream,CH_4}$ is the emission factor for upstream fugitive methane emissions occurring in the absence of the project activity.

As explained in the preceding paragraph of "Baseline emissions", $EF_{BL,CO_2,y}$ corresponds to the Option 1, viz., the build margin calculated according to the Tool to calculate the emission factor for an electricity system, published by the CEA (version 6). Hence, the project participant has used the following equation given by the methodology to calculate $EF_{BL,upstream,CH_4}$.

$$EF_{BL,upstream,CH_4} = \frac{\sum_j FF_{j,k} \cdot EF_{k,upstream,CH_4}}{\sum_j EG_j}$$

 VALIDATION REPORT

Each of the quantities in the above equation have been calculated using authentic data from the version 6 of CEA database that was applicable at the start of the validation. The detailed calculations are presented in worksheets "Fugitive EM factor" of the CER spreadsheet submitted to the validation team. The team has verified the correctness of data and the computations. The validation team has confirmed that the calculation is consistent with the calculation of CO₂ emissions in the build margin and the combined margin, i.e. the same cohort of plants and data on fuel combustion and electricity generation have been used. This is because the CEA database provides the value of the operating and builds margin emission factors and also includes a listing of all the plants supplying power to the respective grids. Thus, the calculation carried out is in line with the requirement of the methodology.

The following values for the above quantities are confirmed:

- $FF_{j,k}$ is the quantity of the fossil fuel type 'k' consumed in the respective power plant 'j'
- The project activity (included for the calculation of the build margin) would be supplying power to the NEWNE grid. The fossil fuel based power plants in the NEWNE grid use the following types of fuels:
 - coal
 - lignite
 - natural gas
 - naphtha

As diesel fired plants are not a part of the plants that were considered in the computation of the build margin, these plants are not included in the determination of the baseline upstream fugitive methane emission factor $EF_{BL, upstream, CH_4, y}$

From the CEA database, values of the fuel consumption of each of these fossil fuel types were taken and multiplied by the respective default emission factor for the fuel type prescribed in Table 2 of the methodology. The default emission factors applied are as below:

Type of fossil fuel used in the power plant	Value of the default emission factor $EF_{k, upstream, CH_4, considered}$	Justification



VALIDATION REPORT



Coal	0.8 tCH ₄ per ktonne	Most of the coal production in India comes from open pit mines contributing over 81% of the total production. A number of large open pit mines of over 10 million tonnes per annum capacity are in operation. Underground mining currently accounts for around 19% of national output. (http://www.mbendi.co.za/indy/ming/coal/as/in/p0005.htm). Hence 0.8 tCH ₄ /kt coal value is used for surface mining
Lignite	0.8 tCH ₄ per ktonne	Guidelines for National Greenhouse Gas Inventories: Reference Manual, ¹² the amount of CH ₄ generated during coal mining is primarily a function of coal rank and depth, gas content, and mining methods, as well as other factors such as moisture. Coal rank represents the differences in the stages of coal formation and depends on the pressure and temperature history of the coal seam; high coal ranks, such as bituminous coal, contain more CH ₄ than low coal ranks, such as lignite. Hence, 0.8 tCH ₄ /kt lignite is used as a conservative value.
Gas	296 tCH ₄ per PJ	As per the Table 2 of the methodology, 296 tCH ₄ /PJ is applicable for rest of the world.
Oil	4.1 tCH ₄ per PJ	As per the Table 2 of the methodology. This value includes for oil production, transport, refining and storage.

Apart from the above values, the other assumptions made in calculating the values of fossil fuels type 'k' consumed in the respective power plant 'j' included in the build margin are as follows :

Emission factor for upstream fugitive emissions in the absence of the project activity (EF_{BL, upstream, CH₄}) are justified as follows:

Parameter assumed	Value applied	Justification
CO ₂ emission factor of coal	26.13 tCO ₂ /TJ	The value considered is based on Table 2.3, of India's Initial Communication to UNFCCC, 2004 (page 37), which is a standard reference and is therefore acceptable.
CO ₂ emission factor of lignite	28.95 tCO ₂ /TJ	The value considered is based on Table 2.3, of India's Initial Communication to UNFCCC, 2004 (page 37), which is a standard reference and is therefore acceptable.

¹² <http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1ref7.pdf>



VALIDATION REPORT

CO ₂ emission factor of NG	15.3 tC/TJ	The value considered is based on Table 1.3, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 1, Volume 2,, which is a standard reference and is therefore acceptable.
CO ₂ emission factor of naphtha	20 tC/TJ	The value considered is based on Table 1.3, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 1, Volume 2, which is a standard reference and is therefore acceptable.
Net power generation of plants in the build margin ΣEG_j	1,09,064 Million units (kWh)	This value is the summation of the electricity generation by all the power plants connected to the NEWNE grid and also included in the calculation of the build margin emission factor. The value is taken from CEA database version 6 which also provides the plant-wise break up of all such plants. This is as per the methodology.
Quantity of coal combusted in power plants in the build margin	56,645 kilo tonnes per year	This is a calculated value based on absolute CO ₂ emissions that had taken place during the year 2008-09 for coal fired plants and the value of emission factor of coal. The data on absolute emissions is available from the CEA database version 6, valid and applicable at the time of the start of validation
Quantity of lignite combusted in power plants in the build margin	2,504 kilotonnes per year	This is a calculated value based on absolute CO ₂ emissions that had taken place during the year 2008-09 for lignite fired plants and the value of emission factor of lignite. The data on absolute emissions is available from the CEA database version 6, valid and applicable at the time of the start of validation
Quantity of natural gas combusted in power plants in the build margin	30.96 PJ/year	This value is computed from absolute emissions data taken from the CEA CO ₂ baseline database version 6, valid and applicable at the time of the start of validation and from the value of CO ₂ emission factor for natural gas. The computation provides gas consumed in energy terms.
Quantity of naphtha combusted in power plants in the build	39.82 PJ/year	This value is computed from absolute emissions data taken from the CEA CO ₂ baseline database version 6, valid and applicable at the time of the start of validation and from the value of CO ₂ emission factor for naphtha. The computation provides naphtha



margin		consumed in energy terms.
GWP _{CH4}	21	The global warming potential for GHG methane is a known standard value.

The detailed computation of the fugitive upstream methane emissions occurring in the absence of the project activity $EF_{BL,upstream,CH4}$ is presented in the Emission Reduction spreadsheet submitted by the project participant to the validation team. The calculations therein were verified by the team and found appropriate.

Accordingly, the value of $EF_{BL,upstream,CH4}$ is confirmed by the team as 10.91 tCO₂e/Million kWh.

As per the methodology, the leakage emissions from fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression into a natural gas transmission or distribution system $LE_{LNG,CO2,y}$ are to be calculated as per the equation:

$$LE_{LNG,CO2,y} = FC_y \cdot EF_{CO2,upstream,LNG}$$

FC_y is the quantity of natural gas combusted in the project activity and is calculated to be 491.83 Mcum. An explanation for the consideration of this value is stated in the paragraphs above.

$EF_{CO2,upstream,LNG}$ is the Emission factor for upstream CO₂ emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system. As reliable and accurate data on the same is not available, the project participant has chosen the default value of this emission factor, prescribed by the methodology to be 6 tCO₂ per TJ. It is assumed that quantity of LNG used in the project would be zero, hence net fugitive emission due to LNG works out to be zero. The same has been calculated in the emission reduction spreadsheet provided by the PP and validated by the validation team.

Hence, the total leakage emissions as a sum of the leakage emissions due to

- i) Net fugitive emissions due to usage of natural gas,
 $LE_{CH4,y} = 107,771$ tCO₂ per year
- ii) Net fugitive emissions due to usage of LNG (0%)
 $LE_{LNG,CO2,y} = 0$ tCO₂ per year
- iii) Leakage occurring in the absence of the project activity = 26,057 tCO₂ per year

iv) Total Leakage emissions per year LE_y
 $= LE_{CH_4,y} + LE_{LNG,CO_2,y} - \text{leakage occurring in the absence of the project activity}$
 $= 107,771 - 26,057 = 81,714 \text{ tCO}_2\text{per year}$

Emission reductions (ER_y)

From the values of baseline emissions, project emissions and leakage emissions, the emission reductions are calculated as

$$ER_y = BE_y - PE_y - LE_y$$

$$BE_y = 19,40,533 \text{ tCO}_{2e} \text{ per year}$$

$$PE_y = 1,07,771 \text{ tCO}_{2e} \text{ per year}$$

$$LE_y = 81,714 \text{ tCO}_{2e} \text{ per year}$$

$$\text{Hence, } ER_y = 8,85,944 \text{ tCO}_{2e} \text{ per year}$$

The estimated 8,859,440 tCO_{2e} of emission reductions over the entire crediting period of 10 years represents a reasonable estimation using the assumptions considered by the project participant. All the assumptions for this estimate either come from the assumptions used for investment analysis or based on official data sources in line with relevant EB guidelines. The assumptions used for investment analysis have been validated in section 3.7.3 of this report. The validation team confirms that the estimates of baseline emissions can be replicated using the information provided. It also can be verified using the Emission Reduction spreadsheet (Ref /15/) for calculations of emission reductions.

CAR 9 was raised as, in the emission reduction sheet provided to the validation team and in the webhosted PDD value of EF_{BUILD MARGIN} and emission factor of fuel are identified as baseline scenario is not consistent, value of NCV was not provided with supporting evidences. Emission factor for fugitive CH₄ upstream emission for coal and lignite were considered as same. In response the project participant corrected the inconsistencies in the PDD and Emission reduction sheet, supporting evidences for PLF were shown as DPR and it was explained that emission factor for fugitive upstream emission for coal and lignite are considered same since the both are produced by surface mining method. To substantiate this the PP has provided the web-link http://www.nlcindia.com/about/about_01b.htm. Validation team reviewed this and found this as appropriate, hence closed the CAR 9.

Car 10 point 4 was raised as, in section B.6.2 in the PDD values of different parameters were not transparently provided. In response to this the PP has revised the PDD with appropriate values in section B.6.2, hence this point was closed.



CAR 11 was raised as, while calculating the project emission (in section B.6.3) value of $COEF_{f,y}$ were not consistent. In response to this the PP corrected the value, hence CAR is closed.

Based on the above assessment, the validation team hereby confirms that:

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

3.7 Additionality of a project activity (97)

The steps taken and sources of information used, to cross-check the information contained in the PDD on this matter are described below.

The steps taken by the validation team to assess the additionality of the Project Activity includes review of documents indicated in the assumptions in the financial analysis spreadsheets i.e. for levelized cost analysis, IRR calculations and benchmark analysis (Ref /14a/, /14b/, 14/c/). The detailed steps, including an assessment of how the documentation referred to in the PDD for the demonstration of additionality is appropriate, are described in Sections 3.7.1 through 3.7.5 below.

3.7.1 Prior consideration of the clean development mechanism (104)

Start date of the project activity:

The detailed chronology of events leading to the start of the project activity are presented in the PDD. The main events are summarised as below:

1. Environmental clearance from Ministry of Environment & Forests (MoEF): 12/04/2007 (Ref /1/)
2. Consent to establish from Gujarat Pollution Control Board (GPCB): 11/06/2007(Ref /2/)
3. Board resolution to avail CDM benefits in order to make 350 MW CCPP financially viable: 25/09/2007 (Ref /10/)



VALIDATION REPORT

4. Sanction of rupee term loan by Rural Electrification Corporation (REC): 05/11/2007 (Ref /11/)
5. Invitation for participation in CDM stakeholder consultation meeting: 12/12/2007 (Ref /16/)
6. Stakeholders consultation for CDM project: 28/12/2007 (Ref /17/)
7. Contract with EPC contractor (BHEL) for Supply, installation and commissioning of the Project activity equipments: 29/12/2007 (Ref /9/)
8. Notice to proceed for EPC of the project: 23/01/2008 (Ref /18/)
9. Gas sales contract with Gujarat State Petroleum Corporation Limited (GSPCL): 25/03/2008 (Ref /12/)
10. Contract with CDM Consultant – 1: 08/05/2008 (Ref /19a/)
11. Invitation of offers from DOE: 04/05/2009 (Ref /27/)
12. Contract with CDM consultant - I terminated: 09/08/2010 (Ref /19b/)
13. Contract of GSEGL with second CDM consultant: 18/08/2010 (Ref /20/)
14. Appointment of DOE: June 2011 (Ref /21/)
15. Meeting with DNA for HCA: 26/09/2011
16. PDD webhosted for Global stakeholder comments on 16/10/2011

The Project participant had invited bids from interested parties for the EPC (Engineering, Procurement and commissioning) for the range of 330 MW to 370 MW Gas based combined cycle power plant at Village: Mora (Hazira), District: Surat, State: Gujarat. The decision was recorded in the meeting of Project Participant's Board of Directors held on 25th September 2007 and is therefore marks this as the date of the Project Participant's decision to set up the project activity. The EPC contractor selected was M/s. Bharat Heavy Electrical Limited, Delhi (BHEL) and the Project Participant has executed a contract/PO with EPC contractor (BHEL) on 29/12/2007 for Engineering, procurement and construction activities of the project activity and there after conveyed a notice to proceed to EPC contractor viz. BHEL, vide its letter dated 23/01/2008. The 'Notice to proceed' describes that the EPC contractor should start its activities.

By signing the agreements (i.e. PO) on 29/12/2007, the Project Participant was legally bound to make payments to the EPC contractor M/s. Bharat Heavy Electrical Limited, Delhi (BHEL) for setting up of the project activity. Hence, the date 29/12/2007, on which all the agreements were signed is the earliest date in the chronology after the Board decision that indicates commitment on the part of the Project Participant towards expenditures for the project activity and therefore could be regarded as the start date of the project activity in accordance with the CDM Glossary of terms (EB 66 Annex 63) as it is the earliest date of the real action



taken towards the implementation of the project activity. Hence, the validation team has accepted the date of signing of the contract (i.e. 29/12/2007) as the start date of the project activity.

CL 9 point j was raised, as in the webhosted PDD the start date of the project activity was stated as year 2005. However, in section C.1.1, it was described as 23/01/2008. In response to this the PP has corrected the start date as 29/12/2007 this being the date of contract with EPC contractor (BHEL); PP has explained that this is the earliest date at which either the implementation or real action of the project activity began. Validation team reviewed the contract agreement dated 29/12/2007 and finds that the said contract for the design and engineering, manufacturing, fabrication, assembly, shop testing, packing and forwarding of equipments/systems for the project on EPC basis. The contract document had a detail price break up and completion schedule of the project signed by both the entities i.e the PP and the EPC contractor, hence validation team is of the opinion that the contract document is of financial obligation on the part of the PP and hence can be considered as a first real action towards the project activity. Hence the contract signing date, 29/12/2007 can be considered as start date; hence the CL 9 point j is closed.

Prior awareness of CDM:

The project participant; M/s. GSEGL already has a similar combined cycle gas based power plant installed at Village Mora (Hazira), Taluka: choryasi, district: Surat. The same was under request for registration and host country approval for the same was received on 25/09/2007 (Project's UNFCCC reference is 4419). This sufficiently indicates the Project Participant's prior knowledge and awareness of CDM; as without this knowledge it would not have been possible for the Project Participant to have carried out the necessary formalities needed for the registration of the project activity.

CDM as a decisive factor in decision making:

The formal decision to set up the project activity is recorded in the 37th minutes of meeting of the Board of Directors of GSEGL, held in Gandhinagar on 25/09/2007. The project participant provided a certified extract (Ref /10/) of the Board resolution to the validation team. The Board decision clearly refers to CDM benefits that would accrue to the project activity.

To further confirm the decisiveness of CDM revenues behind the investment decision, the validation team visited the corporate office of GSEGL located at Gandhinagar on 5/01/2012. The team vetted the certified extract of the Board resolution against the original resolution on file in the Board register maintained at the project participant's corporate office at Gandhinagar. The contents of the extract were found to be a verbatim reproduction of the original. The validation team also held a



detailed interview with the senior officials of GSEGL who had participated in the decision making process. The validation team was informed by senior officials of GSEGL that the decision to set up the natural gas was taken even though the levelised cost of generation of power with natural gas as fuel was higher than the levelised cost of generation with cheaper alternatives such as coal or lignite, making the gas option less economically attractive than others. The team was further informed that the decision was taken only on the basis of the possibility of CDM revenues through the sale of carbon credits accruing to the project activity. The validation team therefore accepted, on the basis of the interview held with senior officials of GSEGL of Government rank, that the CDM revenues were indeed a decisive factor behind the decision to set up the project activity.

Continuing and real actions taken:

A complete chronology of events starting from the date of investment decision up to the submission of the PDD to the DOE for validation is presented in the PDD. The chronology illustrates the steps taken by the project participant to avail of CDM benefits for the project activity. Documentary references in respect of each event in the chronology were provided to the validation team. The documents provided were vetted against their originals and found to be true copies of the same.

The following documents were the basis on which the validation team was able to conclude that the CDM was seriously considered and the PP had taken the necessary steps to avail CDM status for the project activity:

<i>Sr. No.</i>	<i>Document reviewed</i>	<i>Real action as per EB 62 Annex 13 guidance</i>
1.	Board resolution to avail CDM benefits in order to make 350 MW CCPP financially viable: 25/09/2007 (Ref/ 10/)	GSEGL board decided to avail CDM benefits after considering all the baseline option and concluded that they will proceed for candidate project. The project can be viable only if CDM revenue is obtained.
2.	Invitation for participation in CDM stakeholder consultation meeting: 12/12/2007 (Ref /16/)	This is as per the requirement of CDM methodology where local stakeholder consultation is required, hence invitation has been circulated to relevant

VALIDATION REPORT

		stakeholders.. Validation team reviewed the invitation to various stakeholders identified by the PP.
3.	Stakeholders consultation for CDM project: 28/12/2007 (Ref /17/)	The stakeholder consultation was arranged as per the invitation letter, where the opinions of the stakeholders were sought after informing them about the project activity.
4.	Contract with EPC contractor (BHEL) for Supply, installation and commissioning of the Project activity equipments: 29/12/2007 (Ref /9/)	This is the first real action for CDM in line with CDM Glossary of terms EB 66, Annex 63
5.	Contract with CDM Consultant – I: 08/05/2008 (Ref /19a/)	This describes the GSEGL continuing action in line with EB 62 Annex 13 Guidance (Ref /B8/)
6.	Invitation offers from DOE: 04/05/2009	This describes the GSEGL continuing action in line with EB 62 Annex 13 Guidance(Ref /B8/)
7.	Contract with CDM consultant - I terminated: 09/08/2010 (Ref /19b/)	This describes the GSEGL continuing action in line with EB 62 Annex 13 Guidance
8.	Contract of GSEGL with another CDM consultant: 18/08/2010 (Ref /20/)	This describes the GSEGL continuing action in line with EB 62 Annex 13 Guidance (Ref /B8/)
9.	Appointment of DOE: 18/11/2011	This describes the GSEGL continuing action in line with EB 62 Annex 13 Guidance
10.	Meeting with DNA for HCA: 26/09/2011	Interview with the DNA, this describes the GSEGL continuing



VALIDATION REPORT

		action in line with EB 62 Annex 13 Guidance (Ref /B8/)
11.	PDD webhosted for Global stakeholder comments on 16/10/2011	This describes the GSEGL continuing action in line with EB 62 Annex 13 Guidance (Ref /B8/)

CL 13 was raised as, in the web hosted PDD, the chronology for demonstrating real and continuing action did not describe the date of interview with DNA or any communication with the DNA. In response to this PP included relevant dates in the revised PDD in order to meet with the guideline of EB 62 Annex 13 with detail events and dates occurred. Validation team reviewed the complete chronology and found it correct, hence closed the CL 13.

The trail of events in the chronology, along with the supporting documentary evidence indicates that the PP had taken necessary actions and steps towards the registration of the project activity as a CDM project. Also, these actions were taken in parallel with the implementation of the project activity, with the intervening gap between documented evidences being less than 2 years, thus meeting the requirement of paragraph 8 (a) EB 62 Annex 13 Guidance(Ref0) pertaining to parallel action towards securing the CDM status for the project activity. The validation team has also ascertained the authenticity of the documentary evidences presented to it by the Project Participant by cross-checking these evidences with personal interviews with the Project Participant's representatives as well as other stakeholders, to meet the requirement in paragraph 7 of the EB 62 Annex 13 guidance. A list of all the interviewed parties is included in section 2.2 of this report. Names of personnel interviewed are listed in the Table in Section 6 in the report below.

Based on the above assessment, the validation team hereby confirms that the proposed CDM project activity complies with the requirements of the latest version of the EB Guidance on prior consideration of CDM.



3.7.1.1 Historical information on project timeline

Project participant has carried out DPR for the project activity. The same is carried out by M/s Tata Consulting Engineers Limited (TCE). The validation team reviewed the extract of the DPR dated of May 2007 (Ref /22/). The project participant evaluated the project activity based on the information available at the time of decision making 25/09/2007. The Project participant has obtained statutory clearances required for establishing and operating the project activity from the concerned Government Departments.

3.7.2 Identification of alternatives (107)

The project participant has identified all the realistic and credible alternatives to the project activity in the section B.4 of the PDD. The consideration of the selected alternatives was validated by the validation team and a detailed assessment of the same is provided in section 3.6.3 of this report.

- i) The list of alternatives considered in the PDD includes as one of the options that the project activity is undertaken without being registered as a proposed CDM project activity
- ii) The alternatives considered are regarded as plausible by the validation team on the basis of its local and sectoral knowledge and experience
- iii) Each of the alternatives complies with national and local legislation of the host country.

Hence, the Validation Team considers the listed alternatives to be credible and complete.

3.7.3 Investment analysis (114)

The project participant has used the levelised cost approach to analyse the identified alternatives to determine the baseline. With this approach, the levelised cost for each of the following alternatives was calculated:

- | | |
|-------------------|--|
| Alternative I : | Power generation using natural gas as fuel and combined cycle technology without CDM revenues (Project activity) |
| Alternative II: | Power generation using coal as fuel (sub critical technology) |
| Alternative III : | Power generation using coal as fuel with super-critical technology (using imported coal) |
| Alternative IV : | Power generation using lignite as fuel |
| Alternative V : | Power generation using naphtha as fuel |



VALIDATION REPORT

These were the only alternatives that remained in consideration for the determination of the baseline, as explained in section 3.6.3 & 3.7.2 above.

The levelised cost calculated for each of these alternatives was based on assumptions of input parameters as detailed in the table below. The sources of information and means of cross-check used for each of the values are also provided in the right hand column of the table.

Alternative I : Power generation using natural gas as the fuel and combined cycle technology without CDM revenues (project activity without CDM)

Input parameter	Value of the parameter	Validation assessment	
		Information source referred to and its appropriateness	Information source used for Cross-checking
Project capacity	351.43 MW	The plant capacity is as per DPR. However, actual capacity is from the EPC contractor M/s. BHEL's offer June 2007, vide EPC specification no. TCE.4915A-H-500-001 (Ref /8/)	The capacity was cross verified from contract document with BHEL (Ref /9/) and site visit observations,
Project cost	1,065.6 Crores INR Crore	As per the DPR carried out by M/s TCE consulting Engineers Limited carried out as of May 2006 (Ref /22/)	The assumption was cross-checked with the Loan sanction letter of Rural Electrification Corporation Ltd's loan sanction letter no. REC/VAD/8/14/20 07-08/687 dated 05/11/2007 (Ref /11a/), which states project cost as INR 1152.54 Crore, which is actually higher than the value considered for the



VALIDATION REPORT

			financial calculations, hence, found conservative.
Debt : equity ratio	70:30	As per the DPR carried out by M/s TCE consulting Engineers Limited as of May 2006 (Ref /22/)	70%:30% debt-equity ratio is the standard norm for the power sector industry. CERC 2004 tariff regulations (Ref /26/) also have ruled in favour of the same ratio, hence acceptable by the validation team.
Time frame for the investment analysis	23 years	The investment analysis is carried out over the life time of the plant. This is assumed as a normative life time of 23 years. The assumption is supported by Tool to determine the remaining lifetime of equipment (EB 50 Annex 15) (Ref /B13/) which prescribes default values for technical lifetime of equipment, hence acceptable.	Not applicable. (Sourced from UNFCCC EB guideline). Not applicable
Plant Load Factor of the plant (PLF)	80%	As per the DPR carried out by M/s TCE consulting Engineers Limited as of May 2006 (Ref /22/)	PLF of 80% is assumed as a normative value as per the CERC Terms and conditions available to the PP at the time of decision (29/12/2007). (http://cercind.gov)



VALIDATION REPORT

			<p>.in/13042007/Terms_and_conditions_of_tariff.pdf)</p> <p>This being Government Of India published data acceptable to the validation team.</p>
Auxiliary consumption	3%	As per the DPR carried out by M/s TCE consulting Engineers Limited as of May 2006 (Ref /22/)	<p>The assumption of auxiliary consumption is taken from GERC tariff order 861/2006 (Ref /23/) which is dated 26/03/2001. This tariff order was available to the project participant prior to the date of decision. Since the GERC is a regulatory authority, the data derived from the same is regarded as authentic and hence was accepted by the validation team. The GERC tariff order is also available in the public domain.</p>
Operations & Maintenance (O&M) cost including insurance cost	9.12 Lakh per MW	As per the DPR carried out by M/s TCE consulting Engineers Limited as of May 2006 (Ref /22/)	<p>The O&M cost is assumed on the basis of CERC tariff regulations 2004</p> <p>(http://cercind.gov.in/13042007/Terms_and_conditions_of_tariff.pdf).</p>



VALIDATION REPORT



			This describes the cost of Operation and Maintenance as 9.12 Lakh per MW. This is a Central government published data, hence, acceptable to the validation team.
Escalation in O&M cost	4% per annum	As per the DPR carried out by M/s TCE consulting Engineers Limited as of May 2006 (Ref /22/)	Validation team also referred to CERC regulations dated 26/03/2004 (Ref /26/) which considers the escalation in O&M cost to be 4%.. The regulation was available to the project participant prior to the date of decision. Since the CERC is a Central government body, the data derived from the same is regarded as authentic and hence was accepted by the validation team.
Station heat rate of the power plant	1850 kcal/kWh (GCV basis)	As per the DPR carried out by M/s TCE consulting Engineers Limited as of May 2006 (Ref /22/)	Station heat rate was cross-checked against the CERC terms and conditions of tariff dated 01/04/2004 (Ref /25/). The station heat rate is specified in the CERC order as 1850 kcal/kWh for



VALIDATION REPORT



			<p>combined cycle operation plants.</p> <p>The value can be cross checked from GERC tariff order 861/2006 (Ref /23/) which is dated 26/03/2001. This tariff order was available to the project participant prior to the date of decision. Since the GERC is a regulatory authority, the data derived from the same is regarded as authentic and hence was accepted by the validation team. The GERC tariff order is also available in the public domain. analysis.</p>
Fuel cost (NG)	<p>INR 7.57/SCM = INR 7570/1000 SCM</p> <p>→ Landed cost of Gas is considered as 5.26 USD/mmbtu which is sourced from DPR Appendix VI 1, sr. no. 9,</p>	As per the DPR carried out by M/s TCE consulting Engineers Limited as of May 2006, (Ref /22/)	<p>The supply cost of natural gas has been crosschecked from a letter from Ministry of Petroleum and Natural Gas. http://petroleum.nic.in/PriceAPMGas1.pdf, which provides the fuel cost as \$4.2 /MMBTU</p> <p>Validation team crosschecked the marketing cost</p>



VALIDATION REPORT



	<p>inclusive of Sales tax =12%</p> <p>The exchange rate is considered as 1USD = 43.06 INR which is sourced from last one year average exchange rate - http://www.x-rates.com/d/INR/USD/hist2008.html</p> <p>This gives landed cost of gas = INR 226.65 /mmbtu</p> <p>After converting this to SCM the same is calculated as INR 7.57/SCM</p>		<p>from the news article http://articles.economictimes.indiatimes.com/2012-01-13/news/30623966_1_marketing-margins-apm-gas-tapti as \$0.13 /MMBTU</p> <p>The cost of gas works out to be \$4.33 + 12.5% Value Added Tax = \$4.87/MMBTU</p> <p>Validation team crosschecked the gas transportation cost from the news article http://www.livemint.com/Home-Page/kdTE6sHMaBqUjrHDdmFLgN/RGTIL-may-soon-raise-Rs1000-cr.html, which states transportation cost of natural gas ranges from \$0.5/mmbtu to \$1.0/mmbtu.</p> <p>Conservatively assuming the transport cost to be \$0.5/MMBTU, and 10% service tax - transportation cost per MMBTU works out to be \$0.55/MMBTU.</p> <p>Landed cost of gas (Gas cost + transportation cost) = 4.87+0.55</p>
--	---	--	---



VALIDATION REPORT



			= \$5.42/MMBTU; Hence the landed cost of gas considered by PP, from the DPR, is justifiable..
Escalation in fuel cost	10%	As per GERC tariff order 861/ 2006 ; Page no 52 of 109, Link: http://www.gercin.org/index.php?option=com_tarifforder&Itemid=32&year=2006&lang=en	State government published document, hence, acceptable.
Net calorific value (G.C.V.) of the fuel (NG)	8421.70 kcal/SCM	As per the DPR carried out by M/s TCE consulting Engineers Limited as of May 2006 (Ref /22/)	Calorific value of the gas used in phase 1 project varies from 8180 kCal/SCM to 8600 kCal/SCM. Hence, NCV considered by the PP is appropriate for the candidate CDM project.
Interest rate on Debt	11%	Actual interest rate applied as per investment guideline EB 62, Annex 5, Para 11. The interest rate was referred from REC document no. REC/FIN/LOAN/GSEGL 2008-09 dated 08-12-2009	The PP in the DPR has considered interest rate as 8%, however, this was changed as per the EB guidelines The interest rate is cross-checked with the term loan mentioned in GERC Tariff Order 861/2006 (Ref /23/) which describes interest rate as 9.11%. The GERC source was available on the date of the Project



VALIDATION REPORT



			Participant's investment decision. The validation team confirms that interest rate considered on actual loan is appropriate.
Loan repayment period	12 years	Actual interest rate applied as per investment guideline EB 62, Annex 5, Para 11. The interest rate was referred from REC document no. REC/FIN/LOAN/GSEGL 2008-09 dated 08-12-2009. The loan repayment period was referred from the REC letter no. RED/VAD/8/14/2007-08/650 dated 11/12/2007, which clearly describes in clause - revision in condition no. 3 page 2.	The PP in the DPR has considered interest rate as 8% and loan repayment as 9 years. However, finally the loan repayment period is considered as per actual loan sanction in line with EB 62, Annex 5, Para 11, hence, appropriate.
Moratorium on loan repayment	27 months	Actual interest rate applied as per investment guideline EB 62, Annex 5, Para 11. The interest rate was referred from REC document no. REC/FIN/LOAN/GSEGL 2008-09 dated 08-12-2009. The moratorium was referred from the REC letter no.	The PP in the DPR has considered moratorium as 24 months. However, finally the loan repayment period considered is as per actual loan sanction in line with EB 62, Annex 5, Para 11, hence, appropriate.



VALIDATION REPORT



		RED/VAD/8/14/2007-08/650 dated 11/12/2007, which clearly describes in clause revision in condition no. 3 page 2.	
Discounting rate	11.10%	As per CERC notification of 04/04/2007 Web link: http://www.cercind.gov.in/08022007/Notification_04-04-2007.pdf	As the discounting rate assumed is taken from the CERC's official web site, the same is regarded as valid by the validation team. This was available to the project participant at the time of decision. (29/12/2007)
Working capital interest rate	9%	As per the DPR carried out by M/s TCE consulting Engineers Limited as of May 2006 (Ref /22/)	The interest rate on working capital loan mentioned in GERC Tariff Order 861/2006 (Ref /16/) is 10.25%. The GERC source was available on the date of the Project Participant's investment decision and is hence, conservative of the two value has been considered by the PP, hence, acceptable as a source of information for determining the rate of interest.
Income Tax Rate	33.66%	As per the prevailing rates under the Income Tax Act 1961 amended	The rates are cross-checked against



VALIDATION REPORT



		by the Finance Act of 2002	Taxmann's Direct Taxes Ready Reckoner published annually.
Minimum Alternate Tax	11.33%	As per the prevailing rates under the Income Tax Act 1961 amended by the Finance Act of 2002	The rates are cross-checked against Taxmann's Direct Taxes Ready Reckoner published annually.
Income tax exemption period	10 years	The Income Tax Act allows under section 80 IA power infrastructure projects to enjoy a 10 year tax holiday at any time during the first 15 years of the commissioning of the plant. The tax exemption is claimed from year 10 to year 15 of the plant's operation. During the first 9 years of operation, the plant is expected to have a negative income due to losses carried forward from the preceding years.	The exemption allowed was cross-checked against Taxmann's Direct Taxes Ready Reckoner published annually.
Rate of depreciation of the plant	3.91%	The rate of depreciation is specified in CERC tariff order CERC: http://www.cercind.gov.in/13042007/Terms_and_conditions_of_tariff.pdf	The depreciation rate is taken on the basis of the Central Electricity Regulatory Committee's order. This is a publicly available source accessible to the Project Participant at the time of the investment decision.



VALIDATION REPORT

Salvage value	10%	As per the Schedule XIV of the Companies Act 1956	The salvage value is taken on the basis of Companies Act and hence, is accepted without the necessity to cross-check it further.
Return on Equity (RoE)	14%	As per Detailed Project Report (DPR) Appendix VI-1	The return on equity is specified in the CERC 2004 tariff regulations (Ref /26/) It is stated that power generation projects need to expect an earning of at least 14% on the equity invested is also accepted by the CERC; as evident from their tariff order of 2004

Justification for sources and parameters considered for Other alternatives:

<i>Input parameter</i>	<i>Values assumed for various alternatives</i>				<i>Validation assessment</i>
PROJECT INVESTMENT RELATED					
	<i>COAL (Subcritical)</i>	<i>Coal-(supercritical)</i>	<i>LIGNITE</i>	<i>NAPHTHA</i>	
Plant capacity	2 x 200 MW	660 MW	2 x 200 MW	351.43 MW	Size of commercially available plant considered Coal & , Coal(supe



					<p>rcritical) plant size : The unit capacity (200 MW for coal-subcritical & 660 MW for coal – supercritical) is found in CEA Committee Report, http://www.cea.nic.in/reports/articles/thermal/committee_recommend_thermal.pdf to recommend the next higher size of coal fired plants.</p> <p>Lignite :The plant size considered (2 x 200 MW) is on the basis of unit sizes commissioned in the state of Gujarat, as seen from the CEA database</p> <p>Naphtha: The same</p>
--	--	--	--	--	--



VALIDATION REPORT

					plant size as the project activity is considered and justified due to the feasibility of fuel usage of naphtha for combined cycle plants.
Project cost per MW (INR)	16000 million	31,331 million	16,246 million	10,683 million	Basis for the cost of coal based plant is the CEA data base as indicated in the excel sheet for working the per kwh price of coal. For the super critical power station, the cost is sourced from British High Commission Report on UMPP Risk Analysis, April 2007 ; Page no



					<p>12 of 151(USD 1227 per kW ; exchange rate USD @ 40.23 INR). The cost of lignite power plant is sourced from http://mospi.nic.in/status_report_july_sept07.pdf, Page 15 of 237 mentions the cost for Expansion of NLC TPS - II is INR 2030.78 Crores. The capacity of NLC TPS- II can be seen in the link: http://www.nlcindia.com/index.php?file_name=about_01h . The cost of naptha is Assumed to be same</p>
--	--	--	--	--	---



VALIDATION REPORT

					as the project cost - as per DPR Appendix IV, page 102
Debt-Equity Ratio	70:30	70:30	70:30	70:30	70:30 debt-equity ratio is a standard norm for power sector investments in the country. CERC 2004 tariff regulations (Ref /26/) also prescribe the same ratio.
Investment analysis time frame	25 years	25 years	25 years	23 years	The lifetime of different 'fuel source' are different. The same is worked out from As per Annex 15, EB 50, http://cdm.unfccc.int/EB/050/eb50_repan15.pdf Hence, acceptable



OPERATIONS RELATED					
	<i>COAL-subcritical</i>	<i>Coal-supercritical</i>	<i>LIGNITE</i>	<i>NAPHTHA</i>	
PLF	80%	80%	80%	80%	The PLF of 80% is assumed as a normative value and is also supported by the CERC terms & conditions of tariff notification : http://www.cercind.gov.in/13042007/Terms_and_conditions_of_tariff.pdf hence, acceptable .
Auxiliary consumption	9%	9%	9.5%	3%	The Auxiliary consumption assumed is based on CERC tariff order: www.cercind.gov.in/13042007/Terms_and_conditions_of_tariff.pdf page 12 Hence,



VALIDATION REPORT

					acceptable
O & M cost	INR 12.65 Lakh per MW Source: http://www.w.cercind.gov.in/13042007/Terms_and_conditions_of_tariff.pdf	INR 9.79 Lakh per MW Source: Calculated based on the O&M expenses provided in British High Commission Report on UMPP Risk Analysis	INR 12.65 Lakh per MW Source: http://www.cercind.gov.in/13042007/Terms_and_conditions_of_tariff.pdf	2.5% of the total project cost Source: http://www.thegef.org/gef/sites/thegef.org/files/repository/09.PAD.Annex_9.pdf , (page 5 of 13, provides O&M cost for existing Naphtha projects)	The values are based on O & M cost values as provided in the CERC tariff, available to the PP at the time of decision taken. The value for super critical is calculated and the value of naphtha based power plant is also from credible source.
Escalation in O&M cost (%)	4%	4%	4%	4%	Escalation in the O&M cost is assumed uniformly for all alternatives. The assumption is based on CERC tariff order, which was available to the PP at the time of decision taken.

VALIDATION REPORT

					http://www.cercind.gov.in/13042007/Terms_and_conditions_of_tariff.pdf
ENERGY RELATED					
	COAL-Subcritical	Coal-supercritical	LIGNITE	NAPHTHA	
Station Heat Rate (kcal/kWh)	<p>For the first year: 2600 kcal/kwh</p> <p>For the second year: 2500 kcal/kwh</p> <p>Source: http://www.cercind.gov.in/13042007/Terms_and_conditions_of_tariff.pdf</p>	<p>For the first year: 2167 kcal/kwh</p> <p>For the second year: 2167 kcal/kwh</p> <p>Source: Calculated from efficiency of 39.69%. The efficiency value has been referred from British High Commission Report on UMPP Risk Analysis, April 2007 ; Page no 10 of 151(Corresponding to</p>	<p>For the first year: 2860 kcal/kwh</p> <p>For the second year: 2750 kcal/kwh</p> <p>Source: http://www.cercind.gov.in/13042007/Terms_and_conditions_of_tariff.pdf (using 1.1 mult factor)</p>	<p>For the first year: 2685 kcal/kwh</p> <p>Source: As per http://www.cercind.gov.in/13042007/Terms_and_conditions_of_tariff.pdf, page 12</p> <p>For the second year: 1850 kcal/kwh</p> <p>Source: As per Detailed Project report (DPR) - appendix VI - 1, sr. no. 21</p>	<p>The SHR values are taken from / calculated from the British High Commission Report on UMPP Risk Analysis. The sources being 3rd party, credible documents acceptable. The source for naphtha is same as gas, which is DPR. hence, acceptable.</p>



		<p>international coal under Indian condition for low super critical technology)</p> <p>The same was cross checked with CERC tariff terms and conditions - 2009 which states only one station heat rate value for the super critical thermal plant. (Ref /30/)</p>			
Fuel cost (INR/MT)	<p>INR 1892 per MT</p> <p>Source: CEA report of the expert committee on fuels for power generation ; page 12 of 17,</p>	<p>INR 1925 per MT</p> <p>Source: As per CEA report - page iv, price of imported fuel is Rs. 1925/tonne; http://www.cea.nic.in/reports/articles/thermal/expert_committ</p>	<p>INR 800 per MT</p> <p>Source : CEA report of the expert committee on fuels for power generation ; page 4 of 17</p> <p>CEA report of</p>	<p>INR 17,400 per MT</p> <p>Source: CEA report of the expert committee on fuels for power generation , Page no.5, http://www.cea.nic.in/reports/ar</p>	<p>Fuel prices are assumed from data provided CEA expert committee report for coal, supercritical & lignite and naphtha. This being a government</p>



VALIDATION REPORT

	http://www.cea.nic.in/reports/articles/thermal/expert_committee_report_fuel.pdf	ee_report_fuel.pdf	the expert committee on fuels for power generation ; page 4 of 17 http://www.cea.nic.in/reports/articles/thermal/expert_committee_report_fuel.pdf	articles/thermal/expert_committee_report_fuel.pdf	t body, the data are found authentic, hence, acceptable .
Escalation in fuel cost	5.25%	5.25%	8%	10% (same as natural gas which is from GERC tariff order 861/2006)	The rate of escalation in the fuel cost for all options is taken from GERC tariff order 861/2006 (Ref /23/).
NCV (kcal/kg)	4150	5206	2800	10500	NCV of Fuels are sourced from: CEA report of the expert committee on fuels for power generation ; page 4 of 17 http://www.cea.nic.in/reports/articles/thermal/expert_committee_report_fuel.pdf



VALIDATION REPORT

					this being a central Government organisation, data found authentic, hence acceptable.
Fuel oil cost (INR/KL)	7,152	7,152	7,152	7,152 However, oil is not required in the naphtha plant.	The cost of fuel oil used as a start up fuel (for coal, super-critical and lignite plants only) are sourced from As per GERC tariff order 861/ 2006 ; Table 36, Page no 55 of 109, Link: http://www.gercin.org/index.php?option=com_tarifforder&Itemid=32&year=2006&lang=en This being state government regulatory authority commission, source



VALIDATION REPORT

					found authentic, and acceptable
Fuel oil NCV (kcal/litre)	9,595	9,595	9,595	9,595 However, oil is not required in the naphtha plant.	The GCV of fuel oil is based on CEA CO2 Emission Database version 2: http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm Hence, acceptable
Fuel oil consumption ml/kWh	First year :4.5 ml/kwh Second year onwards : 2.0 ml/kwh http://www.cercind.gov.in/13042007/Terms_and_conditions_of_tariff.pdf	First year :4.5 ml/kwh Second year onwards: 2.0 ml/kwh	First year :5 ml/kwh Second year onwards: 3.0 ml/kwh	N.A.	The fuel oil consumption is a normative value assumption that is based on CERC terms and conditions of tariff of April 2007 http://www.cercind.gov.in/13042007/Terms_and_conditions_of_tariff.pdf
Fuel oil price escalation	10.5%	10.5%	10.5%	N.A.	Fuel oil escalation is assumed on the



					basis of GERC tariff order 861/2006 dated 26/03/2001 (Ref /23/)
FINANCING RELATED					
	<i>COAL- subcritical</i>	<i>Coal- supercritical</i>	<i>LIGNITE</i>	<i>NAPHTHA</i>	
Interest rate on term loan (%)	11%	11%	11%	11%	Loan interest rates for all the alternative s considered is same as that for gas based power station i.e. project activity. The source for this is actual loan interest rate as explained above for the project activity.
Repayment period (years)	12 years	12 years	12 years	12 years	The repayment period of 12 years is uniformly assumed for all alternative s. The same period is also



					<p>applied in the levelised cost worked out for the project activity.</p> <p>The actual term loan repayment period seen from the loan sanction letter of the lender to the project activity Rural Electrification Corporation Limited is also 12 years. The repayment and moratorium was referred from the REC letter no. RED/VAD/8/14/2007-08/650 dated 11/12/2007, which clearly describes in clause revision in condition</p>
--	--	--	--	--	--



					no. 3 page 2..
Moratorium on loan principal amount repayment	27 months	27 months	27 months	27 months	The validation team referred to the loan sanction letter from the Rural Electrification Corporation Limited; vide its letter no. RED/VAD/8/14/2007-08/650 dated 11/12/2007, which clearly describes in clause revision in condition no. 3 page 2..
Discounting rate (%)	11.10%	11.10%	11.10%	11.10%	Source : http://www.cercind.gov.in/08022007/Notification_04-04-2007.pdf The discounting is assumed uniformly at the same rate for all alternative



					s and to the project activity as well; hence is accepted by the validation team
WORKING CAPITAL RELATED					
	<i>COAL-sub critical</i>	<i>Coal-supercritical</i>	<i>LIGNITE</i>	<i>NAPHTHA</i>	
Interest rate on working capital (%)	9%	9%	9%	9%	The interest rate on working capital loan mentioned in GERC Tariff Order 861/2006 (Ref /23/) is 10.25%. The GERC source was available on the date of the Project Participant's investment decision and is hence, conservative of the two value has been considered by the PP, hence,



VALIDATION REPORT

					acceptable as a source of information for determining the rate of interest.
Escalation factor for spares	6%	6%	6%	6%	Sourced from a Central Government published data of CERC: http://www.cercind.gov.in/13042007/Terms_and_conditions_of_tariff.pdf
TAX & DEPRECIATION RELATED					
	COAL	Coal-supercritical	LIGNITE	NAPHTHA	
Income Tax (%)	33.66%	33.66%	33.66%	33.66%	The income tax rate assumed are as per the prevailing rates under the Income Tax Act 1961 amended by the Finance Act of 2002
MAT (%)	11.33%	11.33%	11.33%	11.33%	The MAT rate



					assumed is as per the prevailing rates under the Income Tax Act 1961 amended by the Finance Act of 2002
SLM Depreciation (%)	3.60%	3.60%	3.60%	3.91%	<p>The rate of depreciation is specified in CERC tariff order CERC: http://www.cercind.gov.in/13042007/Terms_and_conditions_of_tariff.pdf</p> <p>The depreciation rate is taken on the basis of the Central Electricity Regulatory Committee's order. This is a publicly available source accessible to the Project</p>



VALIDATION REPORT

					Participant at the time of the investment decision.
Return on Equity (RoE)	14%	14%	14%	14%	<p>As per Detailed Project Report (DPR) Appendix VI-1</p> <p>The return on equity is specified in the CERC 2004 tariff regulations (Ref /26/) It is stated that power generation projects need to expect an earning of at least 14% on the equity invested is also accepted by the CERC; as evident from their tariff order of 2004, hence acceptable</p>



The above investment analysis described in the revised PDD and presented in more detail in the spreadsheets provided to the validation team meets the requirements mandated by the EB 62 Annex 05 guidelines on investment analysis (Ref /5/) and also the applied methodology AM 0029 ver. 03 (Ref /3/), with regard to the following:

- The period of assessment is not limited to the crediting period of the project activity but has been spread out over the entire operational lifetime of 23 years of the project activity. This meets the requirement of paragraph 3 of the EB 62 Annex 05 guidance.
- The project levelised cost and cash flow analysis has considered the salvage value of assets at the end of the project lifetime as 10% of the initial asset value, which is assessed by the validation team's financial expert to be fair and reasonable in the context of the project activity. The salvage value is added back as a cash inflow in the terminal year of the project lifetime. This is in accordance with paragraph 4 of EB 62 Annex 05.
- Depreciation of the plant is added back while computing the project cash flows, since it is not a real expense to the project activity. This meets paragraph 5 requirement of the EB 62 Annex 05 guidance.
- The validation team confirms that project participant has applied all the statutory levies and taxes as per the then valid tax rules. Incentives like provisions of section 80IA [deferred tax benefit] as per Indian Income Tax Act have also been correctly applied. The financial expert in the validation team has validated the same and observed that they are correct.
- All the input values considered for the investment analysis are valid and applicable at the time of the investment decision that was made on 25/09/2007. The input values have also been applied consistently in the calculations. The requirement in paragraph 6 of EB 62 Annex 05 guidance is therefore met.
- The input values are based on either authentic data sources such as the Central Electricity Authority (CEA) database or the relevant tariff regulations /tariff orders ruled by tariff regulatory authorities such as GERC (Gujarat Electricity Regulatory Commission) or the Central Electricity Regulatory Commission (CERC) that had been prevailing at the time of the Project Participant's investment decision. These sources are available in the public domain and the Project Participant has provided internet weblinks referring the same.
- Project participant has provided to the validation team, the spreadsheet versions of the investment analysis and the benchmark; that are readable and in which the individual cells, formulae and algorithms employed are viewable and unprotected. Paragraph 8 of EB 62 Annex 05 guidance on investment analysis makes it necessary for project participant to supply the validation team with spreadsheets that are readable and unprotected.



- The financial indicators selected are the levelised cost of generation and the post tax project IRR. As the project activity is funded through a combination of equity and debt, the choice of project IRR as a financial indicator is appropriate for the benchmark analysis. Similarly, the use of levelised cost of generation for the alternatives, viz., i) Gas based power generation and ii) Other alternatives such as coal-subcritical, coal-supercritical, lignite and naphtha based power generation is appropriate as a comparison between the various alternatives is possible on the basis of unit cost of output delivered by each of the respective alternatives.
- The benchmark chosen for the investment analysis is the weighted average cost of capital (WACC) which is acceptable, as the financial indicator is also the project IRR. This is in line with paragraph 12 of the EB 62 Annex 05 guidance which states that WACC is an appropriate benchmark for a project IRR.
- As the project activity is an independent power project that can be developed by any entity (and not just the project participant), the benchmark chosen for the analysis is based on publicly available data, which could be validated by the validation team. This is in line with the paragraph 13 of the EB 62 Annex 05 guidance.
- The choice of a benchmark analysis to demonstrate the additionality of the project activity is also appropriate and in line with the requirement of the AM 0029 ver. 03 methodology to demonstrate additionality in Step 1.
- Project participant has carried out a sensitivity analysis as described in more detail below. Results of the sensitivity analysis establish that the investment analysis is robust enough over reasonable variations in the key input parameters
- The levelised cost was calculated for each of the baseline candidate alternatives viz.

- Alternative 1 : Power generation using natural gas as fuel and combined cycle technology without CDM revenues @ INR 4.7749 per kwh
- Alternative 2 : Power generation using coal as fuel (sub critical technology)@ INR 3.0960 per kWh
- Alternative 3 : Power generation using coal as fuel with super-critical technology (using Imported coal) @ INR 2.6921 per kWh
- Alternative 4 : Power generation using lignite as fuel @ INR 3.0010 per kWh
- Alternative 5 : Power generation using naphtha as fuel @ INR 7.4464 per kWh

The above comparison of levelised cost of generation for various alternatives shows that the project activity itself is not the least expensive



alternative for power generation and is therefore unlikely to happen. As the levelised cost is the lowest for imported coal with supercritical technology power generation, this alternative as the baseline scenario is justified, in line with paragraph 34 (a) of EB 65 Annex 21 Tool for the demonstration and assessment of additionality v6.0.0.

The methodology AM 0029 also requires project participants to demonstrate additionality of the project activity through an investment benchmark analysis (step 1). However, the webhosted PDD did not include a benchmark analysis. The validation team, therefore raised a Clarification Request (CL-4) to the project participant for clarifying why the benchmark analysis in line with the requirement of the methodology was not included. In response to the same, the project participant has provided the Benchmark analysis in the revised PDD. Hence, CL-4 was closed. The benchmark analysis is based on project IRR compared against the investment benchmark.

The project IRR was computed considering yearly cash flows over a 23 year investment time frame. The assumptions used for computing the Project IRR are same as presented in the table above and the validation justification for each of the parameters is also provided in the same table. The value of project IRR calculated is 11.63%.

Benchmark investment analysis:

The EB 62 Annex 05 guidance on investment analysis stipulates that the benchmark chosen for the demonstration of investment analysis should be suitable for the type of IRR calculated and used. In the case of the project activity, the financial indicator employed is the project IRR.

The project participant has chosen the weighted average cost of capital (WACC) as a benchmark for comparison with the project IRR. Paragraph 12 of the EB 62 Annex 05 guidance states that the WACC is an appropriate benchmark for project IRR and hence selection of the same as a benchmark meets the paragraph 12 requirement. Besides, the project activity funding is envisaged as a mixture of equity and debt (in the ratio 30:70) and therefore such a benchmark is also relevant for comparison with the financial indicator.

The financial indicator used to demonstrate the additionality is the project IRR (post-tax). In computing the same, loan interest is added back to arrive at the net cash flow. The benchmark used is a post-tax weighted average value.

The WACC is a composite benchmark based on a weighted average of the cost of equity and debt and reflects the cost of capital employed for investment in a project activity. Cost of debt and the cost of equity are the two values necessary to be determined for arriving at the WACC. The



WACC is a weighted average cost of funds for the project activity which is also based on the debt: equity ratio.

i) **Debt-Equity ratio** considered for the weighted average cost of capital is 70%:30%, as per Detailed Project Report (DPR) Appendix VI-1. Thus, the debt-equity ratio taken into consideration (70%:30%) is a typical financing structure observed for power sector projects in the country. Hence the same is accepted since it meets the requirements of paragraph 18 of the EB 62 Annex 05 guidance on investment analysis.

Cost of Equity CoE :

The project participant has computed the cost of equity with the help of the Capital Asset Pricing Model (CAPM), using publicly available financial data. The CAPM is a widely accepted model by investors to estimate the expected rate of return on equity (Cost of Equity). The computation of the CoE with the CAPM therefore is in accordance with sound financial practice and meets paragraph 15 requirement of the EB 62 Annex 5 guidelines on investment analysis. The project participant has used the following equation to calculate the cost of equity. The "Beta" in the equation represents the risk involved in the project type.

$\text{Cost on Equity CoE} = \text{Risk free rate of return} + (\text{Market risk premium} * \text{Beta})$
--

The formula used is as per the CAPM method for arriving at the cost of equity. This can be verified from the source of information provided on "http://en.wikipedia.org/wiki/Capital_asset_pricing_model".

The method used for the calculation of benchmark is in accordance with the Guidelines on the assessment of investment analysis (Annex 05, EB-62). The financial data used are standard in the market and hence the above approach for calculating benchmark was accepted by the validation team.

All the parameters used in calculation of the cost of equity (by CAPM) were checked by the validation team for their appropriateness. The Risk free rate has been sourced from the yield on Central Government Securities and is based on data available from the Reserve Bank of India (RBI) report published vide web link : <http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/80303.pdf> and therefore was available to the project participant as on the date of decision, i.e. 25/09/2007. The weighted average interest rate on Central Government securities has been considered as the risk free rate at the time of the investment decision and the same was 7.89 %. This rate is based on the yields of various bonds issued during the year 2006-07; which also include bonds of maturity periods of more than 10 years. This would



therefore include long term bonds also of periods corresponding to the investment time frame of the project activity, i.e. 23 years.

The validation team accessed the webpage link provided by the PP and confirmed that the weighted average rate of interest on Central Government Securities in 2006-07 was 7.89%. The said information is available and can be cross checked from the web link <http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/80303.pdf>. The date of publication of this report was also checked and it was confirmed that this information was available to the PP at the time of decision making. The validation team has also been able to confirm that the RBI website has been operational since 1996¹³.

Market risk premium is calculated as the difference between a) the market return (over a sufficiently long period) and b) the risk free rate. The market return is arrived at based on the Bombay Stock Exchange (BSE) Sensex data, which is a widely accepted market index for a diverse portfolio of stocks across various industry sectors.

Beta value:

The beta value for the project type, as stated in the PDD, is derived as a proxy value, based on the beta values of the listed stocks of a group of equivalent power generating companies in India that were listed on the Bombay Stock Exchange at the time of the project participant's investment decision. The companies that were considered for the computation of the beta value are as follows:

1. BF Utilities Ltd.
2. CESC Ltd.
3. Neyveli Lignite Ltd.
4. Tata Power Co. Ltd.
5. Gujarat Industries Power Company Limited
6. Reliance Infrastructure Ltd.
7. Torrent Power

All these companies considered as a sample group for deriving the beta value fall into the same industry type, viz., "Power Generation & Distribution". The project participant has computed the beta values for the stocks of these companies from market data available on the BSE web site www.bseindia.com/histdata/hindices.asp, which is an authentic and reliable source for market related data on listed Companies in India. The project participant has included the beta values taken from Bloomberg database and screenshots of the same are included in the WACC calculation spread sheet. The average beta value for the 7 companies in

¹³ http://www.rbi.org.in/scripts/chro_1991.aspx



the group is calculated as 1.061 and the same was used by the project participant to calculate the cost of equity.

Computation of the beta value :

Market index- BSE Sensex

The beta value reflects the sensitivity of a particular listed stock to market fluctuations. All the companies chosen in the sample group for computing the beta value are listed companies on the Bombay Stock Exchange and authentic data on their share prices is available by accessing the BSE web site <http://www.bseindia.com/histdata/hindices.asp>.

For determining the beta value of the listed stock, a market index is required. The PP has selected the BSE-Sensex index for this purpose. Validation team agrees with the choice of BSE-Sensex as the market index as the index values are available right from 1979 and hence, it is possible to compute the market return over a period that would correspond to the investment time span of the project activity.

The Beta value was computed for each of the 7 companies referred to above as the following ratio :

$$\text{Beta} = \text{COVAR}(\text{Stock Return}, \text{Market Return}) / \text{VAR}(\text{Stock Return})$$

COVAR (Stock return, market return) is the covariance of the individual stock of each of the 7 companies with respect to the market return.

VAR (Market return) is the variance of the market return values

A detailed computation of the Beta value was presented to the validation team by the PP in the form of an excel spreadsheet. The computation was validated by the financial expert in the team and found it to be correct.

The CoE according to the CAPM is then calculated as

$$\text{CoE} = \text{Risk free rate} + \text{beta} * (\text{Market return} - \text{Risk free rate})$$

The risk free rate as explained in the paragraph on “return on equity” above is 7.89%, being the rate of interest on long term Central Government securities. The market return is the return computed as the CAGR (Compounded Annual Growth Rate) on values of the BSE Sensex index from the year of the inception of the index (1979) up to the date of investment decision (31-March-2007) and is worked out as 19.37%. This is also explained in the excel spreadsheet submitted by the PP to the validation team.

The beta value was computed to be 1.061 in the same excel spreadsheet. Hence, the cost of equity CoE is calculated as

$$7.89 \% + 1.1061 * (19.37\% - 7.89\%) = 20.07\%.$$

Cost of debt C_d :

The PP has considered the actual interest rate of loan from REC. Actual interest rate applied as per investment guideline EB 62, Annex 5, Para 11. The interest rate was referred from REC document no. REC/FIN/LOAN/GSEGL2008-09 dated 08-12-2009 as disbursement date, which is 11%, as per the letter from Rural Electrification Corporation, hence considered as Cost of Debt.

Computation of WACC:

The WACC is a weighted average cost computed in the following manner :

$$WACC = CoE * w_e + C_d * (1 - T) * w_d$$

Where,

CoE : Return on equity computed with the CAPM as explained above
= (20.07)

C_d : Cost of debt (11%) actual paid by the PP validated from the loan document vide REC letter no. REC/LOAN/GSECL/2008-09 dated 18/12/2008.

w_e : percentage of equity funding (30%)

w_d : percentage of debt funding (70%)

T : percentage of tax assumed on the debt (11.33%)

Tax assumed (T) :

The PP has assumed Minimum Alternate Tax (MAT) as the percentage of tax to be applied in working out the WACC value. Due to prevailing tax rate structure, the power sector companies in India are eligible to claim tax exemptions for a period of up to 10 years, as per section 80 IA of the Income Tax Act. Tax depreciation also impacts the overall tax computations and the assessed Company finally pays tax at a reduced rate of Minimum Alternate Tax (MAT). The same rate is therefore considered as the tax rate 'T' in the determination of the WACC. As per the IRR model submitted by the PP, which has also been validated by the financial expert, the PP is applying taxes as per the MAT rate for the first 15 years of operations; income tax @33.66% is being paid only for the last 8 years. Hence, considering the MAT rate in WACC @ 11.33% is more appropriate.

The validation team verified the correctness and authenticity of the data used for the calculation of cost of equity. The data used for the benchmark computation is based on parameters such as market return, risk free rate of return, beta values of stocks which are standard market parameters. The data is obtained from public sources that can be



accessed and hence, could be validated by the DOE. The benchmark thus computed is a reasonable expectation of return by an investor and also meets the requirements of paragraph 15 of the EB 62 Annex 05 "Guidelines on the Assessment of Investment Analysis" and hence the validation team has accepted the same.

The benchmark WACC thus determined is 12.85% and the project IRR was compared against the same. The validation team notes that the project IRR of 11.63% is much lower than the benchmark.

The project IRR is below the benchmark. Paragraph 34 of Step 2(c) of the Tool for the demonstration and assessment of additionality (EB 65 annex 21) states that the project activity can not be regarded as "financially attractive", if the financial indicator is lower than the benchmark. The validation team therefore agrees that the project activity is additional because the project IRR is less than the benchmark.

With the demonstration of project IRR being less than the benchmark, the Step 1 of the applied methodology AM0029 ver. 03, combined with the Tool for the demonstration and assessment of additionality EB 65 Annex 21, regarding the assessment of additionality is fulfilled.

The validation team has confirmed that all data used to arrive at the benchmark was derived from sources available to the project participant at the time of the investment decision and hence the validation team accepted the same.

The data is obtained from sources that can be accessed and hence, could be validated by the validation team. The benchmark thus computed is a reasonable expectation of return by an investor and also meets the requirements of the EB 62 Annex 05 "Guidelines on the Assessment of Investment Analysis" and hence the validation team has accepted the same.

Sensitivity analysis:

The project participant has carried out a sensitivity analysis in order to determine whether small changes in the values of the input parameters would likely affect the overall result of the analysis. Paragraph 20 of the EB 62 Annex 05 guidance on investment analysis requires sensitivity analysis to be carried out for all variables that contribute to 20% of either total project costs or total project revenues. Accordingly, the sensitivity analysis carried out by the project participant has subjected the following variables to variation in the levelised cost analysis for both project case and other alternatives available.

- i) Fuel cost
- ii) Fuel cost escalation



- iii) Station heat rate of the power plan
- iv) Plant Load Factor (PLF)
- v) Project cost

The project IRR value in the analysis is computed on the basis of costs and revenue projections. In considering the revenue, the cost of generation computed for every year is taken as the basis. Hence, any variation in the input parameters of cost lead to a corresponding increases in the revenue in the same proportion. Since these results in the same IRR value for any variation in the cost input parameters, a sensitivity analysis especially for the IRR is not necessary.

The validation team accepts these parameters of choice for the sensitivity analysis with the following justifications:

i) Fuel Cost:

The actual cost of fuel supplied to the project activity plant is considered as explained below: The cost is worked out as : INR 7.57/SCM = INR 7570/1000 SCM

Here,

→ Landed cost of Gas is considered as 5.26 USD/mmbtu which is sourced from DPR Appendix VI 1, sr. no. 9, inclusive of 12% ST

→ The exchange rate is considered as 1 USD = 43.06 INR which is sourced from last one year average exchange rate - <http://www.x-rates.com/d/INR/USD/hist2008.html>

→ This gives landed cost of gas = INR 226.65 /mmbtu

After converting this to SCM the same is calculated as INR 7.57/SCM = INR 7570/1000 SCM. Against this, the supply cost of natural gas has been crosschecked from a letter from Ministry of Petroleum and Natural Gas. <http://petroleum.nic.in/PriceAPMGas1.pdf>, which provides the fuel cost as \$4.2 /MMBTU. Again marketing cost for this is sourced from the news article http://articles.economictimes.indiatimes.com/2012-01-13/news/30623966_1_marketing-margins-apm-gas-tapti as \$0.13 /MMBTU. Further, the gas transportation cost from the news article <http://www.livemint.com/Home-Page/kdTE6sHMabqUjrHDdmFLgN/RGTIL-may-soon-raise-Rs1000-cr.html>, which state a transportation cost of natural gas from \$0.5mmbtu to \$1.0 mmbtu. Conservatively assuming the transport cost to be \$0.5/MMBTU, and 10% service tax – transportation cost per MMBTU works out to be \$0.55/MMBTU. Landed cost of gas (Gas cost + transportation cost) = 4.87+0.55 = \$5.42/MMBTU which is higher than the assumed cost, hence conservative and acceptable. Hence the landed cost of gas considered by PP, from the DPR, is justifiable.



- ➔ The validation team accepted the range of variation of +/-10% for this parameter. The levelised cost working is therefore very conservative as the actual cost of gas is much higher than assumed.

The fuel cost for other alternatives (i.e. cost of coal, lignite & naphtha) was also subjected to a +10%/-10% range of variation in the sensitivity analysis. The prices of coal and lignite fuels are administered and controlled by the Government of India's Ministry of Coal. A rise in prices of these fuels beyond this range is not a likely scenario and hence the range of variation (+/-10%) is accepted as appropriate by the validation team. The range of variation is also in line with paragraph 21 of the EB 62 Annex 05 guidance on investment analysis.

ii) Escalation in fuel cost:

In the levelised cost model, fuel costs are subjected to annual escalation of 10% for the project activity, sourced from the GERC tariff order 861/2006; Page no 52 of 109, Link: http://www.gercin.org/index.php?option=com_tarifforder&Itemid=32&year=2006&lang=en

The rate of escalation assumed in the analysis is justified in the table of assumptions above. However, this rate is also subjected to sensitivity analysis, as it would not be possible to know at the time of the investment decision to what extent fuel prices would rise every year. The range of sensitivity considered is +/- 10% which is as per the requirement in EB 62 Annex 5 guidelines paragraph 21.

iii) Station heat rate (SHR) of the power plant:

For alternative-1 (gas based power generation), the station heat rate parameter used in the financial analysis was subjected to a variation of +/-10%. An SHR of 1850 kcal/kWh was sourced from Detailed Project report (DPR) - appendix VI - 1, sr. no. 21, this is also cross verified from the CERC order No. L-7/25(5)/2003-CERC, dated 26/03/2004, (page number 12). Hence it is assumed that estimation of station heat rate as 1850 kcal/kWh is appropriate. However, even if the range of variation of this parameter in the sensitivity analysis is up to +/-10%, the levelised cost for gas based power generation is still higher than for the baseline alternative. It is to note here that, since the plant is not commissioned yet the actual heat rate is not available to the PP, hence could not provide it to the validation team.

iv) Plant Load Factor:

This input parameter used in the financial analysis was subjected to a variation of +/-10% in the case of alternative -1 (gas based power generation). The project activity plant is expected to be commissioned in January 2013. Hence, actual operational data from the plant after its commissioning is not available to the validation team. The PLF of

existing phase I project for the FY 2011-12 is about 66% (900.3 GWh/(156.2*8760/1000) GWh). This has been verified from the monthly operation data submitted to CEA by GSEGL vide its letter no. GSEG-Hazira/CEA/1170/20 dated 11/04/2012. (Ref /29/). Hence it is assumed that estimation of PLF as 80% is appropriate and is supported by DPR as well as CERC order No. L-7/25(5)/2003-CERC, dated 26/03/2004. Moreover, a PLF much lower than the assumption made will only result in a higher levelised cost for the power generation from the project activity, as compared to other baseline options considered. Hence sensitivity in the range of +/-10% is justified.

v) Total project cost:

The total project cost assumed in the financial analysis for levelised cost is based on the information available at the time of the decision. As the project implementation, when taken up, would occur over a period of time, the actual project cost incurred could be different from the assumption made. Hence, it is appropriate to subject this parameter to sensitivity analysis. In the case of the project activity, the validation team noted that actual cost incurred for implementing the project activity was INR 1065.6 Crore. The actual project cost would be much higher than assumed in the financial analysis (INR million) and hence, the validation team accepted a range of +/-10% for the sensitivity to be appropriate.

For all other alternatives the sensitivity was carried out over a range of +/-10% and is accepted by the validation team since it is as per the requirements in paragraph 21 of EB 62 Annex 05 which specifies the general range of variation that should be applied to parameters being subjected to the sensitivity analysis.

The sensitivity analysis for all alternatives is presented in a tabular format as below:

Fuel Price Variation					
Fuel	Base case	+10%	+5%	-5%	-10%
Natural Gas (w/o CDM)	4.7749	5.1718	4.9733	4.5764	4.3779
Coal	3.0960	3.2905	3.1933	2.9987	2.9014
Coal Super-critical	2.6921	2.8282	2.7602	2.6240	2.5559
Lignite	3.0010	3.1744	3.0877	2.9143	2.8275
Naphtha	7.4464	8.1158	7.7811	7.1118	6.7771
Fuel Price Escalation Variation					
Fuel	Base case	+10%	+5%	-5%	-10%
Natural Gas (w/o	4.7749	5.1813	4.9717	4.5899	4.4161



VALIDATION REPORT

CDM)					
Coal	3.0960	3.1888	3.1416	3.0518	3.0091
Coal Super-critical	2.6921	2.7573	2.7241	2.6611	2.6311
Lignite	3.0010	3.1437	3.0704	2.9352	2.8727
Naphtha	7.4464	8.0361	7.7334	7.1745	6.9167
SHR (Station Heat Rate) Variation					
Fuel	Base case	+10%	+5%	-5%	-10%
Natural Gas (w/o CDM)	4.7749	5.1718	4.9733	4.5764	4.3779
Coal	3.0960	3.2777	3.1869	3.0051	2.9142
Coal Super-critical	2.6921	2.8198	2.7559	2.6282	2.5644
Lignite	3.0010	3.1763	3.0887	2.9133	2.8256
Naphtha	7.4464	8.1158	7.7811	7.1118	6.7771
PLF (Plant Load Factor) variation					
Fuel	Base case	+10%	+5%	-5%	-10%
Natural Gas (w/o CDM)	4.7749	4.7017	4.7365	4.8173	4.8644
Coal	3.0960	2.9957	3.0435	3.1540	3.2185
Coal Super-critical	2.6921	2.5754	2.6310	2.7596	2.8347
Lignite	3.0010	2.8922	2.9440	3.0640	3.1339
Naphtha	7.4464	7.3780	7.4106	7.4861	7.5301
Project Cost Variation					
Fuel	Base case	+10%	+5%	-5%	-10%
Natural Gas (w/o CDM)	4.7749	4.8373	4.8061	4.7436	4.7124
Coal	3.0960	3.2467	3.1902	3.0345	2.9915
Coal Super-critical	2.6921	2.7994	2.7457	2.6385	2.5848
Lignite	3.0010	3.0933	3.0471	2.9549	2.9087
Naphtha	7.4464	7.5062	7.4874	7.4239	7.4015

The results of the sensitivity analysis performed on various parameters as described above indicate that for the range of variations of these parameters,



- The levelised cost of generation of at least one of the power generation alternatives listed continues to be lower than that of gas based power generation even with the range of variations applied in the sensitivity analysis. Therefore there is at least one means of power generation (coal-supercritical) that continues to remain a cheaper alternative than the project activity.

From the sensitivity analysis, the validation team therefore concluded that the financial analysis can be regarded as being robust to a reasonable range of variation in the values of the input parameters. Hence, the results indicated by the financial analysis, viz.,

- The baseline alternative to the project activity is a coal-supercritical based power plant of capacity 660 MW as stated in the PDD is established from the analysis

The validation team, based on the assessment result by the financial expert engaged, hereby confirms that the underlying assumptions are appropriate and the financial calculations are correct.

3.7.4 Barrier analysis (118)

The project participant has not claimed that there are any barriers to the implementation of the project activity. Hence, this requirement of the VVM is not applicable to the validation assessment of the project activity.

3.7.5 Common practice analysis (121)

In accordance with Step 2 of the assessment of additionality under the AM 0029 methodology, the project participant is required to demonstrate that the project activity is not common practice in the relevant country or sector, by applying the step 4 of the Tool for the demonstration and assessment of additionality. The same has been presented in section B.5 of the PDD and is described and validated as below.

The project activity is a grid connected power generation plant that uses gas as the fuel for power generation and the baseline established is a coal- (supercritical) fired grid connected power generation plant. Hence, the project activity essentially is a technology switch from a baseline alternative that uses a more emission intensive fossil fuel (coal) to a less emission intensive fossil fuel, viz., gas and the project activity can be classified as a measure referred to in paragraph 6 (b), i.e. "Switch of technology with or without change of energy source".

Project Participant has therefore applied the requirements of paragraph 47 of the EB 65 guidance to illustrate that the project activity is not common practice.



Geographical scope of the common practice analysis:

For the purpose of the demonstration of the common practice analysis, the project participant has, by default, chosen the entire host country India as the applicable geographical area. This meets the requirement specified under paragraph 5 of EB 65 Annex 21 Tool for the demonstration and assessment of additionality.

The EB 65 guidance has provided a step-wise approach in paragraph 47 to demonstrate the common practice analysis. Compliance to the same is shown in the PDD.

Step 1 of the guidance requires the identification of the applicable output range as +50%/-50% of the design output or capacity of the project activity. The project activity is a power plant of capacity 351.43 MW. Hence, the Project Participant has identified the output range as 175.71 MW (project capacity-50%) to 527.15 MW (project capacity + 50%), which is -50%/+50% of the project capacity.

Step 2 requires that all plants in the geographical area are identified; which deliver the same output or capacity and are within the applicable output range. These plants should also have started commercial operations prior to the start date of the project activity. The project activity is a gas based (i.e. thermal) plant that would be supplying power to the grid. Hence, all plants within the geographical area (i.e. India) are identified; that supply the power to the grid, i.e. all grid connected thermal power plants in India are selected for comparison.

However, the project activity is a gas based power plant in which natural gas is the primary fuel used. Hence, all thermal power plants using fuels other than gas, such as coal, lignite, naptha, diesel/oil based plants can be regarded as based on "different technologies" by virtue of using a different kind of fuel. This is as per the paragraph 8 of the EB 65 guidance which specifies that technologies could be treated as "different" if they operate on a different kind of fuel. The project participant has excluded all such plants.

Step 2 therefore results in the identification of a total number of 279 plants. All these plants are of capacity in the range of 175.71 MW to 527.15 MW MW, which is $\pm 50\%$ of the project capacity. The only power plant which is registered in CDM mechanism is Vemagiri CCCP. (UNFCCC ref. No. 4334) is already excluded from this 279 numbers.

Step 3 provides identifies those plant that apply technologies different than the technology applied in the proposed project activity. This number= N_{diff} .



Here, 216 projects use coal as primary fuel, 10 projects use lignite as primary fuel, 9 projects use Naptha as primary fuel, 1 project use oil as primary fuel, 12 are Nuclear power plants, and 26 are Hydro Power Plants. Further, among the 5 units which use gas as a primary fuel, four units namely Essar GT IMP Unit 1, Paguthan Unit 4, Peeddapuram CCGT Unit 1 and P.Nallur CCGT Unit 1 have capacity to fire multiple fuels (at least one fuel other than natural gas). Multi-fuel fired CCGTs are not only technologically different (burner design, storage tanks, pipelines, etc.) but also have greater flexibility to choose within a range of fuels, depending on economics and availability and are thus better able to diversify fuel risks and dispatch risks, as compared to single fuel (natural gas) fired plants. Hence these 278 projects are considered as applying technologies different from the candidate project activity.

Hence, Step 3 gives $N_{diff} = 278$

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

$$\begin{aligned}\text{Factor } F &= 1 - (278/279) \\ &= 0.0036\end{aligned}$$

This shows that the proposed project activity is a .common practice. within a sector in the applicable geographical area if the factor F is greater than 0.2 and $N_{all}-N_{diff}$ is greater than 3.

$$\begin{aligned}N_{all} - N_{diff} &= 279-278 = 1 \\ \text{Factor } F &= 0.0036\end{aligned}$$

The factor F is not greater than 0.2; also the difference between N_{all} and N_{diff} is not greater than 3.

Hence, from the above assessment of the data provided in the revised PDD it is confirmed by the validation team that the project activity is not a common practice within the given geographical area..

CL 12 was raised as in the common practice analysis was not correctly described in the PDD. The same was corrected by the PP with the authentic sources, hence, CL is closed.

3.8 Monitoring plan (124)

BVCH hereby confirms that the monitoring plan complies with the requirements of the methodology.



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

The Project uses the approved monitoring methodology AM 0029 (Grid Connected Electricity Generation Plants using Non-Renewable and Less GHG Intensive Fuel), version 03 (Ref /3/). The monitoring methodology is applicable under the same conditions as the baseline methodology. The applicability of the baseline methodology is explained in section 3.6.1 of this report. The applicability of the monitoring methodology is also, therefore, demonstrated under the same conditions.

From the observations made by the team during its visit to the site on 04/01/2012 and 05/01/2012, the monitoring plan described in the webhosted PDD was found to be inadequate in several respects. The validation team found that since the project activity is not implemented yet and the installation is still going on, all the details as identified in the web hosted PDD could not be checked. However, validation team ensured that description of monitoring plan is as per the requirement of AM 0029.

CAR 12 was raised as parameters description, frequency of measurement for fuel consumed, its sources were not correctly identified, procedure for identifying quantity of NG used and RLNG used was not described. The Project Participant revised the monitoring plan in sections B.7.1 & B.7.2 of the PDD. On the basis of the corrections made, the CAR was closed by the team.

Project emissions

Project emissions are required to be monitored as per the monitoring methodology which specifies the following as relevant parameters to be monitored:

1) Amount of fossil fuel of various type to be used in the project activity:

The monitoring plan in section B.7.1 of the PDD has therefore listed the following parameters:-

1. $FC_{f,y}$ – the quantity of fuel (i.e. natural gas/R-LNG) that will be consumed in the project activity in year y

2) Net calorific value of the fossil fuels of various type to be used in the project activity:

The fuels used in the project activity would be natural gas/R-LNG. Hence, the monitoring plan in the section B.7.1 of the PDD includes the following parameters:-

- $NCV_{f,y}$ – Weighted average net calorific value of natural gas/R-LNG that will be consumed by the project activity in year y



3) Emission factors of fossil fuel of various type used in the project activity:

The emission factor of the types of fuels is included as monitoring parameters in the section B.7.1 of the PDD:-

- $COEF_{f,y}$ – the CO_2 emission coefficient in tCO_2 per m^3 for natural gas/R-LNG in year y

[these will be calculated from values of NCV, OXID & $EF_{CO_2,y}$ for the respective fuel type, applicable during the crediting period]

4) Project emission PE_y

This is a calculated value using the above monitored parameters and is included as a monitoring parameter in section B.7.1 of the PDD.

Baseline emissions

As per the AM 0029 methodology, the baseline emissions are required to be monitored as per the Tool to calculate emission factor for an electricity system. The monitoring parameters specified by the tool and relevant to the baseline emissions are as follows:

- 1) Electricity generated in the project activity $EG_{PJ,y}$ is included as a monitoring parameter in section B.7.1 of the PDD. It is the measured value of net electricity generation by the project plant during year y . The net electricity export to the grid is obtained after deducting the imports of the electricity by the project activity.,
- 2) The CO_2 baseline emission factor ($EF_{BL,CO_2,y}$) is determined as corresponding to Option I described in the methodology and corresponds to the build margin. As the methodology requires the ex-post determination of this factor, the same is also included as a monitoring parameter ($EF_{Grid, BM, Y}$) in the monitoring plan of the PDD in section B.7.1.

Although the methodology requires only the electricity generated by the plant to be monitored, i.e. the gross generation, the monitoring plan in the PDD has also included deduction of electricity imports and only the net value will be considered for the calculations. This will lead to a conservative calculation of the emission reductions as imports also would get accounted for.

Leakage emissions

The project participant has included the baseline upstream fugitive methane emissions factor $EF_{BL, upstream, CH_4}$ as an ex-post monitored value in the monitoring plan of the PDD in section B.7.1. The methodology requires that the emission factor for upstream fugitive CH_4 emissions occurring in the absence of the project activity ($EF_{BL, upstream, CH_4}$)

VALIDATION REPORT

should be calculated consistent with the baseline emission factor (EF_{BL,CO_2}) used in equation (4) of the methodology. As ex-post estimation of the EF_{BL,CO_2} value is stipulated under the methodology, a simultaneous ex-post estimation of the $EF_{BL,upstream,CH_4}$ value is regarded as appropriate by the validation team.

The steps taken to assess whether the monitoring arrangements described in the PDD are feasible within the project design are as follows:

The validation team carried out a visit to the site of the project activity initially from 04/01/2012 to 05/01/2012. During the site visit, the validation team observed the actual monitoring arrangements being practised at the site.

The validation team made the following observations at the site:

- The parameter $EG_{PJ,y}$ would be monitored by the meters installed at the switchyard of the project activity, located in the project premises. The meter installed would be an ABT (Availability Based Tariff) meter and of accuracy class 0.2 s. For one main meter, there is also a check meter installed; primary purpose of which is for confirmation of the main meter readings and also to act as a standby for the main meter. The main and check meters are installed and owned by State Government authorities such as the State Load Despatch Centre (SLDC) and these agencies have complete control over the same. Both main and check meters would be bi-directional (i.e. capable of measuring electricity exports by the plant to the grid as well as imports from the grid) $EG_{PJ,y}$ is a calculated parameter, being the difference between the electricity exports and imports by the plant to and from the grid. They would have storage capacity of 35 days data for the data of monitored electricity $EG_{PJ,y}$. GETCO/SLDC will provide the data of net electricity exported to the grid in its weekly statements.
- The quantity of gas consumed in the project activity $FC_{f,y}$ is monitored on-line by a gas flow main meter installed by the gas supplier GSPL at the project site within the gas conditioning /metering skid in the Supplier's premises. This monitoring would take place at the GSPL control room and the monitoring equipment as well as the monitoring itself are under GSPL's control. The gas flow would be monitored on a daily basis.
- For cross checking purpose of fuel consumed, a meter would be installed by the PP. The temperature transmitter accuracy is proposed as In the range of 0.15 to 0.50 °C. The pressure transmitter accuracy would be In the range of +/- 0.040 to 0.075 % of span.



- The NCV of gas supplied to the plant is monitored on –line by means of an on-line gas chromatograph. This is installed by GSPL in the gas conditioning skid. The monitoring equipment as well as the monitoring itself would be under the control of GSPL. The monitoring would be atleast fortnightly as per methodology requirement.
- The responsibilities for calibration of monitoring equipment at the plant are designated as under :
 - a) Electricity main meters at the switchyard that monitor electricity exports & imports to & from the grid : GETCO
 - b) Plant electricity meters : The Project participant who is responsible for the calibration which is carried out by third party testing agencies either at the plant premises or externally
 - c) Gas flow meter(main meter) and on-line gas chromatograph : The responsibility for carrying out the calibration rests with GSPL. The Project Participant has no role in the same. However, the Project Participant shall ensure that the calibration is carried out at a frequency as stated in the monitoring plan of the PDD and relevant records maintained.
 - d) Gas flow meters (check meters): installed within the plant: GSEGL.
- Based on the above information and physical site visit conducted The validation team confirms that the QA/QC procedures as described in the PDD were in place at the site.

On the basis of the above observations made at the site, the validation team confirms that the monitoring arrangements described in the monitoring plan of the PDD are feasible within the project design.

The validation team also interacted with the project participant's representatives at the site. The project activity would be managed by a competent team and the responsibilities for implementation of the project activity such as data verification, recording, storage and archiving would be allocated at different levels in the team. The validation team confirms from its site observations and its interviews with the site personnel that the project participant possesses the necessary ability to implement the monitoring plan as described in the PDD.

BVCH hereby confirms that the project participants are able to implement the monitoring plan.



3.9 Sustainable development (127)

The host Party's DNA confirmed the contribution of the project to the sustainable development of the host Party. An assessment of the same is provided in section 3.1 of this report. The project participant described contribution to sustainable development as per four indicators of sustainable development stipulated by Ministry of Environment & Forests in India. Project participant has obtained approval (Ref /5/) from the DNA of India and it is confirmed by the DNA that the project activity contributes to sustainable development in India. The project activity is in compliance with all current applicable legislations. The project activity will displace fossil fuel based electricity generation. Hence, there are only benefits derived out of the project and no adverse effects are envisaged. Moreover, the location of the project activity largely contributes to the social well being of the region. During the site visit it was noticed that the project provided substantial employment to local residents of nearby villages.

The host Party's DNA has also confirmed the contribution of the project to the sustainable development of the host country through the Host Country Approval Letter issued by it.

3.10 Local stakeholder consultation (130)

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

During the site visit carried out by members of the validation team on 04/01/2012 to 05/01/2012, a meeting was held with the local stakeholders to verify the process of consultation described by the project participant in the section E.1, E.2 & E.3 of the PDD. The team verified through personal interviews carried out with the local stakeholders that

- The stakeholder consultation had indeed been carried out by the project participant on 28/12/2007, at which representatives from Ministry of Forest & Environment, Government of Gujarat, Gujarat Pollution Control Board, Gujarat Industrial Development Corporation (GIDC), Consultants/ Advisors, NGOs, participants from local communities, state government and governmental agencies, employees and contractor were invited. The local stakeholders for the meeting that was planned on 28/12/2007 had been notified in advance to the local villagers on 12/12/2007. The notification was by means of personal invitation letters and notices placed at various important points, notice boards etc. The validation team verified the original of the invitation memo that was sent and also the acknowledged memos from some of the local stakeholders.
- The stakeholders informed the validation team that they had received sufficient notice in advance of the said meeting (15 days in advance)



- The local villagers who were interviewed by the validation team informed them that the consultation process was held in an open manner and they were given sufficient and relevant information about the project activity.
- The local stakeholders interviewed also informed that queries raised by them at the consultation meeting were responded by the project participant in a satisfactory manner.
- The validation team verified the following documents :
 - a) the list of participants at the meeting held together with their respective signatures
 - b) A copy of the meeting summary and the original were also verified by the validation team and found to be in order

The validation team, on the basis of the above confirms that the process of local stakeholder consultation is observed to be adequate.

3.11 Environmental impacts (133)

The Ministry of Environment & Forest (MoEF) in India requires that an Environmental Impact Assessment (EIA) be carried out by the project participant prior to establishing the project activity at the designated site. In accordance with the same, a Rapid Environment Impact Assessment was carried out by the project participant. A copy of the report was shared with the validation team. The team has noted that the EIA assessment report was prepared by the agency M/s National Environment Engineering Research Institute (NEERI – a Government of India agency), dated (Ref /28/); the environmental impacts on the soil, air quality and the ecology of the surrounding area have been adequately discussed.

CAR 14 was raised as it was mentioned in the web hosted PDD in Section D.2 that EIA study revealed that there are no significant environmental impacts. However, Documents related to this were not shown/submitted to the validation team. In response, the PP submitted the document for the same i.e. EIA study carried out by National Environmental Engineer Research Institute, (NEERI) report of April 2006, which stated there is no significant environmental impacts due to the project activity. Having reviewed this, the validation team closed the CAR.

The project activity has obtained all the statutory permissions required to establish and operate the project activity such as

- i) The Environmental Clearance from the MoEF, dated 12/04/2007 (Ref /1/)
- ii) The Consent to establish from Gujarat Pollution control board, dated 11/06/2007 (Ref /2/)



The validation team has been provided copies of the above statutory approvals and permissions. The copies were vetted against their originals and found to be a replica of the same.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD using methodology AM 0029 was webhosted on the UNFCCC for global stakeholders' comments as per CDM requirements. The project was webhosted from 16/10/2011 to 14/11/2011¹⁴.

The comments received during the webhosting of the project activity have been included in the final validation report. The project participant provided responses to these comments. Validation team took due account of these comments and the respective responses while making the validation opinion. The details of the comments received, responses by the project participant/s and the explanation of how due account of these comments is taken by the validation team are attached as Appendix B with this validation report.

5 VALIDATION OPINION

Bureau Veritas Certification has performed a validation of the project activity **"351.43 MW Natural Gas Based Combined Cycle Power Plant at Hazira, Gujarat"** in India. The validation was performed on the basis of UNFCCC criteria and host country criteria and also on the criteria given to provide for consistent project operations, monitoring and reporting.

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

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

By synthetic description of the project, the project is likely to result in reductions of GHG emissions partially. An analysis of the investment in the project activity demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented and maintained as designed, the project is likely to achieve the estimated amount of emission reductions = **8,85,944 tCO₂e per annum**.

¹⁴ <http://cdm.unfccc.int/Projects/Validation/index.html>



The review of the project design documentation (version 03) and the subsequent follow-up interviews have provided Bureau Veritas Certification with sufficient evidence to determine the fulfillment of stated criteria. In our opinion, the project correctly applies and meets the relevant UNFCCC requirements for the CDM and the relevant host country criteria. Bureau Veritas Certification thus requests registration of **“351.43 MW Natural Gas Based Combined Cycle Power Plant at Hazira, Gujarat”** as a CDM project activity.

6 REFERENCES

Category 1 Documents:

Documents provided by Gujarat State energy Generation Limited (GSEGL) that relate directly to the GHG components of the project.

/1/	Environmental clearance from Ministry of Environment & Forests (MoEF), dated 12/04/2007
/2/	Consent to establish from Gujarat Pollution Control Board (GPCB), dated 11/06/2007
/3/	Web hosted PDD version 1 dated 21/09/2011
/4/	Final PDD version 3 dated 27/12/2012
/5/	Revised Host Country Approval File No. 4/20/2011-CCC dated 25/10/2012
/6/	Application made by the Project Participant to the DNA for Host Country Approval (HCA)
/7/	Invitation from DNA for HCA meeting
/8/	The technology supplier's (BHEL) offer of June 2007, vide EPC specification no. TCE.4915A-H-500-001
/9/	Contract/PO executed between PP and the technology supplier BHEL for the said project activity dated 29/12/2007
/10/	Board resolution to avail CDM benefits in order to make 350 MW CCPP financially viable, dated 25/09/2007 – certified extract thereof
/11/	Sanction of rupee term loan by Rural Electrification Corporation (REC), dated 5/11/2007 vide no. REC/VAD/8/14/2007-08/687
/12/	The Gas supply agreement between the PP and the Gas supplier viz. Gujarat State Petroleum Corporation Limited dated 25/03/2008
/13/	Power Purchase agreement (PPA) between PP and GUVNL dated 18/06/2008
/14/	<ul style="list-style-type: none"> a) Financial spread sheet showing levelized cost for each of the alternative considered as plausible b) Financial spread sheet showing IRR calculation c) Financial spread sheet showing benchmark calculations
/15/	Estimation of emission reduction Spreadsheet

VALIDATION REPORT

/16/	Invitation for participation in CDM stakeholder consultation meeting: 12/12/2007
/17/	Stakeholders consultation for CDM project: 28/12/2007
/18/	Notice to proceed for EPC of the project: 23/01/2008
/19/	a) Contract with CDM consultant - I: 08/05/2008 b) Contract with CDM consultant - I terminated: 09/08/2010
/20/	Contract of GSEGL with second CDM consultant: 18/08/2010
/21/	Appointment of DOE: June 2011
/22/	The DPR carried out by M/s Tata Consulting Engineers Limited (TCE) of May 2007 (Ref /22/)
/23/	GERC tariff order 861/2006 dated 26/03/2001
/24/	GERC terms & conditions of tariff notification 12 of 2005
/25/	CERC terms and conditions of tariff dated 01/04/2004
/26/	CERC tariff regulations 26/03/2004
/27/	Invitation offer from DOE – 04/05/2009
/28/	EIA study carried out by National Environmental Engineer Research Institute, (NEERI) report of April 2006
/29/	M/s.GSEGL's letter to CEA vide reference no. . GSEG-Hazira/CEA/1170/20 dated 11/04/2012 for the PLF of existing phase I project (156.1 MW) for the FY 2011-12 which is about 66% (900.3 GWh/(156.1*8760/1000) GWh). This has been verified from the monthly operation data submitted.
/30/	CERC tariff terms & conditions 2009

Category 2 Documents:

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

/B1/	PDD completion guidance - Guidelines for completing the project design document (CDM-PDD) and the form for proposed new baseline and monitoring methodologies (CDM-NM), version 07, EB 41 Annex 12
/B2/	CDM PDD Form, (CDM –PDD), Version 3
/B3/	AM 0029 - Version 3 Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas
/B4	Tool for the demonstration and assessment of additionality, Version 6.0, EB 65 Annex 21
/B5/	Guideline on the Assessment of Investment Analysis, Version 5, EB 62, Annex 5
/B6/	Tool to calculate the emission factor for an electricity system - version 2.2.1
/B7/	CDM Glossary version 5, EB 47
/B8/	Guidelines on the demonstration and assessment of prior consideration of the CDM, version 4, EB 62 Annex 13



/B9/	CEA CO ₂ baseline database for Indian power sector
/B10/	IPCC Guidelines for National Greenhouse Gas Inventories- 2006
/B11/	VVM version 1.2 EB 55 Annex 1
/B12/	Tool to calculate the emission factor for an electricity system version 02.2.1 of EB 63 Annex 19
/B13/	Tool to determine the remaining lifetime of equipment, Annex 15 of EB 50 meeting report

Persons interviewed:

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

/1/	Shailesh Sivdasan, Manager (Finance)
/2/	Sourish Dasgupta, Manager, PwC
/3/	Selvakumar, Consultant, PwC
/4/	Rakesh K Mishra, Operation Manager - STEAG
/5/	M K Gupta Group GM- STEAG
/6/	D V Mahida, Plant Manager – STEAG
/7/	Yogesh Patel – S.O. GSEGL
/8/	Ravi Tamakuwala – S.O., GSEGL
/9/	O. V. Shah – Manager, GSEGL



7 CURRICULA VITAE OF THE DOE'S VALIDATION TEAM MEMBERS

Mr. Hitesh Karandikar: (Team Leader)

Bureau Veritas Certification (India) Pvt. Ltd.-Verifier - Climate Change

He is a B.E. (Bachelor of Engineer) in Electrical Engineering. (1991 batch). He is an MBA in Marketing and Finance. He has worked in Gujarat Electricity Board of Gujarat state in various departments. He has worked at world renowned Hydro Power project viz. "Sardar Sarovar Narmada Nigam Limited". He has an experience of Designing switch Yard Structures, foundation switchyard structures. He is a certified Energy Manger from Bureau of Energy Efficiency, and has vide experience of preliminary energy audit of more than 200 industries. He was also a team mate from Gujarat Electricity Board, in carrying out thermal power energy audit carried out by NPC, Hyderabad and ERDA, Vadodara. He has been faculty in many "Energy Conservation" seminars/conferences.

His other professional qualification includes : He is a ISO 9001, 14001 and OHSAS 18001 Lead Auditor (more than 200 man-day audit experience). He is also a certified Six Sigma Black Belt. He has successfully undergone training of CDM verifier organized by Bureau Veritas.

Mr. Bhavesh Prajapati (Team member)

Bureau Veritas Certification, GHG Verifier

Graduate in the field of Chemical Engineering and post graduate in finance (MBA-Finance). He has more than 8 years of Industrial work experience in the field of environment audits, consultancy of HVAC (pharmaceutical industry as well as commercial air conditioning) and utility services and project management of various Greenfield as well as brownfield projects. He has undergone lead verifier training on UNFCCC Clean Development Mechanism. He is involved in the Validation/verification of CDM and VCS projects.

Mr. Rakesh Tripathi (Team member)

Bureau Veritas Certification, Verifier- Climate Change

Mr. Rakesh Tripathi is graduate (B.Tech) in Electronics and communication and Post-graduate (MBA) in Power management with around 2.5 years of experience in the field of climate change services. He is working with Bureau Veritas Certification (India) Pvt. Ltd. as Verifier-Climate Change. Prior to joining Bureau Veritas, he worked on CDM/VCS projects as a consultant. He has received extensive training in CDM



validation and verification processes and participated in assessment of CDM projects.

Mr. Sanjay Patankar (Team Leader)

Bureau Veritas Certification Lead Verifier- Climate Change

Educational qualifications: B.E. (Mech.) M.E. (Mech.)

He has over 20 years of experience in engineering manufacturing industry covering various functions like enterprise management, product design, engineering, tool & die design, improvements in the production shop, quality assurance & control and systems planning and implementation, including ISO 9001 based quality management systems. Working for the last 4^{1/2} years in Bureau Veritas Certification (India) Private Ltd. as Lead Auditor for ISO 9001, 14001 and OHSAS 18001 standards/specifications. Has undergone training related to Clean Development Mechanism and is currently involved in validation and verification of CDM project activities.

Mr. H B Muralidhar, Internal Technical Reviewer

Bureau Veritas Certification, Climate Change Lead Verifier

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

VALIDATION REPORT

APPENDIX A: GUJARAT STATE ELECTRICITY CORPORATION LIMITED CDM PROJECT VALIDATION PROTOCOL

VALIDATION PROTOCOL

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

CHECKLIST QUESTION	Ref.	§	COMMENTS		Draft Concl	Final Concl
1. Approval			COUNTRY A (India)	COUNTRY B (insert the country name)		
a. Have all Parties involved approved the project activity?	VVM	44	<p>The host party has approved the project activity vide its letter no. 4/21/2011-CCC dtd. 20 October 2011.</p> <p>However, title of the project activity mentioned in the HCA is not consistent with the Webhosted PDD.</p>	Not Applicable	CL 1	--
b. Has the DNA of each Party indicated as being involved in the proposed CDM project activity in section A.3 of the PDD provided a written letter of approval? (If yes, provide the reference of the letter of approval, any supporting documentation, and specify if the letter was received from the	VVM	45	Refer 1.a above	Not applicable	(CL 1)	--


**BUREAU
VERITAS**

VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS		Draft Concl	Final Concl
project participatn or directly from the DNA)						
c. Does the letter of approval from DNA of each Party involved:	VVM	45	Yes, Refer 1.a above	Not applicable	(CL 1)	--
i. confirm that the Party is a Party of the Kyoto Protocol?	VVM	45.a	Yes, Refer 1.a above	Not applicable	(CL 1)	--
ii. confirm that participation is voluntary?	VVM	45.b	Yes, Refer 1.a above	Not applicable	(CL 1)	--
iii. confirm that, in the case of the host Party, the proposed CDM project activity contributes to the sustainable development of the country?	VVM	45.c	Yes, Refer 1.a above	Not applicable	(CL 1)	--
iv. Refers to the precise proposed CDM project activity title in the PDD being submitted for registration?	VVM	45.d	Yes, Refer 1.a above	Not applicable	(CL 1)	--
d. Is(are) the letter(s) of approval unconditional with respect to (i) to (iv) above?	VVM	46	Yes, Refer 1.a above	Not applicable	(CL 1)	--
e. Has(ve) the letter(s) of approval been issued by the respective Party's designated national authority (DNA)?	VVM	47	Yes, Refer 1.a above	Not applicable	(CL 1)	--
f. If there is doubt with respect to (e) above, was verified with the DNA that the letter of approval is valid for the proposed CDM project activity under validation?	VVM	47	Refer 1.a above	Not applicable	(CL 1)	--
g. Is there doubt with respect to the authenticity of the letter of approval?	VVM	48	Refer 1.a above	Not applicable	(CL 1)	--
h. If yes, was verified with the DNA that the letter of approval is authentic?	VVM	48	Refer 1.a above	Not applicable	(CL 1)	--
2. Participation			(GSEG)	PP2 (Not applicable)		



BUREAU
VERITAS

VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
a. Have all project participants been listed in a consistent manner in the project documentation?	VVM	51	Yes, the project participant is Gujarat State Energy Generation Limited which is listed in a consistent manner in the project documentation	Not applicable; there is only one PP OK	OK
b. Has the participation of the project participants in the project activity been approved by a Party to the Kyoto Protocol?	VVM	51	OK, refer 1.a above	(CL 1)	--
c. Are the project participants listed in tabular form in section A.3 of the PDD?	VVM	52	Yes, The project participants mentioned as Gujarat State Energy Generation Limited as project Participants in section A.3 of the PDD	OK	OK
d. Is the information in section A.3 consistent with the contact details provided in annex 1 of the PDD?	VVM	52	<ul style="list-style-type: none"> Yes, the information in section A.3 is consistent with the contact details provide in Annex 1 of the PDD 	<ul style="list-style-type: none"> - 	<ul style="list-style-type: none"> OK
e. Has the participation of each of the project participants been approved by at least one Party involved, either in a letter of approval or in a separate letter specifically to approve	VVM	52	Yes, Gujarat State Energy Generation Limited is the only	(CL 1)	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
participation? (Provide reference of the approval document for each of the project participants)			Project participant. The approval is given in written vide its letter no. 4/21/2011-CCC dtd. 20 October 2011. However, title of the project activity mentioned in the HCA is not consistent with the Webhosted PDD		
f. Are any entities other than those approved as project participants included in these sections of the PDD?	VVM	52	Not applicable, refer 2.e above	(CL 1)	--
g. Has the approval of participation issued from the relevant DNA?	VVM	53	Yes, refer 2.e above	(CL 1)	--
h. Is there doubt with respect to (g) above? L	VVM	53	refer 2.e above	(CL 1)	--
i. If yes, was verified with the DNA that the approval of participation is valid for the proposed project participant?	VVM	53	refer 2.e above	(CL 1)	--
3. Project design document					
a. Is the PDD used as a basis for validation prepared in accordance with the latest template and guidance from the CDM Executive Board available on the UNFCCC CDM website?	VVM	55	Yes, the PDD is prepared in accordance with the latest template, i.e. (CDM-PDD) Version 03 - in effect as of: 28 July 2006. The same is as per guidance from the CDM Executive Board available on the UNFCCC CDM website	OK	OK
b. Is the PDD in accordance with the applicable CDM requirements for completing the PDD?	VVM	56	Yes, refer 3.a above	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
c. In CDM-PDD section A.1 are the following provided?	EB 41	Ann 12			
i. Title of project	EB 41	Ann 12	Yes, the title of the project "351.43 MW Natural Gas based Combine cycle Power Plant at Hazira, Gujarat" is provided in Section A.1 of the PDD	OK	OK
ii. Current version number and date of document	EB 41	Ann 12	Yes, the version is 01 and date of document is 21/09/2011	OK	OK
d. In CDM-PDD section A.2 are following provided (max. one page)?	EB 41	Ann 12			
i. A brief description of the project activity covering purpose which includes the scenario existing prior to the start of project, present scenario and baseline scenario	EB 41	Ann 12	OK, brief description of the project activity is provided in section A.2 of the PDD and following information Included 1.Generation of electricity from combined cycle power project of capacity 351.43 MW will be sold to NEWNE grid 2.Scenario existing prior to the start of the project 3.Baseline scenario and 4.Project scenario	OK	OK
ii. Explanation on how the GHG emission reductions are effected	EB 41	Ann 12	OK, Section A.2 of PDD explains The project activity would reduce anthropogenic GHG emissions into the atmosphere due to the use of relatively lower GHG intensive fuel (Natural Gas) and much higher efficient power generation as against the lignite / coal based power generating station of	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
iii. The PP's vies on the contribution of project activity to sustainable development	EB 41	Ann 12	equivalent capacity. The webhosted PDD mentions that the contribution of project activity to sustainable development. PP also stated that the 2% of the revenue accrued by sale of CER will be used towards sustainable development annually and plan for above mentioned expenditure is explained in Annex 04 of the PDD. However, No such information is provided in Annex 4. Pl. clarify.	CL-2	--
e. In CDM-PDD section A.3 are following provided in the tabular format?	EB 41	Ann 12			
i. List of project participants and parties	EB 41	Ann 12	Ok, the list of project participants i.e. Gujarat State Energy Generation Limited is provided in tabular format.	OK	OK
ii. Identification of Host Party			OK, India is the host party	OK	OK
iii. Indication whethre the Party wishes to be considered as project participant	EB 41	Ann 12	The host party does not wish to be considered as project participant.	OK	OK
f. In CDM-PDD section A.4.1 are following provided?	EB 41	Ann 12			
i. Technical description, location, host party(ies) and address as required	EB 41	Ann 12	The web hosted PDD mentions that the new 351.43 MW gas based power plant Project is proposed to be set up at Taluka- Choryasi, District- Surat, Village Hazira in Gujarat State of India. The host party is India. However, during site visit it has been observed that the site is located	CAR 1	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			in Village Mora. Pl. explain.		
ii. Detailed physical location with unique identification of the project activity (eg. Longitude/latitude) – not to exceed one page	EB 41	Ann 12	<p>The project is located within Longitude: 72°38'E; Latitude: 21°08'N. and the description in section A.4.1 is within one page.</p> <p>The Latitude and Longitude in Degree, minutes and second format are not provided with reference of source.</p>	CAR 2	OK
g. In CDM-PDD section A.4.2 is the list of categories of project activities provided?	EB 41	Ann 12	OK, As per the scope of the project activity listed in the "List of Sectoral scopes" (Document CDMACCR-06 version 03)', the project activity will principally fall in Scope Number 1, Sectoral scope – energy industries (renewable/ non-renewable sources) being a Grid-connected electricity generating project using non-renewable fuel in energy industries.	OK	OK
h. In CDM-PDD section A.4.3 are following provided?	EB 41	Ann 12			
i. A description of how environmentally safe and sound technology, and know-how, is transferred to the Host Party(ies)	EB 41	Ann 12	The PP has not provided the description of how the technology used is environmentally safe and sound, The PDD should also include information about the about technology transfer involved in this project activity.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. Explanation of purpose of project activity with scenario existing prior to the start of project, scope or present activities and the baseline scenario	EB 41	Ann 12	<p>Explanation of purpose of project activity with scenario existing prior to the start of project, scope or present activities and the baseline scenario is explained in PDD.</p> <p>Following requires clarification -</p> <ol style="list-style-type: none"> 1. Overall efficiency of CCGP is not mentioned in PDD 2. The values used should be consistent in the PDD(temperature, fuel consumption, Rated capacity) <p>PP is requested to provide supporting documents for following :</p> <ol style="list-style-type: none"> 3. PLF value 4. Fuel supply agreement (Long term) 5. Technical specification for GTG, STG and HRSG 	CAR 3	--
iii. List and arrangement of the main manufacturing/production technologies, systems and equipments involved	EB 41	Ann 12	Yes, the list and arrangement of the main manufacturing/production technologies, systems and equipments are involved in PDD section A.4.3.	OK	OK
iv. The emissions sources and GHGs involved	EB 41	Ann 12	The emission sources and GHGs involved are not mentioned in A.4.3	CAR 4	--
i. In CDM-PDD section A.4.4 is the estimation of emission reductions provided as requested in a tabular format?	EB 41	Ann 12	Yes, A.4.4 indicates estimation per annum as 8,856,460 as requested in a tabular format.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
j. In CDM-PDD section A.4.5 is Information regarding Public funding provided?	EB 41	Ann 12	There is no ODA funding provided	OK	OK
k. In CDM-PDD section B.1 are following provided?	EB 41	Ann 12			
i. The approved methodology and version number	EB 41	Ann 12	The approved methodology and version numbers are mentioned as : Approved baseline methodology AM0029 (version 03 EB39) PL. mention the Approved monitoring methodology used for the project activity	CAR 5	OK
ii. Any methodologies or tools which the above approved methodology draws upon and their version number	EB 41	Ann 12	In the section B.1, Tools mentioned are not latest version.	CAR 6	--
l. In CDM-PDD section B.2 are following provided?	EB 41	Ann 12			
i. Justification of the choice of methodology that the project activity meets each of the applicability conditions	EB 41	Ann 12	OK, the justification of the choice of methodology that the project activity meets each of the applicability conditions is provided. The selected methodology AM0029 version 03 is used and The project activity is "the construction and operation of a new natural gas fired grid-connected electricity generation plant."	OK	OK
ii. Documentations with references that had been used. This can be provided in Annex 3 instead	EB 41	Ann 12	Annex 3 mentions about baseline information	OK	OK
m. In CDM-PDD section B.3 are following provided?	EB	Ann			



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
i. Description of all sources and gases included in the project boundary in the table	41 EB 41	12 Ann 12	Description of all sources and gases included in the project boundary in the table1, however, PP need to provide the justification for not including CH4 as a source for transportation of fuel to project site	CAR 7	--
ii. A flow diagram of the project boundary physically delineating the project activity	EB 41	Ann 12	The spatial extent of the project boundary dose not includes all power plants connected physically to the baseline grid as defined in "Tool to calculate emission factor for an electricity system.	CAR 8	OK
iii. The flow diagram with all equipments, systems and flows of mass and energy etc	EB 41	Ann 12	PP need to provide flow diagram with all equipments, systems and flows of mass and energy.		
n. In CDM-PDD section B.4 are following provided?	EB 41	Ann 12			
i. Explanation how the most plausible baseline scenario is identified in accordance with the selected baseline methodology	EB 41	Ann 12	<p>Most plausible baseline scenarios are identified in accordance with the selected baseline methodology.</p> <p>However, PP need to clarify following:-</p> <ol style="list-style-type: none"> 1. For Alternative 2.1, efficiency for the combined cycle is not mentioned. Similarly for other alternatives where applicable. 	CL-3	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>2. For alternative 3.1 PP need to justify how the capacity 210 MW is commonly available size for power generation from coal/lignite (the source is not available)</p> <p>3. For alternative 3.2 PP need to provide the supporting document for “the super critical technology is commercially available in turbine capacity of 500 MW, 600 MW , 800 MW and above.” PP need to specify whether the proposed alternative is considered as a baseline scenario or not.</p> <p>4. Alternative 4, The project activity is exporting power to NEWNE grid, PP need to clarify how the import of electricity from the WESTERN grid is found appropriate as one of the plausible baseline scenario.</p>		
ii. Justification of key assumptions and rationales	EB 41	Ann 12	Refer (n.i) above	-	-
iii. Transparent illustration of all data used to determine the baseline scenario (variables, parameters, data sources, etc.)	EB 41	Ann 12	Refer (n.i) above	-	-
iv. A transparent and detailed description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take	EB 41	Ann 12	Refer (n.i) above	-	-



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
place in the absence of the proposed project activity					
o. In CDM-PDD section B.5 are following provided?	EB 41	Ann 12			
i. Explanation of how and why this project activity is additional and therefore not the baseline scenario in accordance with the selected baseline methodology	EB 41	Ann 12	<p>OK, The additionality of the project is mentioned in PDD section B.5</p> <p>Following requires clarification :</p> <ol style="list-style-type: none"> 1) Use of the latest version of Investment analysis is not done by the PP. 2) It is stated in the web hosted PDD that "If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate also methodology AM0029 requires a benchmark investment analysis. However, in the web hosted PDD additionality is not demonstrated through Benchmark, PL. explain. 	CL-4	-
ii. Justification of key assumptions and rationales	EB 41	Ann 12	Refer (o.i) above and (o.iv) below		
iii. Transparent illustration of all data used to determine the baseline scenario (variables,	EB 41	Ann 12	Data Source is required to be supported/demonstrated for the data used	CL 5	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
parameters, data sources etc)			<p>to determine the baseline scenario for the following :</p> <p>(1) Project participant is required to provide justification for not including the alternative of “partial generation of the capacity through the project activity and partially through other means” for consideration as another baseline alternative</p> <p>(2) PP is required to provide the supporting documents for the values considered for Baseline scenario. (PLF. O&M esclation etc.)</p>		
iv. Evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity, if the starting date of the project activity is before the date of validation	EB 41	Ann 12	Starting date of the project activity is 23/01/2008. In order to demonstrate that CDM was seriously considered in the decision to proceed with the project activity evidences are provided in section B.5.	OK	OK
p. In CDM-PDD section B.6.1 are following provided?	EB 41	Ann 12			
i. Explanation as to how the procedures, in the approved methodology to calculate project emissions, baseline emissions, leakage emissions and emission reductions are applied to the proposed project activity	EB 41	Ann 12	The latest version of approved methodology to calculate project emissions, baseline emissions, leakage emissions and emission reductions are applied to the proposed project activity	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. Equations used in calculating emission reductions	EB 41	Ann 12	<p>The equations used in calculating emission reductions have following inadequacies :</p> <ol style="list-style-type: none"> 1) Value of the EF-build margin and emission factor of fuel identified as baseline scenario (Lignite) is not consistent in the PDD. 2) PP need to substantiate the value of NCV considered for natural gas consumed 3) Please clarify use of IPCC values, which are taken directly. Also, clarify why are local values not considered-e.g. gas supplier data ? 4) While calculating $COEF_{f,y}$ conversion of value of NCV to TJ/SCM is not correct and unit is also not consistent 5) The emission factor for fugitive CH₄ upstream emission for coal and lignite is considered as same. Please clarify. 6) Equation for Leakage emission 	CAR 9	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			due fugitive upstream methane emission is not as per the applied methodology.		
iii. Explanation and justification for all relevant methodological choices, including different scenarios or cases, options and default values	EB 41	Ann 12	Refer (p.i) and (p.ii) above		
q. In CDM-PDD section B.6.2 are following provided?	EB 41	Ann 12			
i. A compilation of information on the data and parameters that are not monitored throughout the crediting period but that are determined only once and thus remains fixed throughout the crediting period AND that are available when validation is undertaken	EB 41	Ann 12	OK	OK	OK
ii. The actual value period	EB 41	Ann 12	OK, the actual value period is 2009-10 of CEA data for $EF_{BM,y}$, Build margin Emission factor and average of 2007-08, 2008-09 and 2009-10 years taken for yearly Operating Margin emission factor .	OK	OK
iii. Explanation and justification for the choice of the source of data	EB 41	Ann 12	Following corrections/justifications for the parameters are required- 1. The justification provided for the choice of data should also refer to the option selected as per the methodology for BM and OM 2. PP need to provide the complete source for the parameter Calorific	CAR 10	



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>value of coal, Naphtha and natural Gas (including Link of website or CEA document)</p> <p>3. The parameter $EF_{co2,f,y}$ is wrongly mentioned as Carbon emission factor of natural gas, which is not as per the applied methodology AM0029.</p> <p>4. Please provide value of all parameters in the section B.6.2 instead of referring it as 'Refer Annex-6'</p>		
iv. Clear and transparent references or additional documentation in Annex 3	EB 41	Ann 12	OK, the transparent reference and additional documents reference is given in Annex 3	OK	OK
v. Where values have been measured, a description of the measurement methods and procedures (e.g. which standards have been used), indicated the responsible person/entity having undertaken the measurement, the date of measurement(s) and the measurement results	EB 41	Ann 12	OK, CEA database is used for Build margin emission factor and Operating margin emission factor. Other values are taken from Different power stations.	OK	OK
r. In CDM-PDD section B.6.3 are following provided?	EB 41	Ann 12			
i. A transparent <i>ex ante</i> calculation of project emissions, baseline emissions (or, where applicable, direct calculation of emission reductions) and leakage emissions expected during the crediting period, applying all relevant	EB 41	Ann 12	The <i>ex ante</i> calculation of project emissions, baseline emissions (or, where applicable, direct calculation of emission reductions) and leakage emissions expected during the crediting period, are	CL-6	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
equations provided in the approved methodology			used according to the approved baseline methodology AM0029. The emission reductions E _{Ry} by the project activity is calculated using the equation 6 of AM0029 version 03 applying all relevant equations provided in the approved methodology. However, following needs clarification : The basis for the following values needs to be specified : a) 80% PLF b) 3% auxiliary power consumption		
ii. Documentation how each equation is applied, in a manner that enables the reader to reproduce the calculation	EB 41	Ann 12	While calculating project emission in section B.6.3 of the PDD, value of COEF _{f,y} is mentioned as 1929.43 tCO ₂ e/Mcum and 1978.08 tCO ₂ e/Mcum, which is not consistent.	CAR 11	--
iii. Additional background information and or data in Annex 3, including relevant electronic files (i.e. spreadsheets)	EB 41	Ann 12	Refer (r.i) above	--	--
s. In CDM-PDD section B.6.4 are the results of the <i>ex ante</i> estimation of emission reductions for all years of the crediting period, provided in a tabular format?	EB 41	Ann 12	OK, the results of ex ante estimation of emission reductions (total 8,856,460 CERs) for all years of crediting period i.e. 10 years is provided in a tabular format.	OK	OK
t. In CDM-PDD section B.7.1 are following provided?	EB 41	Ann 12			
i. Specific information on how the data and	EB	Ann	Information on how the data and	CAR-12	--



**BUREAU
VERITAS**

VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
parameters that need to be monitored would actually be collected during monitoring for the project activity	41	12	<p>parameters need to be monitored would be collected is provided in tabular format, however following need to be Corrected/clarified.</p> <p>1. While describing measurement method of $FC_{f,y}$ it is stated that the fuel consumption will be monitored by GSPC. PP to explain the measurement frequency of gas from GSPC i.e. supplier end and at the user end for cross checking in accordance with the methodology..</p> <p>2. For parameter $NCV_{f,y}$ PP has considered 100% NG and 0% RLNG for calculating the value, however during site visit it has been noted that proportion of NG and RLNG as a fuel is not fixed and will be supplied on the basis of availability of NG or RLNG or both with the supplier. Please clarify.</p> <p>3. For parameter $NCV_{f,y}$ PP need to provide the supporting documents for value considered</p> <p>4. Source of data mentioned for $EF_{co2,f,y}$ is not appropriate.</p> <p>5. For the parameter $EG_{p,y}$ PP has not</p>		



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			mentioned the type/accuracy of meter installed and calibration frequency of the meter.		
			6. For parameter COEF unit mentioned in the table is not as per the applied methodology And values used in calculation is also not consistent in the PDD.		
ii. For each parameter the following below information, using the table provided:	EB 41	Ann 12			
a. The source(s) of data that will be actually used for the proposed project activity (e.g. which exact national statistics). Where several sources may be used, explain and justify which data sources should be preferred.	EB 41	Ann 12	Refer (t.i) above	--	--
b. Where data or parameters are supposed to be measured, specify the measurement methods and procedures, including a specification which accepted industry standards or national or international standards will be applied, which measurement equipment is used, how the measurement is undertaken, which calibration procedures are applied, what is the accuracy of the measurement method, who is the responsible person/entity that should undertake the measurements and	EB 41	Ann 12	Refer (t.i) above	--	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
what is the measurement interval; (i) A description of the QA/QC procedures (if any) that should be applied; (ii) Where relevant: any further comment. Provide any relevant further background documentation in Annex 4.					
u. In CDM-PDD section B.7.2 are following provided?	EB 41	Ann 12			
i. A detailed description of the monitoring plan	EB 41	Ann 12	OK, the detailed description of the monitoring plan is given in section B.7.2	OK	OK
ii. The operational and management structure that the project operator will implement in order to monitor emission reductions and any leakage effects generated by the project activity	EB 41	Ann 12	<p>The O&M structure that the PP will implement in order to monitor emission reduction is provided in the section B.7.2 of the PDD with their responsibilities. However PP need to clarify following:-</p> <p>1. It is stated in the web hosted PDD that a specialized training programme was conducted by GSEGL through BHEL. Pl. provide evidence.</p>	CL-7	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>2. As stated in the PDD, "PP will assign an official to oversee the activity towards sustainable development achieved through the revenue received from CER's." This is not included in the O & M structure identified, Please clarify</p> <p>3. It is mentioned in the description that the CDM manager will direct O&M team, Fuel Team and CDM team. However, the organogram structure provided is different than description. Pl. clarify.</p>		
iii. The responsibilities for and institutional arrangements for data collection and archiving	EB 41	Ann 12	Refer (u.ii) above	--	--
iv. Indication that the monitoring plan reflect good monitoring practice appropriate to the type of project activity	EB 41	Ann 12	Refer (u.ii) above	--	--
v. Relevant further background information in Annex 4	EB 41	Ann 12	<p>Further information on monitoring is given in Annex 4. However, PP also need to include following</p> <ol style="list-style-type: none"> 1. The condition if both the meters (main and check) are found faulty. 2. PP has not mentioned the name of the O&M contractor, as during site visit it has been observed that O&M will be done by "STEAG" 	CL 8	--
v. In CDM-PDD section B.8 are following provided?	EB 41	Ann 12			



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
i. Date of completion of the application of the methodology to the project activity study in DD/MM/YYYY	EB 41	Ann 12	OK, date of completion of the application of the methodology to the project activity study is 26/06/2010	OK	OK
ii. Contact information of the person(s)/entity(ies) responsible for the application of the baseline and monitoring methodology to the project activity	EB 41	Ann 12	Gujarat state Energy Generation limited is the project participant and contact details are given in Annex 1.	OK	OK
iii. Indication if the person/entity is also a project participant listed in Annex 1	EB 41	Ann 12	Refer (v.ii) above	--	--
w. In CDM-PDD section C.1.1 are following provided?	EB 41	Ann 12			
i. The starting date of a CDM project activity, which is the earliest of the date(s) on which the implementation or construction or real action of a project activity begins/has begun (EB33, Para 76/CDM Glossary of terms/EB41, Para 67)	EB 41	Ann 12	Starting date of the project activity is: 23/01/2008 The start date of a CDM project activity is "the earliest date at which either the implementation or construction or real action of a project activity begins". In light of the above definition, GSEG has taken the start date as the date of Engineering, Procurement & Construction contract.	OK	OK
ii. A description of how this start date has been determined, and a description of the evidence available to support this start date	EB 41	Ann 12	Refer (w.i) above		
iii. If this starting date is earlier than the date of publication of the CDM-PDD for global stakeholder consultation by a DOE, description in Section B.5 contain a of how the benefits of the CDM were seriously considered prior to the	EB 41	Ann 12	Yes, section B.5 contains how the benefits of the CDM were seriously considered prior to the starting date	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
starting date (EB41, Para 68).					
x. In CDM-PDD section C.1.2 is the expected operational lifetime of the project activity in years and months provided?	EB 41	Ann 12	OK, the expected operational lifetime of the project activity is 20 Years and 0 months. (However, this is corrected afterwards as 23 years, during validation time period)	OK	Ok
y. In CDM-PDD section C.2 is it stated whether the project activity will use a renewable or a fixed crediting period and is C.2.1 or C.2.2 completed accordingly?	EB 41	Ann 12	OK, it is stated that project uses fixed crediting period and crediting period is 10 Years.	OK	OK
z. In CDM-PDD section C.2.1 is it indicated that each crediting period shall be at most 7 years and may be renewed at most two times, provided that, for each renewal, a designated operational entity determines and informs the Executive Board that the original project baseline is still valid or has been updated taking account of new data where applicable?	EB 41	Ann 12	Not applicable, (refer 3. X-Project design Document) above	OK-	OK
aa. In CDM-PDD section C.2.1.1 are dates in the following format: (DD/MM/YYYY) provided?	EB 41	Ann 12	Not applicable , (refer 3. X-Project design Document) above	OK-	OK
bb. In CDM-PDD section C.2.1.2 is the length of the first crediting period in years and months provided?	EB 41	Ann 12	Not applicable , (refer 3. X-Project design Document) above	OK	OK
cc. In CDM-PDD section C.2.2 is the fixed crediting period at most ten (10) years provided?	EB 41	Ann 12	The fixed crediting period is at most 10 years is not mentioned in the section C.2.2 of the PDD	CAR 13	--
dd. In CDM-PDD section C.2.2.1 are the dates provided in the following format: (DD/MM/YYYY)?	EB 41	Ann 12	It is described that, the 1st year of crediting will start from the date of registration of this project activity or	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			30/10/2011; which ever is later.		
ee. In CDM-PDD section C.2.2.2 is the length of the crediting period in years and months Provided?	EB 41	Ann 12	OK, the length of the crediting period in years and months is provided, which is 10 years 0 months	Ok	OK
ff. In CDM-PDD section D.2 are the conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the Host Party, if environmental impacts are considered significant by the project participants or the Host, provided?	EB 41	Ann 12	Section D.2 mentions The EIA study revealed that there are no significant environmental impacts. Documents related to this are not shown to DOE during validation visit.	CAR 14	--
gg. In CDM-PDD section E.1 are the following provided?	EB 41	Ann 12			
i. The process by which comments by local stakeholders have been invited and compiled. An invitation for comments by local stakeholders shall be made in an open and transparent manner, in a way that facilitates comments to be received from local stakeholders and allows for a reasonable time for comments to be submitted.	EB 41	Ann 12	OK, The local stakeholder comments on the project activity were invited by notifying the local stakeholders about the agenda, time and venue of the meeting through notices placed at various important locations such as community meeting halls of nearby villages, important notice boards, representative of MOEF, Gujarat pollution control board, NGO's and state government agencies. The local stakeholders were notified 15 days in advance (notice period) to the actual date of the local stakeholder consultation meeting.	OK	OK
ii. The project activity is described in a manner,	EB	Ann	OK, The project activity i.e. Power	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
which allows the local stakeholders to understand the project activity, taking into account confidentiality provisions of the CDM modalities and procedures.	41	12	generation by use of Natural gas is described in a manner which allows the local stakeholders to understand the project activity, taking into account confidentiality provisions of the CDM modalities and procedures.		
iii. The local stakeholder process has been completed before submitting the proposed project activity to the DOE for validation.	EB 41	Ann 12	OK, The local stakeholder process has been completed on 28 th December 2007. The proposed project activity was submitted to DOE for validation at a later date.	OK	OK
hh. In CDM-PDD section E.2 are following provided?	EB 41	Ann 12			
i. Identification of local stakeholders that have made comments	EB 41	Ann 12	OK, identification of stake holders and comments are listed in E.2 of PDD	OK	OK
ii. A summary of this comments.	EB 41	Ann 12	Refer (hh.i) above	-	
ii. In CDM-PDD section E.3 is the explanation of how due account have been taken of comments received from local stakeholders provided?	EB 41	Ann 12	OK, the the explanation of how due account have been taken of comments received from local stakeholders provided is given in Section E.3 of the PDD.	OK	OK
jj. In CDM-PDD Annex 1 are the following provided?	EB 41	Ann 12			
i. Contact information of project participants	EB 41	Ann 12	OK, The project participant is Gujarat State Energy Generation Ltd. whose contact information is provided in Annex 1	OK	OK
ii. For each organisation listed in section A.3 the following mandatory fields: Organization, Name of contact person, Street, City, Postfix/ZIP,	EB 41	Ann 12	Refer (jj. i above)	--	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
Country, Telephone and Fax or e-mail					
kk. In CDM-PDD Annex 2 is information from Parties included in Annex I on sources of public funding for the project activity which shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of those Parties provided?	EB 41	Ann 12	OK, in CDM-PDD Annex 2 information that Public funding from Annex I countries and diversion of official development assistance (ODA), is not involved in this project activity.	OK	OK
ll. In CDM-PDD Annex 3 is the background information used in the application of the baseline methodology provided?	EB 41	Ann 12	Yes	OK	OK
mm. In CDM-PDD Annex 4 is the background information used in the application of the monitoring methodology provided?	EB 41	Ann 12	Yes	OK	OK
4. Project description					
a. Does the PDD contain a clear description of the project activity that provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation?	VVM	58	<p>The PDD contains description of the project activity. Following clarifications are required at various places in the PDD :</p> <p>a) Reference to support claim of requirement of natural gas/LNG as 0.42 MMTPA for the project activity.</p> <p>b) PP stated that the 2% of the revenue accrued by sale of CER will be used towards sustainable development annually. Monitoring</p>	(CL- 2), CL 9	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>plan proposed for the expenditure is included in Annex 4 of the PDD, however, the same is not evident in Annex 4.</p> <p>c) The project participant is requested to clarify the maximum possible power generation of the CCPP that would be technically /theoretically possible under the set of conditions that the plant would be expected to operate. Also explain overload capacity of the plant if any.</p> <p>d) Pl. clarify why data is used till 2005-06 for demand supply position. As pp presented the demand-supply position for state of Gujarat during 9th year plan. PP need to clarify which 9th year plan pp is referring to in section A.2 of the PDD.</p> <p>e) In table 1 in section A.4.3 of the PDD parameter is not correctly specified</p> <p>f) PP need to clarify how the start up fuel is less than 1% for the proposed project activity in section</p>		



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>B.2 of the PDD.</p> <p>g) Units used for Natural gas while describing gas availability is not consistent. The total availability and requirement of natural gas presented in PDD was published on 26th August 2010. Please clarify how this information is relevant to the project activity whose start date is 23/01/2008.</p> <p>h) Source provided for the values of the Gas requirement, gas consumption, Power requirement and power available is not appropriate.</p> <p>i) PP has selected the Power generation from Lignite as a baseline scenario. PI. demonstrate the availability of the Fuel (Lignite) in the project area.</p> <p>j) The start date of the project activity is stated on page 33 (Common practice analysis) as year 2005; however, the actual start date stated in C.1.1 is in 2008. PI. clarify.</p>		



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			k) Basis for selection of 351.43 MW as the capacity of the project activity at ISO conditions (including details of the ISO conditions) is not clearly mentioned/explained in the web hosted PDD.		
b. Is the description of the proposed CDM project activity as contained in the PDD:	VVM	59			
i. sufficiently covering all relevant elements?	VVM	59	Refer 4.a above	-	-
ii. accurate?	VVM	59	Refer 4.a above	-	-
iii. providing the reader with a clear understanding of the nature of the proposed CDM project activity?	VVM	59	Refer 4.a above	-	-
c. Is the proposed CDM project activity in existing facilities or or utilizing existing equipments?	VVM	60	Refer 4.a above	-	-
d. Is the CDM project activity one of the following types:	VVM	60			
i. Large scale?	VVM	60	Yes, the proposed CDM project activity is large scale, where estimated CER generation per annum is 885,646 per annum.	OK	OK
ii. Non-bundled small scale projects with emission reductions exceeding 15,000 tonnes per year?	VVM	60	Not Applicable, refer (4. d.i) above	OK	OK
iii. Bundled small scale projects, each with emission reductions not exceeding 15,000 tonnes?	VVM	60	Not Applicable, refer (4. d.i) above	OK	OK
e. If yes to (c) and (d) above, was a physical site	VVM	60	Not Applicable, refer (4. d.i) above	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
inspection conducted to confirm that the description in the PDD reflects the proposed CDM project activity, unless other means are specified in the methodology?					
f. If yes to (d.iii) above, was the number of physical site visits base on samping?	VVM	60	Not Applicable, refer (4. d.i) above	OK	OK
g. If yes is the sampling size appropriately justified through statistical analysis?	VVM	60	Not Applicable, refer (4. d.i) above	OK	OK
h. For all other proposed CDM project activities not referred to in paragraphs 59 – 60, and for other individual proposed small scale CDM project activities with emission reductions not exceeding 15,000 tonnes per year, was a physical site inspection conducted?	VVM	62	Not Applicable, refer (4. d.i) above	OK	OK
i. If no:	VVM	62			
i. Was the validation undertaken by reviewing available designs and feasibility studies, conducting comparison analysis to equivalent projects, as appropriate?	VVM	62	Not Applicable, refer (4. d.i) above	OK	OK
ii. Was it appropriately justified?	VVM	62	Not Applicable, refer (4. d.i) above	OK	OK
j. Does the proposed CDM project activity involve the alteration of an existing installation or process?	VVM	63	No, the proposed CDM project activity does not involve alteration, it is a new activity.	OK	OK
k. If yes, does the project description clearly state the differences resulting from the project activity compared to the pre-project situation?	VVM	63	Not applicable, refer 4.j above.	OK	OK
5. Baseline and monitoring methodology					



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
a. General requirement					
a. Do the the baseline and monitoring methodologies selected by the project participants comply with the methodologies previously approved by the CDM Executive Board?	VVM	65	<p>The baseline and monitoring methodology selected by project participants is AM0029 version 03 which is based on the approach 48 (b) of CDM modalities and procedures “Emissions from a technology that represents an economically attractive course of action, taking into account barriers to investment”</p> <p>However, PL. mention the Approved monitoring methodology used for the project activity.</p>	(CAR 5)	--
b. Is the selected methodology applicable to the project activity?	VVM	66	Refer to (5.b.c) below	-	-
c. Had the selected methodology been correctly applied?	VVM	66	Refer to (5.b.c) below	-	-
d. Had the selected methodology been correctly applied with respect to project boundary?	VVM	67	Refer to (5.b.c) below	-	-
e. Had the selected methodology been correctly applied with respect to baseline identification?	VVM	67	Refer to (5.b.c) below	-	-
f. Had the selected methodology been correctly applied with respect to Algorithms and/or formulae used to determine emission reductions?	VVM	67	Refer to (5.b.c) below	-	-



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
g. Had the selected methodology been correctly applied with respect to additionality?	VVM	67			
h. Specific questions per methodology regarding application of the methodology with respect to additionality. 1) Does the PDD explain the additionality of the project activity on the basis of the following steps : - Benchmark investment analysis - Common practice analysis 2) Is the relevant tool for the demonstration and assessment of additionality referred to by the methodology ?	AM 0029		1) The project activity is a large scale project activity. However, the additionality of the project is not explained in line with the latest tool for demonstration and assessment of additionality ex. Use of benchmark is not evident in the web hosted PDD as per Tool. 2) The applied Tool for demonstration and assessment of additionality is not latest	CL 10	--
1) Had the selected methodology been correctly applied with respect to monitoring methodology?	VVM	67	Yes	OK	OK
i. Specific questions per methodology regarding application of the methodology with respect to monitoring methodology. 1) Does the PDD refer to the AM 0029 monitoring methodology in conjunction with the baseline methodology w.r.t. the applicability conditions described	AM 0029		refer 5.a.h above.	--	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
as above in (g) ?					
<i>b. Applicability of the selected methodology to the project activity</i>					
a. Is the selected baseline and monitoring methodology, previously approved by the CDM Executive Board, applicable to the project activity?	VVM	68			
i. Specific questions per methodology regarding applicability.	AM 0029				
1) Does the project activity involve the construction and operation of a natural gas fired power plant ?			1) The project activity is the construction and operation of a new natural gas fired power plant		
2) Is the power plant proposed to be set up under the project activity a new plant ?			2) The proposed power plant is a new plant		
3) Is the natural gas based power plant connected to the grid ?			3) The power plant is connected to the Western Grid, which is a part of the NEWNE grid.		
4) Are the physical and geographical boundaries of the baseline grid, the power plant is connected to –clearly identifiable ?			4) The geographical and physical boundaries of the baseline grid are clearly defined.		
5) Is the information pertaining to the grid and the estimation of baseline emissions, publicly available ?			5) Information on the baseline grid and		



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
6) Can it be shown by the project participant that natural gas required for the project activity is sufficiently available and that future natural gas based power plants comparable in size to the project activity would not be constrained as a result of the use of natural gas by the project activity ?			<p>emission factors is publicly available from the CEA database.</p> <p>6) The applicability condition of the AM 0029 methodology pertaining to “sufficient availability of natural gas in the region, that will not constrain the availability of gas for future projects” has not been objectively demonstrated. In particular, the following aspects are not discussed : Like :</p> <ul style="list-style-type: none"> a) the actual consumption rate of natural gas in the project activity b) an analysis of the demand and supply scenario that prevailed at the time of the decision to invest in the project activity c) What combination of fuel will be used by the project activity. During the site visit discussions it was learnt by the validation team that the fuel will be made available to the project on the availability of natural gas and /or LNG. 	<p>(CL 9)</p> <p>(CAR 12)</p>	
b. Is the methodology correctly quoted?	VVM	69	Ok, the methodology is an Approved	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			baseline methodology AM0029 (version 03 EB39) having title as “Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas” .		
c. Are the applicability conditions of the methodology met?	VVM	70	<p>Applicability Condition of the methodology are met.</p> <p>However, PP need to demonstrate that the start up fuel requirement is less than 1%</p>	(CL 9)	--
ii. Specific questions per methodology regarding applicability conditions. Please refer to remarks in a-(i) above					
d. Is the proejct activity expected to result in emissions other than those allowed by the methodology?	VVM	70	Not applicable, the project activity is expected to result in emissions for : 1) On-site fuel combustion due to the project activity 2) Transportation of fuel to project site (inside the project boundary) 3) Processing and transportation of fuel outside the project boundary – which is as per approved methodology AM0029 (version 03 EB39	OK	OK
e. Is the choice of the methodology justified?	VVM	70	OK, The project activity is Grid Connected Electricity Generation Plants using Natural Gas, hence the choice of the methodology is justified.	OK	OK
f. Have the project participants shown that the	VVM	70	Refer to (5.b.c) below	-	-


**BUREAU
VERITAS**

VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
project activity meets each of the applicability conditions or the approved methodology?					
g. Have the project participants shown that the project activity meets each of the applicability conditions of any tool or other methodology component referred to the methodology?	VVM	70	Refer to (5.b.c) below		
iii. Specific questions per methodology regarding applicability conditions of any tool or other methodology component referred to the methodology. 1) Does the methodology refer to Tool for demonstration and assessment of additionality and the Tool to calculate the emission factor for an electricity system ? 2) Are the said tools used by the project participant to demonstrate the project activity's additionality and for the calculation of baseline emission factors ?	AM 0029		1) The project activity is a large scale project activity. However, the additionality of the project is not explained in line with the latest tool for demonstration and assessment of additionality ex. Use of benchmark is not evident in the web hosted PDD as per Tool. 2) Tool used to calculate the emission factor for an electricity system is not latest	(CL 10)	--
h. Is the DOE, based on local and sectoral knowledge, aware that comparable information is available from sources other than that used in the PDD?	VVM	70	Yes	OK	OK
i. If yes, was the PDD cross checked again the other sources to confirm that the project activity meets the applicability conditions of the methodology? (provide the reference to these choices)	VVM	70	The DOE has cross checked the information given in the PDD pertaining to the applicability condition of natural gas availability from other sources in the public domain.	(CL 9)	



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			However PP need to demonstrate that the start fuel consumption is less than 1 %		
j. Can a determination regarding the applicability of the selected methodology to the proposed CDM project activity be made?	VVM	71	OK, The applicability of the selected methodology proposed to the CDM project is justifiable. However PP need to demonstrate that the start fuel consumption is less than 1 %	(CL 9)	--
k. If no, clarification of the methodology was requested, in accordance with the guidance provided by the CDM Executive Board?	VVM	71	Refer (5.b.j) above	--	--
l. If answer to (5.b.c) above is "no", revision or deviation from the methodology was requested, in accordance with the guidance provided by the CDM Executive Board?	VVM	72	Refer (5.b.j) above	--	---
m. If yes to (5.b.k) and (5.b.l) above, a request for registration was submitted before the CDM Executive Board has approved the proposed deviation or revision?	VVM	73	Refer (5.b.j) above	--	--
c. Project boundary					
a. Does the PDD correctly describe the project boundary, including the physical delineation of the proposed CDM project activity included within the project boundary for the purpose of calculating project and baseline emissions for the proposed CDM project activity?	VVM	77	The PDD describes the project boundary, however, following discrepancies have been identified : Table 1 (Overview of emission sources included or excluded from project boundary) on page 15 [B.3] needs to be clarified. Upstream methane emissions are	(CAR 7) CL-11	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			considered as leakage emissions but these are not included in the table.		
<p>i. Specific questions per methodology regarding application of the methodology with respect to project boundary.</p> <p>1) Does the spatial extent of the project boundary includes the project site and all power plants connected physically to the baseline grid as defined in "Tool to calculate emission factor for an electricity system".</p>	AM 0029		The spatial extent of the project boundary dose not includes all power plants connected physically to the baseline grid as defined in "Tool to calculate emission factor for an electricity system.	(CAR 8)	--
b. Is the delineation in the PDD of the project boundary correct?	VVM	78	Refer (c.a.i.1) above	--	--
c. Does the delineation in the PDD of the project boundary meet the requirements of the selected baseline?	VVM	78	Refer (c.a.i.1) above	--	--
d. Have all sources and GHGs required by the methodology been included within the project boundary?	VVM	78	Refer (c.a.i.1) above	--	--
e. Does the methodology allow project participant to choose whether a source or gas is to be included within the project boundary?	VVM	78	Not applicable	OK	OK
f. If yes, have the project participants justified that choice?	VVM	78	Not applicable	OK	OK
g. If yes, is the justification provided reasonable?	VVM	78	Not applicable	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
(provide reference to the supporting documented evidence provided by the project participants)					
d. Baseline identification					
a. Does the PDD identify the baseline for the proposed CDM project activity, defined as the scenario that reasonably represents the anthropogenic emissions by sources of GHGs that would occur in the absence of the proposed CDM project activity?	VVM	80	Different kinds of most plausible baseline scenarios are identified in accordance with the selected baseline methodology. Pl. refer (1.3.n.i) and (1.3.o.ii) above.	(CL-3) (CL-5)	--
b. Has any procedure contained in the methodology to identify the most reasonable baseline scenario, been correctly applied?	VVM	81	Refer (5.d.a) above	--	--
i. Specific questions per methodology regarding application of any procedure contained in the methodology to identify the most reasonable baseline scenario. 1) Has the PDD derived the baseline scenario through an identification of various alternatives to the project activity ? 2) Are all plausible alternatives to the project activity considered in the analysis ?			1) Project participant has considered a total of 4 alternative scenarios for baseline determination. Project participant is required to provide justification for not including the alternative of "partial generation of the capacity through the project activity and partially through other means" for consideration as another baseline alternative 2) All the alternatives considered are plausible. However, only those alternatives realistically plausible are taken into final	(CL-3) (CL-5)	



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
<p>3) Do the alternatives considered provide outputs or services comparable to the project activity ?</p> <p>4) Do the alternatives include at least the following :</p> <ul style="list-style-type: none"> • The project activity not implemented as a CDM project; • Power generation using natural gas, but technologies other than the project activity; • Power generation technologies using energy sources other than natural gas; • Import of electricity from connected grids, including the possibility of new interconnections. <p>5) Do the alternatives consider all power plant technologies that have recently been constructed or are under construction or being planned ?</p> <p>6) Is a clear description of each baseline scenario alternative, including information on the technology such as efficiency and technical lifetime, provided in the PDD ?</p> <p>7) Are all the alternatives considered for the baseline scenario in compliance with the legal and regulatory requirements ?</p>			<p>consideration</p> <p>3) It has been shown in the PDD that alternatives provide similar outputs and services comparable to the project activity, However PP need to provide justification about the inclusion and exclusion of the baseline scenarios.</p> <p>4) The PDD includes, in section B.4 all the alternatives required as a minimum to be considered, as per the methodology</p> <p>5) Yes</p> <p>6) PP need to provide the efficiency of the the combine cycle for alternative 2.1, And similarly for other alternatives where applicable.</p>		



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			7) All the alternatives considered are in compliance with the legal and regulatory requirements of the host country		
c. Does the selected methodology require use of tools (such as the “Tool for the demonstration and assessment of additionality” and the “Combined tool to identify the baseline scenario and demonstrate additionality”) to establish the baseline scenario?	VVM	81	OK, “Tool for the demonstration and assessment of additionality” (Version 06.0, EB 39) is used to establish the baseline scenario.	OK	OK
d. If yes, was the methodology consulted on the application of these tools? (In such cases, the guidance in the methodology shall supersede the tool.)	VVM	81	OK, the Approved baseline methodology AM0029 (version 03 EB39) is used for guidance.	OK	OK
i. Specific questions per methodology regarding application of tools to establish the most reasonable baseline scenario. 1) Is the additionality established using Steps 1 to 4 of the Tool for demonstration and assessment of additionality ? 2) Is the baseline emission factor calculated using the Tool to calculate the emission factor for an electricity system ?			1) No, PP need to use the steps as per the “tool for demonstrate and assessment of Additionality” 2) Yes Pl. refer (1.5.a.h)	(CL 10)	--
e. Does the methodology require several alternative scenarios to be considered in the identification of the most reasonable baseline scenario?	VVM	82	Yes, the Approved baseline methodology AM0029 (version 03 EB39) requires several alternative scenarios to be considered in the identification of the most reasonable baseline scenario	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
f. If yes, are all scenarios that are considered by the project participants and are supplementary to those required by the methodology reasonable in the context of the proposed CDM project activity?	VVM	82	<p>Different scenarios considered for the project activity are as below :-</p> <p>1. Project activity implemented as a project without the CDM revenue.</p> <p>2. Power generation using natural gas but technology other than project activity</p> <p>1. Open cycle mode 2. Combine cycle mode</p> <p>3. Power generation using fuel other than natural gas</p> <p>1. Coal Based plant 2. Coal based-super critical plant 3. Lignite based plant 4. Naphtha base plant 5. Run of river hydro Plant 6. Nuclear Power plant 7. Wind energy generation</p> <p>4. Import of electricity from grid connected power plants.</p> <p>However, "partial generation of the capacity through the project activity and</p>	(CL-5)	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			partially through other means" is not consideration as another baseline alternative. Refer CL-5.		
g. Has any reasonable alternative scenario been excluded?	VVM	82	Refer (5.d.f) above	--	--
h. Is the baseline scenario identified reasonably supported by:	VVM	83	Refer (5.d.f) above	--	--
i. Assumptions?	VVM	83	Refer (5.d.f) above	--	--
ii. Calculations?	VVM	83	Refer (5.d.f) above	--	--
iii. Rationales?	VVM	83	Refer (5.d.f) above	--	--
i. Are the documents and sources referred to in the PDD correctly quoted and interpreted?	VVM	83	Refer (5.d.f) above	--	--
j. Was the information provided in the PDD cross checked with other verifiable and credible sources, such as local expert opinion, if available? (identify the sources)	VVM	83	Not applicable.	OK	OK
k. Have all applicable CDM requirements been taken into account in the identification of the baseline scenario for the proposed CDM project activity?	VVM	84	Refer (5.d.f) above	--	--
l. Have all relevant policies and circumstances been identified and correctly considered in the PDD, in accordance with the guidance by the CDM Executive Board?	VVM	84	Refer (5.d.f) above	--	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
m. Does the PDD provide a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed CDM project activity?	VVM	85	Refer (5.d.f) above	--	--
e. Algorithms and/or formulae used to determine emission reductions					
a. Do the steps taken and equations applied to calculate project emissions, baseline emissions, leakage and emission reductions comply with the requirements of the selected baseline and monitoring?	VVM	88	The steps taken and equations applied to calculate project emissions, baseline emissions, leakage and emission reductions are used as per According to the approved baseline methodology AM0029 (version 03). However, The emission factor for fugitive CH ₄ upstream emission for coal and lignite is considered as same also, the value of COEF _{f,y} taken for calculation of project emissions PE _y is different at two different places in the PDD (1978.08 & 1929.43) pl. refer CAR 9 and CL 9	(CAR 9) (CL 9)	--
b. Have the equations and parameters in the PDD been correctly applied with respect those in the select approved methodology?	VVM	89	OK, Refer (5.e.a) above	OK	OK
ii. Specific questions per methodology regarding steps taken and equations and parameters applied to calculate project emissions, baseline emissions, leakage and emission reductions.				OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
1. Does it Specify clearly which sources of project, baseline and leakage electricity consumption should be calculated with this tool; 2. Does it Provide necessary procedures, equations and monitoring provisions to determine the quantity of electricity that is consumed by each identified source;			1. Yes, sources of baseline, project and leakage of electricity consumption is calculated with Tool to calculate baseline, project and/or leakage emissions from electricity consumption” version 1 2. The procedures demonstrate which equations and monitoring provisions are used for each identified source		
c. Does the methodology provide for selection between different options for equations or parameters?	VVM	89	Yes, the methodology provide for selection between different options for equations or parameters, accordingly the Project participant has selected three options as per methodology AM0029: version 03 Option 1: Build Margin Option 2: Combined Margin Option 3: Emission factor of Lignite based power plant	OK	OK
d. If yes, has adequate justification been provided (based on the choice of the baseline scenario, context of the proposed CDM project activity and other evidence provided)?	VVM	89	OK, refer (5.e.c) above	OK	OK
e. If yes, have correct equations and parameters been used, in accordance with the methodology selected?	VVM	89	Refer to (5.e.b) above	-	-
f. Will data and parameters be monitored	VVM	90	OK, as per PDD, data and parameters will	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
throughout the crediting period of the proposed CDM project activity?			be monitored throughout the crediting period of the proposed CDM project activity i.e. 10 years.		
g. If no, and these data and parameters will remain fixed throughout the crediting period, are all data sources and assumptions:	VVM	90	Refer (5.e.f) above	--	--
i. Appropriate and correct?	VVM	90	Refer (5.e.f) above	--	--
ii. Applicable to the proposed CDM project activity?	VVM	90	Refer (5.e.f) above	--	--
iii. Resulting in a conservative estimate of the emission reductions?	VVM	90	Refer (5.e.f) above	--	--
h. Will data and parameters be monitored on implementation and hence become available only after validation of the project activity?	VVM	90	Refer (5.e.f) above	--	--
i. If yes, are the estimates provided in the PDD for these data and parameters reasonable?	VVM	90	OK, Refer (5.e.f) above	OK	OK
6. Additionality of a project activity					
a. Does the PDD describe how a proposed CDM project activity is additional?	VVM	93	<p>OK, the additionality of the project is mentioned in PDD section B.5</p> <p>Following requires clarification :</p> <ol style="list-style-type: none"> 1) Use of the latest version of Investment analysis is not done by the PP. 2) It is stated in the web hosted PDD that "If the alternative to the project activity is the supply 	Refer (CL 4)	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate also methodology AM0029 requires a benchmark investment analysis. However, in the web hosted PDD additionality is not demonstrated through Benchmark, PL. explain.		
b. Does the CDM-PDD state the latest version of the additionality tool being used?	VVM	94	The CDM-PDD dose not use the latest version of "Tool for demonstration and assessment of additionality"	(CL 10)	--
c. Were the following steps of the tool to assess additionality used:	EB 39	Ann 10			
i. Identification of alternatives to the project activity?	EB 39	Ann 10	Refer (5.d.f) above		--
ii. Investment analysis to determine that the proposed project activity is either: 1) not the most economically or financially attractive, or 2) not economically or financially feasible?	EB 39	Ann 10	OK, investment analysis To determine whether the proposed project activity is economically or financially less attractive than the other alternatives without the CDM revenues, the sub-steps 2b, 2c and 2d have been followed as required under AM0029.	OK	OK
iii. Barriers analysis?	EB 39	Ann 10	Not applicable . The project participant has carried out Benchmark analysis.	OK	OK
iv. Common practice analysis?	EB	Ann	PP has performed the common practice	CL 12	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
	39	10	analysis. In the common practice analysis : 1. Please provide the document supporting the plants considered for common practice analysis. 2. Under regulatory regime, PP mentioned that 7 Power plants enjoyed special status. Pl. clarify how the regulatory framework is different for installation of current project activity. 3. Please explain the change in investment climate pre and post 2002 4. Please clarify how the defined region is appropriate for the assessment of common practice analysis.		
d. In step 1 (i) have all the sub-steps as below been followed?	EB 39	Ann 10			
i. Sub-step 1a: Define alternatives to the project activity	EB 39	Ann 10	Refer (5.d.f) above		
ii. Sub-step 1b: Consistency with mandatory laws and regulations	EB 39	Ann 10	PP need to use the steps as per the "tool for demonstrate and assessment of Additionality" version 06.0.0	(CL 10)	--
e. Have the following alternatives been included while defining alternatives as per sub-step 1a?	EB 39	Ann 10			
i. (a) The proposed project activity undertaken	EB	Ann	Not applicable	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
without being registered as a CDM project activity;	39	10			
ii. (b) Other realistic and credible alternative scenario(s) to the proposed CDM project activity scenario that deliver outputs services or services with comparable quality, properties and application areas, taking into account, where relevant, examples of scenarios identified in the underlying methodology;	EB 39	Ann 10	Refer (5.d.f) above		
iii. (c) If applicable, continuation of the current situation (no project activity or other alternatives undertaken).	EB 39	Ann 10	Not applicable	OK	OK
f. Has the project participant included the technologies or practices that provide outputs or services with comparable quality, properties and application areas as the proposed CDM project activity and that have been implemented previously or are currently being introduced in the relevant country/region?	EB 39	Ann 10	Yes, the project participant has included the technologies or practices of electricity generation through natural gas having Combined cycle gas turbines. This implies a penetration of 16.96%, and a share of 83% from Non-CCGT in the western region of India.	OK	OK
g. Has the outcome of Step 1a: Identified realistic and credible alternative scenario(s) to the project activity done correctly? Please briefly mention the outcome.	EB 39	Ann 10	Refer (5.d.f)above		
h. Is the alternative(s) in compliance with all mandatory applicable legal and regulatory requirements, even if these laws and regulations have objectives other than GHG reductions, e.g. to mitigate local air pollution.?	EB 39	Ann 10	OK	OK	OK
i. If an alternative does not comply with all	EB	Ann	Not applicable	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
mandatory applicable legislation and regulations, has it been shown that, based on an examination of current practice in the country or region in which the law or regulation applies, those applicable legal or regulatory requirements are systematically not enforced and that noncompliance with those requirements is widespread in the country?	39	10			
j. Has the outcome of Step 1b: Identified realistic and credible alternative scenario(s) to the project activity that are in compliance with mandatory legislation and regulations taking into account the enforcement in the region or country and EB decisions on national and/or sectoral policies and regulations done correctly? Please state the outcome.	EB 39	Ann 10	The Project participant has considered realistic and credible alternative scenario(s) to the project activity, which are in compliance with mandatory legislation and regulations taking into account the enforcement in the region or country and EB decisions on national and/or sectoral policies and regulations, however, one of the scenario is not considered.	(CL 5)	--
k. Has PP selected Step 2 (Investment analysis) or Step 3 (Barrier analysis) or both Steps 2 and 3?	EB 39	Ann 10	The PP has selected Step 2 i.e. Investment Analysis	OK	OK
l. In step 2, have all the sub-steps as below been followed?	EB 39	Ann 10			
i. Sub-step 2a: Determine appropriate analysis method;	EB 39	Ann 10			
ii. Sub-step 2b: Option I. Apply simple cost analysis;	EB 39	Ann 10	The methodology AM0029 requires a benchmark investment analysis to be carried out to justify that the project is additional. however, the levelized cost	(CL 4)	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			comparision analysis is not in line with the requirements for selecting benchmark, given in the Tool for demonstration and assessment of additionality		
iii. Sub-step 2b: Option II. Apply investment comparison analysis;	EB 39	Ann 10	The methodology AM0029 requires a benchmark investment analysis to be carried out to justify that the project is additional. however, the levelized cost comparision analysis is not in line with the requirements for selecting benchmark, given in the Tool for demonstration and assessment of additionality	(CL 4)	--
iv. Sub-step 2b: Option III. Apply benchmark analysis;	EB 39	Ann 10	The methodology AM0029 requires a benchmark investment analysis to be carried out to justify that the project is additional. however, the levelized cost comparision analysis is not in line with the requirements for selecting benchmark, given in the Tool for demonstration and assessment of additionality	(CL 4)	--
v. Sub-step 2c: Calculation and comparison of	EB	Ann	The methodology AM0029 requires a	(CL 4)	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
financial indicators (only applicable to Options II and III);	39	10	benchmark investment analysis to be carried out to justify that the project is additional. however, the levelized cost comparison analysis is not in line with the requirements for selecting benchmark, given in the Tool for demonstration and assessment of additionality		
vi. Sub-step 2d: Sensitivity analysis (only applicable to Options II and III).	EB 39	Ann 10	The methodology AM0029 requires a benchmark investment analysis to be carried out to justify that the project is additional. however, the levelized cost comparison analysis is not in line with the requirements for selecting benchmark, given in the Tool for demonstration and assessment of additionality	(CL 4)	--
m. In sub-step 2a has the determination of appropriate method of analysis done as per the guidance as below?	EB 39	Ann 10			
i. Simple cost analysis if the CDM project activity and the alternatives identified in Step 1 generate no financial or economic benefits other than CDM related income (Option I).	EB 39	Ann 10	The methodology AM0029 requires a benchmark investment analysis to be carried out to justify that the project is additional. however, the levelized cost comparison analysis is not in line with	(CL 4)	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			the requirements for selecting benchmark, given in the Tool for demonstration and assessment of additionality		
ii. Otherwise, use the investment comparison analysis (Option II) or the benchmark analysis (Option III). Specify option used with justification.	EB 39	Ann 10	Refer (6.m.i - additionality)above	OK	OK
n. Has the below guideline followed for sub-step 2b Option I. Apply simple cost analysis? Document the costs associated with the CDM project activity and the alternatives identified in Step1 and demonstrate that there is at least one alternative which is less costly than the project activity.	EB 39	Ann 10	Refer (6.m.i - additionality)above	OK	OK
o. Has the below guideline followed for sub-step 2b Option II. Apply investment comparison analysis? Identify the financial indicator, such as IRR, NPV, cost benefit ratio, or unit cost of service most suitable for the project type and decision-making context. Please specify	EB 39	Ann 10	Refer (6.m.i - additionality)above	OK	OK
p. Has the below guideline followed for Sub-step 2b: Option III. Apply benchmark analysis?	EB 39	Ann 10	Refer (6.m.i - additionality)above	OK	OK
i. Identify the financial/economic indicator, such as IRR, most suitable for the project type and decision context.	EB 39	Ann 10	Refer (6.m.i - additionality)above	OK	OK
ii. When applying Option II or Option III, the financial/economic analysis shall be based on parameters that are standard in the market,	EB 39	Ann 10	The project participant has used standard available data from CEA guidelines.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
considering the specific characteristics of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer. Only in the particular case where the project activity can be implemented by the project participant, the specific financial/economic situation of the company undertaking the project activity can be considered.					
iii. Discount rates and benchmarks shall be derived from: (a) Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data; (b) Estimates of the cost of financing and required return on capital (e.g. commercial lending rates and guarantees required for the country and the type of project activity concerned), based on bankers views and private equity investors/funds' required return on comparable projects; (c) A company internal benchmark (weighted average capital cost of the company), only in the particular case referred to above in 2. The project developers shall demonstrate that this benchmark has been consistently used in the past, i.e. that project activities under similar conditions developed by the same company used the	EB 39	Ann 10	<p>The project participant has used benchmark for levelized tariff where, cost of Power Generation using Lignite as fuel is considered as the benchmark. The data required are used from Government/official approved data from Gujarat Energy Regulatory Committee, Central Electricity regulatory committee and Central Electricity Authority .</p> <p>However, while doing financial analysis, The benchmark selected is , however, the lowest cost of power generation per kWh among the baseline alternatives, which is not in line with the requirements for selecting benchmark, given in the Tool for demonstration and assessment of additionality</p>	(CL 4)	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
same benchmark; (d) Government/official approved benchmark where such benchmarks are used for investment decisions; (e) Any other indicators, if the project participants can demonstrate that the above Options are not applicable and their indicator is appropriately justified. Please specify benchmark and justify.					
q. Has the below guideline followed for Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III)?	EB 39	Ann 10	Refer (6.m.i - additionality)above	OK	OK
i. Calculate the suitable financial indicator for the proposed CDM project activity and, in the case of Option II above, for the other alternatives. Include all relevant costs (including, for example, the investment cost, the operations and maintenance costs), and revenues (excluding CER revenues, but possibly including inter alia subsidies/fiscal incentives, ODA, etc, where applicable), and, as appropriate, non-market cost and benefits in the case of public investors if this is standard practice for the selection of public investments in the host country.	EB 39	Ann 10	The levelized tariff for all the plausible options to the proposed project activity has been calculated and presented in Section B.4 of PDD	OK	OK
ii. Present the investment analysis in a transparent manner and provide all the relevant assumptions, preferably in the CDM-PDD, or in separate annexes to the CDM-PDD.	EB 39	Ann 10	OK, the investment analysis in a transparent manner is provided in PDD in section B.4 and also in section Annex 3 and Annex 6	OK	OK
iii. Justify and/or cite assumptions.	EB 39	Ann 10	OK, the assumptions are given in Annex 7 of the PDD	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
iv. In calculating the financial/economic indicator, the project's risks can be included through the cash flow pattern, subject to project-specific expectations and assumptions.	EB 39	Ann 10	OK	OK	OK
v. Assumptions and input data for the investment analysis shall not differ across the project activity and its alternatives, unless differences can be well substantiated.	EB 39	Ann 10	Refer 6.q. (iii) above		
vi. Present in the CDM-PDD a clear comparison of the financial indicator for the proposed CDM activity. Please specify details for above.	EB 39	Ann 10	Clear Comparison of the financial indicator is presented in section B.5 of the PDD. However, for inadequacies identified in the PDD	(CL 4)	--
r. Has the below guideline followed for Sub-step 2d: Sensitivity analysis (only applicable to Options II and III)? Include a sensitivity analysis that shows whether the conclusion regarding the financial/economic attractiveness is robust to reasonable variations in the critical assumptions.	EB 39	Ann 10	Yes, the sensitivity analysis is done. However, the levelized cost comparison analysis is not in line with the requirements for selecting benchmark, given in the Tool for demonstration and assessment of additionality	(CL 4)	--
s. Has the outcome of Step 2 clearly mentioned with justification?	EB 39	Ann 10	Refer (6.r) above	OK	OK
t. In step 3: Barrier analysis have all the sub-steps as below been followed?	EB 39	Ann 10			
i. Sub-step 3a: Identify barriers that would prevent the implementation of the proposed CDM project activity;	EB 39	Ann 10	Barrier analysis has not been used.	OK	OK
ii. Sub-step 3 b: Show that the identified barriers would not prevent the implementation of at	EB 39	Ann 10	Barrier analysis has not been used.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
least one of the alternatives (except the proposed project activity).					
u. Has the below guideline followed for Sub-step 3a: Identify barriers that would prevent the implementation of the proposed CDM project?	EB 39	Ann 10	Refer(6.f.i above)	--	--
i. (a) Investment barriers: For alternatives undertaken and operated by private entities: Similar activities have only been implemented with grants or other non-commercial finance terms. No private capital is available from domestic or international capital markets due to real or perceived risks associated with investment in the country where the proposed CDM project activity is to be implemented, as demonstrated by the credit rating of the country or other country investments reports of reputed origin.	EB 39	Ann 10	Investment barrier is not claimed by the project participant	OK	OK
ii. (b) Technological barriers: Skilled and/or properly trained labour to operate and maintain the technology is not available in the relevant country/region, which leads to an unacceptably high risk of equipment disrepair and malfunctioning or other underperformance; Lack of infrastructure for implementation and logistics for maintenance of the technology, Risk of technological failure: the process/technology failure risk in the local circumstances is significantly greater than for other technologies that provide services or	EB 39	Ann 10	Technological risks are not claimed by the project participant	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
outputs comparable to those of the proposed CDM project activity, as demonstrated by relevant scientific literature or technology manufacturer information, The particular technology used in the proposed project activity is not available in the relevant region.					
iii. (c) Barriers due to prevailing practice: The project activity is the “first of its kind”.	EB 39	Ann 10	No, this is not a “first of its kind” project activity	OK	OK
iv. (d) Other barriers, preferably specified in the underlying methodology as examples.	EB 39	Ann 10	Not applicable	OK	OK
v. Has the outcome from Step 3a clearly mentioned in PDD?	EB 39	Ann 10	OK	OK	OK
w. Has the below guideline followed for Sub-step 3 b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity)?	EB 39	Ann 10			
i. If the identified barriers also affect other alternatives, explain how they are affected less strongly than they affect the proposed CDM project activity. In other words, demonstrate that the identified barriers do not prevent the implementation of at least one of the alternatives. Any alternative that would be prevented by the barriers identified in Sub-step 3a is not a viable alternative, and shall be eliminated from consideration.	EB 39	Ann 10	Not applicable	OK	OK
ii. Provide transparent and documented evidence, and offer conservative interpretations of this	EB 39	Ann 10	Not applicable	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
documented evidence, as to how it demonstrates the existence and significance of the identified barriers and whether alternatives are prevented by these barriers.					
iii. The type of evidence to be provided should include at least one of the following: (a) Relevant legislation, regulatory information or industry norms; (b) Relevant (sectoral) studies or surveys (e.g. market surveys, technology studies, etc) undertaken by universities, research institutions, industry associations, companies, bilateral/multilateral institutions, etc; (c) Relevant statistical data from national or international statistics; (d) Documentation of relevant market data (e.g. market prices, tariffs, rules); (e) Written documentation of independent expert judgments from industry, educational institutions (e.g. universities, technical schools, training centres), industry associations and others. Please specify.	EB 39	Ann 10	<p>Following government, private website reference are provided by Project participant, which supports to demonstrate that identified barriers affect only project activity and not the alternatives identified.</p> <ol style="list-style-type: none"> CEA Database http://cea.nic.in/planning/c%20and%20e/Database_publishing_ver3.zip http://www.ibic.go.jp/english/oec/post/2002/pdf/105_full.pdf http://www.ntpc.co.in/powerplants/ntpc_pw_kawas.shtml http://timesofindia.indiatimes.com/articleshow/1602986123.cms Ministry of Power Annual Report 1991-92; Page 28; http://powermin.nic.in/reports/pdf/ar91-92.pdf and http://www.adbi.org/discussion-paper/2007/04/26/2236.policy.environment.power.sector/policy.developments.for.private.investment.in.the.indian.power.sector 	--	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			6. CEA Database http://www.cea.nic.in/planning/c%20and%20e/database_publishing_ver4.zip 7. CEA Project Monitoring Reports for Goa, Gujarat, Maharashtra, Madhya Pradesh, Chattisgarh and National Thermal Power Corporation downloaded on 24 Aug 2010, for projects in 2007-2008		
x. Has the outcome from Step 3 clearly mentioned in PDD?	EB 39	Ann 10	Step 3 is not being used by the PP	OK	OK
y. In step 4: Common practise analysis have all the sub-steps as below followed?	EB 39	Ann 10			
i. Sub-step 4a: Analyze other activities similar to the proposed project activity;	EB 39	Ann 10	OK, analysis of other activities (implemented or underway), that are similar to the proposed CDM project activity, on various parameters (Region and Broad technology, Regulatory regime, Technology, Access to financing and Changes in investment climate) is carried out.	OK	OK
ii. Sub-step 4b: Discuss any similar Options that are occurring.	EB 39	Ann 10	As mentioned in PDD, there are no Other Activities that are similar to the Project Activity and hence the Sub-Step 4(b) is not applicable to the Project Activity.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
z. Has the below guideline followed for Sub-step 4a: Analyze other activities similar to the proposed project activity? Provide an analysis of any other activities that are operational and that are similar to the proposed project activity. Other CDM project activities are not to be included in this analysis. Provide documented evidence and, where relevant, quantitative information. On the basis of that analysis, describe whether and to which extent similar activities have already diffused in the relevant region.	EB 39	Ann 10	<p>Evidences are provided in support of the analysis from CEA, Ministry of power and following links were provided:-</p> <ol style="list-style-type: none"> 1. CEA Database http://cea.nic.in/planning/c%20and%20e/Database_publishing_ver3.zip 2. http://www.ibic.go.jp/english/oec/post/2002/pdf/105_full.pdf 3. http://www.ntpc.co.in/powerplants/ntpc_pw_kawas.shtml 4. http://timesofindia.indiatimes.com/articleshow/1602986123.cms 5. Ministry of Power Annual Report 1991-92; Page 28; http://powermin.nic.in/reports/pdf/ar91-92.pdf) and http://www.adbi.org/discussion-paper/2007/04/26/2236.policy.environment.power.sector/policy.developments.for.private.investment.in.the.indian.power.sector 	OK	OK
aa. Has the below guideline followed for Sub-step 4b: Discuss any similar Options that are occurring? If similar activities are identified, then it is	EB 39	Ann 10	Refer (6.y.ii- additionality) above	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
necessary to demonstrate why the existence of these activities does not contradict the claim that the proposed project activity is financially/economically unattractive or subject to barriers. This can be done by comparing the proposed project activity to the other similar activities, and pointing out and explaining essential distinctions between them that explain why the similar activities enjoyed certain benefits that rendered it financially/economically attractive (e.g., subsidies or other financial flows) and which the proposed project activity cannot use or did not face the barriers to which the proposed project activity is subject. In case similar projects are not accessible, the PDD should include justification about non-accessibility of data/information.					
bb. Has the outcome from Step 4 clearly mentioned in PDD?	EB 39	Ann 10	OK,	OK	OK
cc. Has it been proved that the project is additional?	EB 39	Ann 10	Project participant needs to clarify on following issue : The methodology AM0029 requires a benchmark investment analysis to be carried out to justify that the project is additional. The benchmark selected is , however, the lowest cost of power generation per kWh among the baseline alternatives, which is not in line with the requirements for selecting benchmark,	(CL 4)	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			given in the "Tool for demonstration and assessment of additionality"		
a. Prior consideration of the clean development mechanism					
a. Is the project activity start date prior to the date of publication of the PDD for stakeholder comments?	VVM	96	Yes, start date of project activity : 23/01/2008 Period of publication of PDD for stakeholder comments is from 16/10/11 to 14/11/11	OK	OK
b. If yes, were the CDM benefits considered necessary in the decision to undertake the project as a proposed CDM project activity?	VVM	96	OK, CDM benefits were considered in the decision to undertake the project as a proposed CDM project activity	OK	OK
c. Is the start date of the project activity, reported in the PDD, in accordance with the "Glossary of CDM terms", which states that "The starting date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a project activity begins."?	VVM	97	Yes, Starting date of the project activity is: 23/01/2008 The start date of a CDM project activity is "the earliest date at which either the implementation or construction or real action of a project activity begins". In light of the above definition, GSEG has taken the start date as the date of Engineering, Procurement & Construction contract.	OK	OK
d. Does the project activity require construction, retrofit or other modifications?	VVM	97	Yes, it requires construction	OK	OK
e. If yes, is it ensured that the date of commissioning cannot be considered as the project activity start date?	VVM	97	Yes, date of commissioning (expected – October 2011) is not considered as the	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			project activity start date (23/01/2008).		
f. Is it a new project activity (project activities with starting date on or after 02 August 2008) or an existing project activity (project activities with a start date before 02 August 2008)?	VVM	98	It is an existing project activity – start date is 23/01/2008, which is prior to 02 August 2008.	OK	OK
g. For a new project, for which PDD has not been published for global stakeholder consultation or a new methodology proposed to the Executive Board before the project activity start date, had the PP informed the Host Party DNA and/or the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status? (Provide reference to such confirmation from Host Party DNA and/or UNFCCC secretariat).	VVM	99	Not applicable, Refer (f.f- Prior consideration) above.	OK	OK
h. For an existing project activity, for which the start date is prior to the date of publication of the PDD for global stakeholder consultation, are the following evidences provided:	VVM	100			
ii. evidence that must indicate that awareness of the CDM prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project, including, inter alia:	VVM	100	The PP has presented in Board decision that the benefits of CDM is required to make the project feasible. The same has been cross checked with the minutes of meeting (37/7) in Board register at the GSEG head office, the decision was taken on 25 th Sep 2007.	OK	OK
a. minutes and/or notes related to the consideration of the decision by the Board			Refer (6.a.h.ii) above	--	--


**BUREAU
VERITAS**

VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
of Directors, or equivalent, of the project participant, to undertake the project as a proposed CDM project activity?					
iii. reliable evidence from project participants that must indicate that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation, including, inter alia:	VVM	100			
a. contract with consultants for CDM/PDD/methodology services?	VVM	100	Consultant for CDM appointed on 08/05/2008.	OK	OK
b. Emission Reduction Purchase Agreements or other documentation related to the sale of the potential CERs (including correspondence with multilateral financial institutions or carbon funds)?	VVM	100	Not available	OK	OK
c. evidence of agreements or negotiations with a DOE for validation services?	VVM	100	Work Order from GSEG to BVC	OK	OK
d. submission of a new methodology to the CDM Executive Board?	VVM	100	Not applicable	OK	OK
e. publication in newspaper?	VVM	100	Not Applicable	Ok	OK
f. interviews with DNA?	VVM	100	Date for interview with DNA (or any communication) not mentioned in PDD : the chronology table in section B.5 needs to be updated accordingly	CL-13	--
g. earlier correspondence on the project with the DNA or the UNFCCC secretariat?	VVM	100	Date for interview with DNA (or any communication) not mentioned in PDD:	(CL-13)	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			chronology table in section B.5 needs to include dates of correspondence with the DNA or UNFCCC , as applicable, regarding the CDM project activity		
b. Identification of alternatives					
a. Does the approved methodology that is selected by the proposed CDM project activity prescribe the baseline scenario and hence no further analysis is required?	VVM	103	The approved methodology is AM0029, which describes the baseline scenario, hence no further analysis is required.	OK	OK
b. If no, does the PDD identify credible alternatives to the project activity in order to determine the most realistic baseline scenario?	VVM	103	Not applicable	OK	OK
c. Does the list of alternatives given in the PDD ensure that:	VVM	104			
i. the list of alternatives includes as one of the options that the project activity is undertaken without being registered as a proposed CDM project activity?	VVM	104	OK, alternative 1 in the PDD is : Power generation using natural gas as fuel and combined cycle technology without CDM revenues (Project activity) in the section B.4.	OK	OK
ii. the list contains all plausible alternatives that the DOE, on the basis of its local and sectoral knowledge, considers to be viable means of supplying the outputs or services that are to be supplied by the proposed CDM project activity?	VVM	104	The Project Participant has considered various plausible alternatives, however, justification for not including the alternative of “partial generation of the capacity through the project activity and partially through other means” for consideration as another baseline alternative is need to be provided	(CL-5)	--
iii. the alternatives comply with all applicable and enforced legislation?	VVM	104	OK, the alternatives identified comply with enforced legislation.	OK	OK
c. Investment analysis					



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
a. Has investment analysis been used to demonstrate the additionality of the proposed CDM project activity?	VVM	106	Yes, to demonstrate the additionality of the proposed CDM project activity, investment analysis is carried out.	OK	OK
b. If yes, does the PDD provide evidence that the proposed CDM project activity would not be:	VVM	106			
i. the most economically or financially attractive alternative?	VVM	106	OK, the methodology AM0029 requires a benchmark investment analysis to be carried out to justify that the project is additional. However, the lowest cost of power generation per kWh among the baseline alternatives, which is not in line with the requirements for selecting benchmark, given in the Tool for demonstration and assessment of additionality.	(CL 4)	--
ii. economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs)?	VVM	106	The PP has demonstrated that without the revenue from sale of certified emission reductions the proposed project activity is not economically or financially feasible. However, the lowest cost of power generation per kWh among the baseline alternatives, which is not in line with the requirements for selecting benchmark, given in the Tool for demonstration and assessment of additionality.	(CL 4)	--
c. Was this shown by one of the following	VVM	107			



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
approaches?					
i. Demonstrate that the proposed CDM project activity would produce no financial or economic benefits other than CDM-related income. Document the costs associated with the proposed CDM project activity and the alternatives identified and demonstrate that there is at least one alternative which is less costly than the proposed CDM project activity.	VVM	107	Not applicable, the proposed CDM project activity would produce financial benefits other than CDM-related income, by sale of electricity it has generated.	OK	OK
ii. The proposed CDM project activity is less economically or financially attractive than at least one other credible and realistic alternative.	VVM	107	OK, refer (6.c.b.i-investment analysis) above.	OK	OK
iii. The financial returns of the proposed CDM project activity would be insufficient to justify the required investment.	VVM	107	OK, refer (6.c.b.i-investment analysis) above.	OK	OK
d. Is the period of assessment limited to the proposed crediting period of the CDM project activity?	EB 41	Ann 45	NO, the period of assessment is not limited to the proposed crediting period of the CDM project activity. Instead it is upto 20 years.	OK	OK
e. Does the project IRR and equity IRR calculations reflect the period of expected operation of the underlying project activity (technical lifetime), or - if a shorter period is chosen - include the fair value of the project activity assets at the end of the assessment period?	EB 41	Ann 45	Refer (6.c.d – investment analysis) above.	OK	OK
f. Does the IRR calculation include the cost of major maintenance and/or rehabilitation if these	EB 41	Ann 45	The project participant has carried out the Levelised Cost analysis. This involves O &	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
are expected to be incurred during the period of assessment?			M cost also.		
g. Do the project participants justify the appropriateness of the period of assessment in the context of the underlying project activity, without reference to the proposed CDM crediting period?	EB 41	Ann 45	Ok, the period of assessment is 20 years, project activity expected life time is also 20 years, and crediting period is 10 years.	OK	OK
h. Does the cash flow in the final year include a fair value of the project activity assets at the end of the assessment period?	EB 41	Ann 45	The lowest cost of power generation per kWh among the baseline alternatives, which is not in line with the requirements for selecting benchmark, given in the Tool for demonstration and assessment of additionality. Please Clarify	(CL 4)	--
i. Has the fair value been calculated in accordance with local accounting regulations where available, or international best practice?	EB 41	Ann 45	Refer 6.c.h (above)	OK	OK
j. Does the fair value calculations include both the book value of the asset and the reasonable expectation of the potential profit or loss on the realization of the assets?	EB 41	Ann 45	Refer 6.c.h (above)	OK	OK
k. Was depreciation, and other non-cash items related to the project activity, which have been deducted in estimating gross profits on which tax is calculated, added back to net profits for the purpose of calculating the financial indicator (e.g. IRR, NPV)?	EB 41	Ann 45	Refer 6.c.h (above)	.OK	OK
l. Has taxation been included as an expense in the	EB	Ann	The project participant has carried out	Ok	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
IRR/NPV calculation in cases where the benchmark or other comparator is intended for post-tax comparisons?	41	45	Levelised cost of generation, hence levelised cost of tariff for financial calculations Taxes are included as expenses		
m. Are the input values used in all investment analysis valid and applicable at the time of the investment decision taken by the project participant?	EB 41	Ann 45	All the relevant values are taken from CERC tariff, notifications and CEA data and DPR However, Station heat rate, Calorific Value and other input parameters are referred from DPR. PP need to provide DPR and other supporting documents for the input values	CL 14	--
n. Is the timing of the investment decision consistent and appropriate with the input values?	EB 41	Ann 45	OK, the timing of investment decision is consistent and appropriate. However, the start date of the project activity is stated on page 33 (Common practice analysis) as year 2005; however, the actual start date stated in C.1.1 is in 2008	(CL 9)	OK
o. Are all the listed input values been consistently applied in all calculations?	EB 41	Ann 45	Refer 6.c.h and 6.c.m (above)	(CL 4) (CL 14)	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
p. Does the investment analysis reflect the economic decision making context at point of the decision to recommence the project in the case of project activities for which implementation ceases after the commencement and where implementation is recommenced due to consideration of the CDM?	EB 41	Ann 45	Not applicable	OK	OK
q. Have project participants supplied the spreadsheet versions of all investment analysis?	EB 41	Ann 45	Yes, Refer 6.c.h (above)	OK	OK
r. Are all formulas used in this analysis readable and all relevant cells be viewable and unprotected?	EB 41	Ann 45	Yes, Refer 6.c.h (above)	OK	OK
s. In cases where the project participant does not wish to make such a spreadsheet available to the public has the PP provided an exact read-only or PDF copy for general publication?	EB 41	Ann 45	Not applicable	OK	OK
t. In case the PP wishes to black-out certain elements of the publicly available version, is it justifiable?	EB 41	Ann 45	Not applicable	OK	OK
u. Was the cost of financing expenditures (i.e. loan repayments and interest) included in the calculation of project IRR?	EB 41	Ann 45	Refer (6.c.h -6.c.m –investment analysis) above. The interest on loan is considered @8.0% in the levelised cost for all alternatives.	OK	OK
v. In the calculation of equity IRR, has only the portion of investment costs which is financed by	EB 41	Ann 45	Refer (6.c.h -6.c.m –investment analysis) above.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
equity been considered as the net cash outflow?					
w. Has the portion of the investment costs which is financed by debt been considered a cash outflow in the calculation of equity IRR? (this is not allowed)	EB 41	Ann 45	Refer (6.c.h -6.c.m –investment analysis) above.	OK	OK
x. In cases where a benchmark approach is used is the applied benchmark appropriate to the type of IRR calculated?	EB 41	Ann 45	Benchmark approach is used, however, project participant has not done IRR calculation, instead PP has opted for Levelised cost analysis.	(CL 4)	--
y. Has local commercial lending rates or weighted average costs of capital (WACC) selected as appropriate benchmarks for a project IRR?	EB 41	Ann 45	Not applicable	OK	OK
z. Has required/expected returns on equity selected as appropriate benchmark for an equity IRR?	EB 41	Ann 45	Refer (6.c.x – investment analysis) above	OK	OK
aa. In case benchmarks supplied by relevant national authorities selected is it applicable to the project activity and the type of IRR calculation presented?	EB 41	Ann 45	Refer (6.c.x – investment analysis) above	OK	OK
bb. In the cases of projects which could be developed by an entity other than the project participant is the benchmark applied based on publicly available data sources which can be clearly validated?	EB 41	Ann 45	Refer (6.c.x – investment analysis) above	OK	OK
cc. Have internal company benchmarks/expected returns (including those used as the expected return on equity in the calculation of a weighted average cost of capital - WACC) been applied in cases where there is only one possible project developer?	EB 41	Ann 45	No, internal company benchmark/expected returns is not selected.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
dd. In such cases, have these values been used for similar projects with similar risks, developed by the same company or, if the company is brand new, would have been used for similar projects in the same sector in the country/region?	EB 41	Ann 45	Refer (6.c.z.cc – investment analysis) above	OK	OK
ee. Has a minimum clear evidence of the resolution by the company's Board and/or shareholders been provided to the effect as above?	EB 41	Ann 45	Refer (6.c.z.cc – investment analysis) above	OK	OK
ff. Has a thorough assessment of the financial statements of the project developer - including the proposed WACC - to assess the past financial behavior of the entity during at least the last 3 years in relation to similar projects been conducted?	EB 41	Ann 45	Since the financial indicator selected is the levelised cost per kWh of power produced, and the same indicators used to justify the baseline as well as claim the additionality of the project activity, the past financial behaviour is not of relevant consideration	OK	OK
gg. Does the risk premiums applied in the determination of required returns on equity reflect the risk profile of the project activity being assessed, established according to national/international accounting principles? (It is not considered reasonable to apply the rate general stock market returns as a risk premium for project activities that face a different risk profile than an investment in such indices.)	EB 41	Ann 45	The project participant has considered a return on equity of 14% as per CERC tariff regulations, in respect of power generation from similar gas based power projects. Hence, the returns from the project activity reflect the risk profile of the project activity	OK	OK
hh. Has an investment comparison analysis and not a benchmark analysis used when the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services?	EB 41	Ann 45	Yes, Levelized cost analysis is done for the project activity.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. Have variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues been subjected to reasonable variation (positive and negative) and the results of this variation been presented in the PDD and be reproducible in the associated spreadsheets?	EB 41	Ann 45	<p>Yes, reasonable variation (positive 10% and negative 10%) have been considered and results of this variation been presented in the PDD and in the associated spreadsheet.</p> <p>PP has performed the sensitivity analysis on following parameter:-</p> <ol style="list-style-type: none"> 1. Project cost 2. Plant load factor 3. Station heat rate 4. Fuel Price 5. Fuel price escalation 	OK	OK
jj. Have a corrective action been raised for a variable to be included in the sensitivity analysis which constitute less than 20% and have a material impact on the analysis ?	EB 41	Ann 45	No, refer (6.c.z-ii- investement analysis) above.	OK	OK
kk. Is the range of variations selected is reasonable in the project context?	EB 41	Ann 45	OK, the range of variations selected is reasonable.	OK	OK
ll. Dos the variations in the sensitivity analysis at least cover a range of +10% and -10%, unless this is not deemed appropriate in the context of the specific project circumstances?	EB 41	Ann 45	OK, the variations in the sensitivity analysis cover a range of +10% and -10%	OK	OK
mm. In cases where a scenario will result in the project activity passing the benchmark or becoming the most financially attractive alternative, is an assessment done of the probability of the occurrence of this scenario in	EB 41	Ann 45	Not applicable	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
comparison to the likelihood of the assumptions in the presented investment analysis, taking into consideration correlations between the variables as well as the specific socio-economic and policy context of the project activity?					
nn. Was a thorough assessment of all parameters and assumptions used in calculating the relevant financial indicator, and determine the accuracy and suitability of these parameters using the available evidence and expertise in relevant accounting practices conducted?	VVM	109	OK	OK	OK
oo. Were the parameters cross-checked against third-party or publicly available sources, such as invoices or price indices?	VVM	109	The project capacity mentioned in the PDD is 351.43 MW. The discrepancy in the capacity figures found in Board decision and needs to be explained. Some of the other documents also show different capacity e.g REC sanction letter dated 18/01/2008 CEA link provided is not appropriate	CL-15	--
pp. Were feasibility reports, public announcements and annual financial reports related to the proposed CDM project activity and the project participants reviewed?	VVM	109	Yes	OK	OK
qq. Was the correctness of computations carried out and documented by the project participants assessed?	VVM	109	Refer 6.c.z.oo (above)	OK	OK
rr. Was the sensitivity analysis by the project	VVM	109	PP need to perform the analysis of	(CL 4)	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
participants to determine under what conditions variations in the result would occur, and the likelihood of these conditions assessed?			conditions at which project activity will cross the bench mark. Refer 6.c.h (above)		
ss. Is the type of benchmark applied is suitable for the type of financial indicator presented?	VVM	110	The benchmark selected is the lowest cost of power generation for the baseline alternative. Such a benchmark is not in line with the Tool for the demonstration and assessment of additionality	(CL 4)	--
tt. Do any risk premiums applied determining the benchmark reflect the risks associated with the project type or activity?	VVM	110	Please refer remarks in (6.c.z.gg) above	OK	OK
uu. To determine this, was it assessed whether it is reasonable to assume that no investment would be made at a rate of return lower than the benchmark by:					
i. assessing previous investment decisions by the project participants involved?	VVM	110	Not applicable	OK	OK
ii. determining whether the same benchmark has been applied?	VVM	110	Not applicable	OK	OK
iii. determining if there are verifiable circumstances that have led to a change in the benchmark?	VVM	110	Not applicable	OK	OK
vv. Did the project participants rely on values from Feasibility Study Reports (FSR) that are approved by national authorities for proposed project activities?	VVM	111	Feasibility Study Reports (FSR) was not shown during validation team's visit. Refer CL 14.	Refer CL 14	--
tt. If yes:	VVM	111			
i. has the FSR been the basis of the decision	VVM	111	Refer (6.c.z.vv-investment analysis above)	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
to proceed with the investment in the project, i.e. that the period of time between the finalization of the FSR and the investment decision is sufficiently short for the DOE to confirm that it is unlikely in the context of the underlying project activity that the input values would have materially changed?					
ii. Are the values used in the PDD and associated annexes fully consistent with the FSR?	VVM	111	Refer (6.c.z.vv-investment analysis above)	OK	OK
iii. If not, was the appropriateness of the values validated?	VVM	111	Refer (6.c.z.vv-investment analysis above)	OK	OK
iv. On the basis of its specific local and sectoral expertise, is confirmation provided, by cross-checking or other appropriate manner, that the input values from the FSR are valid and applicable at the time of the investment decision?	VVM	111	Refer (6.c.z.vv-investment analysis above)	OK	OK
d. Barrier analysis					
a. Has barrier analysis been used to demonstrated the additionality of the proposed CDM project activity?	VVM	113	No, the project participant has not opted for barrier analysis. This is allowable as per "Tool for the demonstration and assessment of additionality" (Version 05.2)	OK	OK
b. If yes, does the PDD demonstrate that the proposed CDM project activity faces barriers that:	VVM	113	Refer (6.d.a barrier analysis) above	OK	OK
i. prevent the implementation of this type of	VVM	113	Refer (6.d.a barrier analysis) above	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
proposed CMD project activity?					
ii. do not prevent the implementation of at least one of the alternatives?	VVM	113	Refer (6.d.a barrier analysis) above	OK	OK
c. Are there any issues that have a clear direct impact on the financial returns of the project activity, other than: risk related barriers, for example risk of technical failure, that could have negative effects on the financial performance; or barriers related to the unavailability of sources of finance for the project activity? {If yes, these issues cannot be considered barriers and shall be assessed by investment analysis. [Refer to (6.c) above]}	VVM	114	Refer (6.d.a barrier analysis) above	OK	OK
d. Were the barriers determined as real by:	VVM	115			
i. assessing the available evidence and/or undertaking interviews with relevant individuals (including members of industry associations, government officials or local experts if necessary) to determine whether the barriers listed in the PDD exist?	VVM	115	Refer (6.d.a barrier analysis) above	OK	OK
ii. ensuring that existence of barriers is substantiated by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics?	VVM	115	Refer (6.d.a barrier analysis) above	Ok	Ok
iii. Is existence of a barrier substantiated only by the opinions of the project participants? (If yes, this barrier cannot be considered as adequately substantiated)	VVM	115	Refer (6.d.a barrier analysis) above	Ok	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
e. Were the barriers determined as preventing the implementation of the project activity but not the implementation of at least one of the possible alternatives by applying local and sectoral expertise to judge whether a barrier or set of barriers would prevent the implementation of the proposed CDM project activity and would not equally prevent implementation of <i>at least one of</i> the possible alternatives, in particular the identified baseline scenario?	VVM	115	Refer (6.d.a barrier analysis) above	Ok	OK
e. Common practice analysis					
a. Is this a large-scale, or first-of-its kind small-scale project activity?	VVM	117	Yes, this is a large scale project activity.	OK	OK
b. If yes, was common practice analysis carried out as a credibility check of the other available evidence used by the project participants to demonstrate additionality?	VVM	117	Yes, common practice analysis carried out as a credibility check of the other available evidence used by the project participants to demonstrate additionality	OK	OK
c. Was it assessed whether the geographical scope (e.g. defined region) of the common practice analysis is appropriate for the assessment of common practice related to the project activity's technology or industry type? (For certain technologies the relevant region for assessment will be local and for others it may be transnational/global.	VVM	118	The geographical scope is defined is India.	OK	OK
d. Was a region other than the entire host country chosen?	VVM	118	No, the region is within host country	OK	OK
e. If yes, was the explanation why this region is more appropriate assessed?	VVM	118	Not applicable	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
f. Using official sources and local and industry expertise, was it determined to what extent similar and operational projects (e.g., using similar technology or practice), other than CDM project activities, have been undertaken in the defined region?	VVM	118	Yes, The CDM PDD describes about region specific activities similar to project activity.	OK	OK
g. Are similar and operational projects, other than CDM project activities, already "widely observed and commonly carried out" in the defined region?	VVM	118	No, similar operational projects are not widely observed and commonly carried out in the define region, the PDD mentions penetration of similar activity to the tune of 16.96% only i.e. electricity generation from Natural Gas, rest of the electricity generation is by other means.	OK	OK
h. If yes, was it assessed whether there are essential distinctions between the proposed CDM project activity and the other similar activities?	VVM	118	Refer (g.- common practice analysis) above.	OK	OK
7. Monitoring plan					
a. Does the PDD include a monitoring plan?	VVM	120	Yes it included in section 7.2 and Annex 4	OK	OK
b. Is this monitoring plan based on the approved monitoring methodology applied to the proposed CDM project activity?	VVM	120	Yes, the monitoring plan is based on the approved monitoring methodology AM0029.	OK	OK
c. Were the list of parameters required by the the selected methodology identified?	VVM	121	Yes, list of parameters as per selected methodology identified in section 7.1	OK	OK
d. Does the monitoring plan contains all necessary parameters?	VVM	121	Yes, refer 3.t.1 above	(CAR 12)	--
e. Are the parameters clearly described?	VVM	121	Yes	OK	OK
f. Does the means of monitoring described in the plan comply with the requirements of the	VVM	121	Yes	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
methodology?					
g. Specific questions per methodology regarding parameters. 1) Is the AM 0029 monitoring methodology used in conjunction with the baseline methodology ? 2) Do the following parameters get monitored in the proposed project activity ? 1. Annual fuel(s) consumption in project activity; 2. Net Calorific Value(s) of the fuel used in the project activity; 3. Fuel emission factors for fuel used in the project activity. 3) Are the baseline emissions monitored in accordance with the Tool to calculate the emission factor for an electricity system ?	AM 0029		1) Both baseline and monitoring methodologies are used in conjunction with each other 2) All the listed parameters are included in the monitoring plan described in the PDD 3) Baseline emission factor is calculated as per the tool to calculate the emission afctor for an electricity system. Consequently, the baseline emissions are also as per the same tool.	OK	OK
h. Are the monitoring arrangements described in the monitoring plan feasibl within the project design?	VVM	121	PP need to provide following calrification/documents: Energy/mass Flow diagram of the Plant is not mentioned in the PDD as per completeness guidance of PDD.	CAR 15	--
i. Are the following means of implementation of the monitoring plan sufficient to ensure that the emission reductions achieved by/resulting from	VVM	121			



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
the proposed CDM project activity can be reported ex post and verified:					
i. Data management procedures?	VVM	121	No, please refer CAR 12 ,CL 8 and CL 7		
ii. quality assurance procedures?	VVM	121	PP need to clarify following:- 1) During site visit validation team has noted that the check meter for Gas consumption is not yet installed, as the project is in construction phase. Please explain the check meter provision for cross checking if any. 2) For electricity meter, calibration frequency is specified as once in 5 yrs as per CEA meter regulations-2006. However, the manufacturer's recommendations in respect of the same is not provided.	CL 16	--
iii. quality control procedures?	VVM	121	Refer (7.i.ii – monitoring plan) above	(CL 16)	
8. Sustainable development					
a. Does the CDM project activity assists Parties not included in Annex I to the Convention in achieving sustainable development?	VVM	123	The Project Participant has narrated the contribution of project activity to sustainable development.PP also stated that the 2% of the revenue accrued by sale of CER will be used towards sustainable development annually and plan for above mentioned expenditure is explained in Annex 04 of the PDD.	(CL 2)	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			However, No such information provided in Annex 4 Clarify how the investment is planned to be done towards sustainable development.		
b. Does the letter of approval by the DNA of the host Party confirm the contribution of the proposed CDM project activity to the sustainable development of the host Party?	VVM	124	The host party has approved the project activity vide its letter no. 4/21/2011-CCC dtd. 20 October 2011. However, title of the project activity mentioned in the HCA is not consistent with the Webhosted PDD.	(CL 1)	--
9. Local stakeholder consultation					
a. Were local stakeholders (public, including individuals, groups or communities affected, or likely to be affected, by the proposed CDM project activity or actions leading to the implementation of such an activity) invited by the PPs to comment on the proposed CDM project activity prior to the publication of the PDD on the UNFCCC website?	VVM	126	Yes, local stakeholders were invited on 28 th december 2007	OK	OK
b. Have comments by local stakeholders that can reasonably be considered relevant for the proposed CDM project activity been invited?	VVM	127	Yes, relevant comments have been invited for the proposed project activity.	OK	OK
c. Is the summary of the comments received as provided in the PDD complete?	VVM	127	Yes	OK	OK
d. Have the project participants taken due account of any comments received and described this process in the PDD?	VVM	127	Yes, the Project participant has taken care for comments from stake holder.	--	--



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
10. Environmental impacts					
a. Have the project participants submitted documentation on the analysis of the environmental impacts of the project activity?	VVM	129	Section D.2 mentions The EIA study revealed that there are no significant environmental impacts. Documents related to this are not shown to DOE during validation visit.	(CAR 14)	--
b. Have the project participants undertaken an analysis of environmental impacts?	VVM	130	Yes, the environmental analysis is carried out	OK	OK
c. Does the host Party require an environmental impact assessment?	VVM	130	Yes	OK	OK
d. If yes, have the project participants undertaken an environmental impact assessment?	VVM	130	Yes, refer 10.a above	OK	OK

VALIDATION REPORT

Table 2 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 1	Summary of project owner response	Validation team conclusion
CL 1 Host Country Approval The host party has approved the project activity vide its letter no. 4/21/2011-CCC dtd. 20 October 2011. However, title of the project activity mentioned in the HCA is not consistent with the Webhosted PDD.	Table 1 1.a	It is a typographical error by the host party. Revised HCA stating the project title as "351.43 MW Natural Gas Based Combined Cycle Power Plant at Hazira, Gujarat", has been submitted to DOE.	The PP has provided the revised HCA stating the project title as "351.43 MW Natural Gas Based Combined Cycle Power Plant at Hazira, Gujarat. The HCA is issued by the DNA of th Host country vide its reference no. 4/21/2011-CCC dated 25/10/2012. Having reviewed this, the validation team closed the CL.
CL 2 Section A.2 The webhosted PDD mentions that the contribution of project activity to sustainable development. PP also stated that the 2% of the revenue accrued by sale of CER will be used towards sustainable development annually and plan for above mentioned expenditure is explained in Annex 04 of the PDD. However, No such information is provided in Annex 4. Pl. clarify.	Table 1.3.d.iii	The statement viz. "monitoring plan proposed for the expenditure is included in Annex 4 of the PDD" has been removed in the revised PDD.	The PP has removed the sentence ""monitoring plan proposed for the expenditure is included in Annex 4 of the PDD". This is evident in revised PDD, CL-2 is closed.
CL 3 section B.4	Table	1. Efficiency of the alternative i.e. "power generation using natural	



VALIDATION REPORT

<p>Most plausible baseline scenarios are identified in accordance with the selected baseline methodology.</p> <p>However, PP need to clarify following:-</p> <ol style="list-style-type: none"> 1. For Alternative 2.1, efficiency for the combined cycle is not mentioned. Similarly for other alternatives where applicable. 2. For alternative 3.1 PP need to justify how the capacity 210 MW is commonly available size for power generation from coal/lignite (the source is not available) <ol style="list-style-type: none"> 1. For alternative 3.2 PP need to provide the supporting document for "the super critical technology is commercially available in turbine capacity of 500 MW, 600 MW , 800 MW and above." PP need to specify whether the proposed alternative is considered as a baseline scenario or not. 	1.3.n.i	<p>gas as fuel and combined cycle technology without CDM revenues (Project activity)" has been mentioned in the revised PDD.</p> <ol style="list-style-type: none"> 2. The statement on available capacity of coal/lignite based power project has been revised in the PDD and also reference has been inserted to evident the source. <ol style="list-style-type: none"> 3. The reference to the capacity of the available super-critical power plant has been provided in the revised document. <p>It has been stated that power generation using super-critical technology has been considered as plausible baseline alternative.</p>	<ol style="list-style-type: none"> 1 Efficiency of the alternative i.e. "power generation using natural gas as fuel and combined cycle technology without CDM revenues (Project activity)" has been mentioned in the revised PDD, hence, this point is closed. 2. for the availability of 210 MW coal based power station, the PP has provided the source as "http://www.cercind.gov.in/13042007/Terms and conditions of tariff.pdf ; Page (10 of 72)". This describes various capacity available in India for the coal based thermal power station, having reviewed this the validation team closed the CL. 3. As clarified by the PP, the super critical technology and the commercially available power plant in India, is of 660 MW, hence, for levelized cost, it has considered 660 MW, which is correct, hence, closed this point.
--	---------	--	---



VALIDATION REPORT

<p>2. Alternative 4, The project activity is exporting power to NEWNE grid, PP need to clarify how the import of electricity from the WESTERN grid is found appropriate as one of the plausible baseline scenario.</p>		<p>4. Please refer to the approved baseline methodology AM0029 version – 03. As per the methodology “import of electricity from connected grids, including the possibility of new interconnections” has been considered as plausible baseline alternatives. Hence inclusion of alternative 4 (i.e. import of electricity from connected grids, including the possibility of new interconnections) is in accordance with the approved baseline methodology AM0029, version -03.</p>	<p>4. The AM 0029 methodology requires imports from connected grids to be defined as one of the competing scenarios. PP has considered the same as an alternative to the project activity, hence, this point is closed.</p> <p>All the points of CL 3 are closed. Hence the CL is Closed.</p>
<p>CL 4 Section B.5 Use of latest version for investment analysis, Benchmark analysis</p> <p>The additionality of the project is mentioned in PDD section B.5</p> <p>Following requires clarification :</p> <p>1) Use of the latest version of Investment analysis is not done by the PP.</p>	<p>Table 1.3.o.i</p>	<p>The PDD has been revised referring to the latest version of the investment analysis guideline.</p> <p>The investment analysis section of the PDD has been revised. In the revised document benchmark analysis has also been included considering project IRR as the financial indicator and WACC as the investment benchmark.</p>	<p>1) The latest guidance on investment analysis (EB 62 Annex 5) is referred to in the revised PDD.</p> <p>2) The revised PDD now contains benchmark analysis with the IRR chosen as a financial indicator and compared with a benchmark determined as the weighted average cost of capital (WACC)</p> <p>All the points of the CL are closed, hence, the CL-4 is closed.</p>



VALIDATION REPORT

<p>3) It is stated in the web hosted PDD that "If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate also methodology AM0029 requires a benchmark investment analysis. However, in the web hosted PDD additionality is not demonstrated through Benchmark, PL. explain.</p>			
<p>CL 5</p> <p>Data Source is required to be supported/demonstrated for the data used to determine the baseline scenario for the following :</p> <p>(1) Project participant is required to provide justification for not including the alternative of "partial generation of the capacity through the project activity and partially through other means" for consideration as another baseline alternative</p> <p>(2) PP is required to provide the supporting documents for the values considered for</p>	<p>Table 1.3.o.iii</p>	<p>1. The plausible baseline alternatives have been identified following the guideline mentioned in the approved methodology, version - 03. The alternative as suggested i.e. partial generation of the capacity through the project activity and partially through other means have not been mentioned as baseline alternative in AM0029, version -03.</p> <p>2. The reference for PLF and O&M escalation have been included in</p>	<p>1) The AM 0029 methodology does not specifically require the comparable alternatives in the baseline to be of the same capacity as the project activity. Hence, the justification provided by the PP can be accepted., hence, this point is closed.</p> <p>2) Supporting documents (DPR for PLF) and the CERC tariff order for</p>



VALIDATION REPORT

Baseline scenario. (PLF. O&M esclation etc.)		the financial model for levelised cost computation. The references e.g. DPR (PLF) and CERC tariff order dated 26 th March, 2004 (O&M escalation) have been submitted to the DOE.	O&M costs are submitted by the PP, hence, this point is closed. All the points of CL 5 are closed, hence, CL is closed.
CL 6 section B.6.3 The ex ante calculation of project emissions, baseline emissions (or, where applicable, direct calculation of emission reductions) and leakage emissions expected during the crediting period, are used according to the approved baseline methodology AM0029. The emission reductions E _R by the project activity is calculated using the equation 6 of AM0029 version 03 applying all relevant equations provided in the approved methodology. However, following needs clarification : The basis for the following values needs to be specified : a) 80% PLF b) 3% auxiliary power consumption	Table 1.3.r.i	PLF 80% and auxiliary consumption 3% have been sourced from the DPR of the project activity.	The copy of DPR is submitted by the PP. The "Appendix VI-1" of the DPR describes the value of PLF = 80% and auxiliary consumption as 3%, hence, CL 6 is Closed.
CL 7 O & M structure The O&M structure that the PP will implement in order to monitor emission reduction is provided in the section B.7.2 of the PDD with their responsibilities.	Table 1.3.u.ii		



VALIDATION REPORT

<p>However PP need to clarify following:-</p> <p>1. It is stated in the web hosted PDD that a specialized training programme was conducted by GSEGL through BHEL. Pl. provide evidence.</p> <p>2. As stated in the PDD, "PP will assign an official to oversee the activity towards sustainable development achieved through the revenue received from CER's." This is not included in the O & M structure identified, Please clarify</p> <p>3. It is mentioned in the description that the CDM manager will direct O&M team, Fuel Team and CDM team. However, the organogram structure provided is different than description. Pl. clarify.</p>		<p>1. Sentence is revised as "In order to ensure that the key technical personnel in charge of operation and maintenance of the project activity are well versed with the technology and its operations, GSEGL would conduct/arrange specialised training programs as and when required."</p> <p>2. Organization structure in section B.7.2 is revised state that the CDM manager is responsible for implementing sustainable development activities using the 2% CER revenue.</p> <p>3. Organogram is revised as per the description.</p>	<p>1. The project participant has revised the sentence and clarified that the training will be provided as and when required. This is clearly described in section B.7.2 of the revised PDD. Hence this point is closed</p> <p>2. In the revised monitoring structure the responsibility of sustainable development has been assigned to the CDM manager. This is included in O&M structure in section B7.2 of the revised PDD. this being consistent, this point is closed.</p> <p>3. The organogram is revised in the PDD to reflect the assigned, responsibilities, hence, this point is closed.</p> <p>All the point of the CL 7 is closed. Hence, CL 7 is Closed</p>
<p><u>CL 8 Emergency procedure</u></p> <p>Further information on monitoring is given</p>		<p>Emergency procedure is included in section 7.2. If the both the meters (main and check) are found faulty in a</p>	<p>1) It is clarified by the PP that in case of emergency i.e. both</p>



VALIDATION REPORT

<p>in Annex 4. However, PP also need to include following</p> <ol style="list-style-type: none"> 1. Further actions if both the meters (main and check) are found faulty. 2. Why information on monitoring in section 7.2 is not provided, instead complete information is provided in Annex 4, pl. clarify in accordance with PDD completeness guidance. 		<p>particular period, emission reduction for that period would not be calculated.</p> <p>Information on monitoring is provided in section 7.2 of the revised PDD.</p>	<p>the meters are not working for a particular period, PP will forgo the emission reductions, hence, this point is closed.</p> <p>2) Relevant information as PDD completeness guidelines has been provided in section B.7.2 of the PDD hence, this point is closed.</p> <p>All the point of the CL is closed. CL 8 is closed.</p>
<p>CL 9</p> <p>The PDD contains description of the project activity. Following clarifications are required at various places in the PDD :</p> <p>a) Reference to support claim of requirement of natural gas/LNG as 0.42 MMTPA for the project activity. (The applicability condition of the AM 0029 methodology pertaining to "sufficient availability of natural gas in the region, that will not constrain the availability of gas for future projects" has not been objectively demonstrated. In particular, the following aspects are not discussed)</p>	Table 1.4.a	<p>a) Natural gas requirement for the candidate project activity is revised as 541.01 Million SCM/year as per the calculation provided in the attached Annexure 1 (Fuel Demand Supply)</p>	<p>a) The PP has now provided an excel sheet, which demonstrates the requirement of natural gas/LNG for the the candit project and the same is 5137.70 SCM against the gas availability of 39914.29 Millon SCM. This is also described in revised PDD. This clearly shows the availability of the of natural gas in the region, hence, this point is closed.</p>



VALIDATION REPORT

<p>b) PP stated that the 2% of the revenue accrued by sale of CER will be used towards sustainable development annually. Monitoring plan proposed for the expenditure is included in Annex 4 of the PDD, however, the same is not evident in Annex 4.</p> <p>c) The project participant is requested to clarify the maximum possible power generation of the CCPP that would be technically /theoretically possible under the set of conditions that the plant would be expected to operate. Also explain overload capacity of the plant if any.</p> <p>d) PI. clarify why data is used till 2005-06 for demand supply position. As pp presented the demand-supply position for state of Gujarat during 9th year plan. PP need to clarify which 9th year plan pp is referring to</p>		<p>b) Section is revised to remove the statement.</p> <p>c) Please refer to the Performance Guarantee section (section F2) BHEL offer which clearly states that gross electrical output at the generation terminal at baseload and site normal operating condition would be equivalent to 351.43 MW. The relevant section of the BHEL offer is submitted to DOE.</p> <p>d) Table for electricity demand supply is revised to include the data upto 2006-07. The 9th year plan is the 9th 5 year plan of Government of India. The</p>	<p>b) The statement “that the 2% of the revenue accrued by sale of CER will be used towards sustainable development annually. Monitoring plan proposed for the expenditure is included in Annex 4 of the PDD” has been removed and PDD is revised accordingly, hence, this point is Closed.</p> <p>c) The PP has furnished extracts from offer letter from technology supplier. This describes maximum generation as 351430 kw (i.e. 351.43 MW), hence, this point is closed.</p> <p>d) For the demand supply position, the PP has provided data till 2006-07. The same is sourced from the 9th 5 year plan of Government of India. The date of decision for the project activity is 25th September 2007, hence, this is appropriate, hence, closed this</p>
--	--	--	---



VALIDATION REPORT

in section A.2 of the PDD.		same is incorporated in the revised PDD.	point.
e) In table 1 in section A.4.3 of the PDD parameter is not correctly specified		e) Table 1 is revised to state the specifications of parameters and major equipments separately.	e) the PP has now provided all the technical details in section A.3, hence, this point is closed.
f) PP need to clarify how the start up fuel is less than 1% for the proposed project activity in section B.2 of the PDD.		f) Since the project is under construction the consumption of startup fuel is not available at this point in time. However the same may verified during the monitoring period.	f) The PP has clarified that since the plant is not commissioned, the use of start-up fuel is verifiable in the post-implementation scenario in order to determine if the condition of the methodology is adhered to, hence, this point is closed.
g) Units used for Natural gas while describing gas availability is not consistent. The total availability and requirement of natural gas presented in PDD was published on 26 th August 2010. Please clarify how this information is relevant to the project activity whose start date is 23/01/2008.		g) Units of natural gas quantities have been made consistent in the revised PDD. Gas availability and demand section is revised to mention the information sources dated before the startdate of the project activity.	g) The units are corrected in revised PDD. Also, the data pertains to the period of decision making, hence, this point is closed.
h) Source provided for the values of the Gas requirement, gas		h) The reference for the values of the Gas requirement, gas	h) The reference for the values of the Gas requirement, gas consumption and power available has been now provided in the revised PDD, hence,



VALIDATION REPORT

<p>consumption, Power requirement and power available is not appropriate.</p> <p>i) PP has selected the Power generation from Lignite as a baseline scenario. Pl. demonstrate the availability of the Fuel (Lignite) in the project area.</p> <p>j) The start date of the project activity is stated on page 33 (Common practice analysis) as year 2005; however, the actual start date stated in C.1.1 is in 2008. Pl. clarify.</p>		<p>consumption, Power requirement and power available are corrected in the revised PDD.</p> <p>i) As per AM 0029 any fuel/ power plant, which delivers similar services (e.g. peak vs. baseload power) and is connected to same grid can be considered for identifying alternative baseline scenarios. NEWNE grid has many number of lignite fuel based power plants, which can be verified from CEA database version 06. Based on the revised financial calculations Coal - with supercritical technology has been considered as the baseline scenario.</p> <p>j) The start date of the project activity referenced by thee DOE has been corrected. Common practice analysis section is revised as per the</p>	<p>this point is closed.</p> <p>i) As clarified by the PP, any fuel/ power plant, which delivers similar services (e.g. peak vs. baseload power) and is connected to same grid can be considered for identifying alternative baseline scenarios. This is in line with AM 0029, hence, this point is closed.</p> <p>j) The start date of the project activity is revised in the PDD and the common practice analysis is also revised with reference to that date, hence, this point is closed.</p>
--	--	---	--



VALIDATION REPORT

<p>k) Basis for selection of 351.43 MW as the capacity of the project activity at ISO conditions (including details of the ISO conditions) is not clearly mentioned/explained in the web hosted PDD.</p>		<p>“Tool for the demonstration and assessment of additionality”, Version 06, EB65. Which considers all power plants commissioned before the start date of the project activity.</p> <p>k) Please refer to the Performance Guarantee section (section F2) BHEL offer which clearly states that gross electrical output at the generation terminal at baseload and site normal operating condition would be equivalent to 351.43 MW. The relevant section of the BHEL offer is submitted to DOE.</p>	<p>k) The project participant has submitted the ‘Section F 2 of the offer letter’, which clearly mentions the gross out put of the plant = 351430 kw, hence, this point is closed.</p> <p>All the points of CL 9 are closed, hence this point is closed.</p>
<p>CL 10</p> <p>1) The project activity is a large scale project activity. However, the additionality of the project is not explained in line with the latest tool for demonstration and assessment of additionality ex. Use of benchmark is not evident in the web hosted PDD as per Tool.</p> <p>2) The applied Tool for demonstration and assessment of additionality is not latest</p>	<p>Table 1.5.a.h</p>	<p>Section is revised as per the “Tool for the demonstration and assessment of additionality” Version 06.0, EB 65.</p>	<p>Point 1) and 2) : The revised PDD refers to the latest version of the Tool for the demonstration and assessment of additionality [Eb 65 Annex 6]. The revised PDD also contains a benchmark analysis of the financial IRR compared to a weighted average cost of capital (WACC). Also, the financial calculations/approach</p>



VALIDATION REPORT

			has been validated by the Financial expert, hence, CL 10 is closed.
CL 11 The PDD describes the project boundary, however, following discrepancies have been identified : Table 1 (Overview of emission sources included or excluded from project boundary) on page 15 [B.3] needs to be clarified. Upstream methane emissions are considered as leakage emissions but these are not included in the table.	Table 1.5.c.a	Table 1 (Overview of emission sources included or excluded from project boundary) is revised as per AM0029.	Overview of emission sources included or excluded from the project boundary is revised in the section B.3 of the PDD in accordance with the applied methodology AM0029, hence, CL 11 is Closed
CL 12 In the common practice analysis : <ol style="list-style-type: none"> 1. Please provide the document supporting the plants considered for common practice analysis. 2. Under regulatory regime, PP mentioned that 7 Power plants enjoyed special status. Pl. clarify how the regulatory framework is different for installation of current project activity. 3. Please explain the change in investment climate pre and post 	Table 1.6.c.iv	Common practice analysis section is revised as per the "Tool for the demonstration and assessment of additionality", Version 06, EB65, considering the applicable geographical area as the entire host country (i.e. India). The Common Practice Analysis has undergone change. CL – 12 (2) & (3) may not be applicable anymore.	In response to the CL the PP has explained Common practice analysis in accordance with "Tool for the demonstration and assessment of additionality" (Version 06.0.0, EB65. The validation team has reviewed the same and found it appropriate, hence, closed the CL 12.



VALIDATION REPORT

2002 4. Please clarify how the defined region is appropriate for the assessment of common practice analysis.			
CL 13 Date for interview with DNA (or any communication) is not mentioned in PDD. Pl. provide the same.	(6.a.h.iii.f)	Date of interview with DNA is included in section B.2 of the revised PDD.	In reponse to the CL, the PP has now described the chronology of events demonstrating real and continued actions in line with the CDM requirment, hence, CL 13 is closed.
CL 14 All the relevant values are taken from CERC tariff, notifications and CEA data and DPR However, Station heat rate, Calorific Value and other input parameters are refered from DPR. Please provide DPR and other supporting documents for the input values Also, CEA link provided is not working. Pl. clarify.	(6.c.m)	CEA links are corrected in the revised PDD. The DPR has been submitted to the DOE.	The PP has now corrected the soucces of different input parametes and values considered thereof. The validation team found that for Baseline emission factor PP has considered CEA website, for Station heat rate , CERC website and DPR is used as a source for PLF, NCV and auxillary consumption .The validation team checked the appropriateness of 'sources, and found them correct, hence, closed the CL 14.
CL 15 The project capacity mentioned in the PDD is 351.43 MW. The discrepancy in the capacity figures found in Board decision and needs to be explained. Some of the other documents also show different capacity e.g REC sanction letter dated	(6.c.oo)	In the meeting, the board has decided to install a natural gas based combined cycle power plant with 350 MW capacity. Subsequently durring bidding process bid was invited. The project capacity 351.43 MW, which is as per the BHEL Offer has been	The PP has clarified that at the time of taking board decision (25/09/2007), the DPR was available to the PP, which described project activity as 350 MW. Based on this, the decision was taken for 350 MW CCPP. Accordingly, PP also floated a tender



VALIDATION REPORT

18/01/2008		<p>considered for PDD. Since most of the activities (e.g. applying for loan) were happening parallel to the bidding process, these documents mention the project capacity as 350 MW.</p> <p>The relevant section of the BHEL offer has been submitted.</p>	<p>inquiry for the capacity of 330 MW to 370 MW power plant. The technology supplier M/s. BHEL provided a bid for the plant capacity as 351.43 MW. Hence, PP has considered this capacity in the web hosted PDD. Also, the same is considered for financial calculations conservatively, hence, this CL is closed.</p>
<p>CL 16</p> <p>PP need to clarify following:-</p> <p>1) During site visit validation team has noted that the check meter for Gas consumption is not yet installed, as the project is in construction phase. Please explain the check meter provision for cross checking if any.</p> <p>2) For electricity meter, calibration frequency is specified as once in 5 years as per CEA meter regulations-2006. However, the manufacturer's recommendations in respect of the same is not provided.</p>	Table 1(7.i.ii)	<p>1. Check meters to measure the gas flow would be installed and maintained by GSEGL. The data from these meters can be used for cross checking the data from GSPL.</p> <p>2. The ABT energy meters (source of SLDC meter reading) at the 220 kV end will be calibrated as per the following regulations</p> <p>a. Central Electricity Authority Regulation, 2006 on installation & operation of energy meters (Reference: http://www.cea.nic.in/reports/regulation/meter_reg.pdf).</p> <p>b. The calibration procedure maintained by GETCO.</p> <p>Both the regulation specifies that the energy meters to be calibrated once in every five years and the same has been mentioned in the PDD</p>	<p>1. The PP's response clarifies that in addition to the main measurement of the gas flow that will be carried out by the gas supplier, the PP also will monitor the same at the project end. This is also described in the Annex 4. The meter that monitors gas flow at the project end is thus the check meter for the readings taken.</p> <p>CL 16.1 is Closed</p> <p>2) For electricity meter, calibration frequency is specified as once in 5 years as per CEA meter regulations-2006, since this being national standard, the validation team accepted this - CL 16.2 is Closed</p> <p>CL is closed</p>



VALIDATION REPORT

CL 17 Please clarify that secondary fuel used (if any) and auxiliary fuel arrangement (if any) for HRSG. Please substantiate the same with evidence.		HRSG proposed by BHEL is an unfired type, which doesn't have any duct burners. The same may verified from Schedule of Technical Particulars-Mechanical Systems section of BHEL offer.	The PP has provided a document viz. BHEL proposal.. The page 2 (Sheet 15 of 92) . The clause 2.1.4 of this page describes that there is no 'Duct burner arrangement'. Having reviewed this, the validation team confirmed that there is no auxiliary fuel arrangement for HRSG, hence, the CL is closed.
CAR 1 Section A.2 The web hosted PDD mentions that the new 351.43 MW gas based power plant Project is proposed to be set up at Taluka-Choryasi, District- Surat, Village Hazira in Gujarat State of India. The host party is India. However, during site visit it has been observed that the site is located in Village Mora. Pl. explain.	Table 1.3.f.i	The name of the village has been mentioned as "Mora" in the revised PDD.	The PDD has been corrected to include the name of village as "Mora" in section A.4.1. CAR-1 is closed.
CAR 2 Section A.4.1.4 The Latitude and Longitude in Degree, minutes and second format are not provided with reference of source.	Table 1.3.f.ii	The latitude and longitude in Degree, minutes and second format, are included in the revised PDD. Reference for the Co-ordinates are provided in a foot note. The location map of the project is included in Section A.4.1.4.	The reference of source for latitude and longitude of the project activity has been provided in section A.4.1.4 of the revised PDD. Hence, CAR 2 is closed
CAR 3 section A.4.3 Explanation of purpose of project activity with scenario existing prior to the start of	Table 1.3.h.ii	The station heat rate of the overall CCPP has been mentioned in section A.2. of the PDD. The values used for temperature, fuel	1. Overall efficiency is stated in



VALIDATION REPORT

<p>project, scope or present activities and the baseline scenario is explained in PDD.</p> <p>Following requires clarification -</p> <ol style="list-style-type: none"> Overall efficiency of CCPP is not mentioned in PDD The values used should be consistent in the PDD(temperature, fuel consumption, Rated capacity) <p>PP is requested to provide supporting documents for following :</p> <ol style="list-style-type: none"> PLF value Fuel supply agreement (Long term) Technical specification for GTG, STG and HRSG 		<p>consumption and rated capacity have been made consistent in the revised PDD.</p> <p>The fuel supply agreement has been submitted to the DOE during validation (Reference: Email communication from GSEG to BVC dated 9th February, 2012).</p> <p>The PLF has been considered at 80% and it has been referred from the DPR. The relevant section of the DPR has been submitted to the DOE.</p> <p>The technical specification of GTG, STG and HRSG are referred from the offer from the EPC contractor. The relevant section of the offer document has been submitted to DOE.</p>	<p>terms of the Station Heat Rate in section A.2, hence, closed.</p> <ol style="list-style-type: none"> The values used for temperature, fuel consumption and rated capacity are now consistently described in PDD, hence, this point is closed. The PLF value is sourced from DPR, carried out by M/s. TCE Consulting Engineering Ltd. Validation team finds this as correct, hence, closed this point. The PP has now provided Fuel supply agreement with GSPL Limited, dated 25/03/2008, having reviewed this, the validation team closed the CAR. The GTG and STG capacity are now included in the revised PDD. The same is sourced from bid offer of technology supplier M/s. BHEL, hence, this point is closed. <p>All the points of the CL are closed, hence, the CAR is closed.</p>
CAR 4 section A.4.3	Table 1.3.h.iv	The emission sources and GHGs involved have been mentioned in	The emission sources and the GHGs involved are stated in a table in



VALIDATION REPORT

The emission sources and GHGs involved are not mentioned in section A.4.3		section A.4.3 of the PDD. Also section B.3 has been referred for further explanation on sources of GHG emission as a result of the project activity.	section B.3. Reference to the same is also included in section A.4.3 of the revised PDD. Hence, the CAR 4 is closed.
CAR 5 The approved methodology and version numbers are mentioned as : Approved baseline methodology AM0029 (version 03 EB39) PL. mention the Approved monitoring methodology used for the project activity.	Table 1.3.k.i	The monitoring methodology AM0029 (version 03 EB39) for "Grid Connected Electricity Generation Plants using Non-Renewable and Less GHG Intensive Fuel", used for project activity is mentioned in section B.1	The project methodology is stated in section B.1 of the revised PDD. Hence, CAR 5 is closed.
CAR 6 section B.1 In the section B.1, Tools mentioned are not latest version.	Table 1.3.k.ii	The latest version of the applicable tools have been referred in section B.1 of the revised PDD.	The latest tools applicable are stated in section B.1 of the revised PDD. Hence, the CAR 6 is closed.
CAR 7 Description of all sources and gases included in the project boundary in the table1, however, PP need to provide the justification for not including CH ₄ as a source for transportation of fuel to project site.	Table 1.3.m.i	The Table 1(i.e. Overview of emissions sources included in or excluded from the project boundary) has been revised in line with the guidance provided in approved baseline methodology AM0029, version-03.	The table showing emissions sources and GHGs is presented in section B.3 of the revised PDD and the same is in line with AM 0029 methodology. CAR 7 is Closed.
CAR 8 The spatial extent of the project boundary does not include all power plants	Table 1.3.m.ii	The schematic representation of the project boundary is revised to include all power plants connected to the NEWNE grid along with metering	The project participant has shown the metering arrangement for the project



VALIDATION REPORT

connected physically to the baseline grid as defined in "Tool to calculate emission factor for an electricity system.		arrangement. A line diagram is included in Annex 4 to show the metering arrangement for natural gas and electricity.	activity in Annex 4 of the revised PDD. Hence, CAR 8 is Closed
<p>CAR 9 Emission reduction calculations</p> <p>The equations used in calculating emission reductions have following inadequacies :</p> <ol style="list-style-type: none"> 1) Value of the EF-build margin and emission factor of fuel identified as baseline scenario (Lignite) is not consistent in the PDD. 2) PP need to substantiate the value of NCV considered for natural gas to be consumed 3) Please clarify why use of IPCC 	Table 1.3.p.ii	<ol style="list-style-type: none"> 1. The value of the EF – build margin and the emission factor of the fuel identified as baseline scenario (coal with supercritical technology) has been made consistent in the PDD. 2. The Detailed Project Report has considered the NCV of Liquefied Natural Gas (LNG) as 8421.70 KCal/Kg. Since the liquefaction of natural gas only changes the physical state* of the gas, the same NCV has been considered for Natural gas (NG). The DPR has been submitted to DOE. 	<ol style="list-style-type: none"> 1) The PP has now consistently described the value of EF – build margin and the emission factor of the fuel identified as baseline scenario i.e. coal with supercritical technology, hence, this point is closed. 2) As clarified by the PP, the Detailed Project Report has considered the NCV of Liquefied Natural Gas (LNG) as 8421.70 KCal/Kg. Since the liquefaction of natural gas only changes the physical state of the gas, the same NCV has been considered for Natural gas (NG). having reviewed this, the validation team closed this point.

* Page no 55; Link: http://www.iea.org/stats/docs/statistics_manual.pdf



VALIDATION REPORT

<p>values, are taken directly, instead of local values e.g. gas supplier data ?</p>		<p>3. The emission factor of natural gas has been considered as 56.1 tCO₂/tJ. This has been referred from Table 1.4, Chapter 1, Volume 2, 2006 IPCC Guidelines for National Greenhouse Gas Inventories.</p> <p>The emission factor of natural gas has been specified in the CEA database, version 06 as 54.3 gCO₂ /MJ.</p> <p>Hence as a conservative estimate the emission factor of natural gas (56.1tCO₂/tJ) has been considered for calculation of emission reduction.</p> <p>The gas supplier does not provide information on emission factor of fuel. The Gas Supply Agreement (GSA) and sample copies of gas invoice have already been provided to DOE to substantiate the same.</p> <p>With regard to oxidation factor of natural gas the IPCC default value has been used as per the guideline provided in the</p>	<p>3) Data on emission factor of natural gas is not available from the gas supplier directly. The fortnightly invoices and daily joint tickets of the gas supplier do not indicate this value. The alternate source, viz., CEA database provides a value which is lower than assumed by the PP. The value of emission factor of natural gas is directly linked to the amount of project emissions; so assuming a higher value is more conservative. Hence, the use of IPCC data that provides a value higher than CEA database is acceptable to the team, hence, this point is closed.</p>
---	--	--	---



VALIDATION REPORT

<p>4) While calculating $COEF_{f,y}$ conversion of value of NCV to TJ/SCM is not correct and unit is also not consistent</p> <p>5) The emission factor for fugitive CH₄ upstream emission for coal and lignite is considered as same. Please explain rationale.</p> <p>6) Equation for Leakage emission</p>		<p>approved monitoring methodology, version -03 (Project emission parameters).</p> <p>4. It is a typographical error in the PDD formula reported in the PDD is revised to show the values individual parameters used and correct unit conversion</p> <p>5. AM 29 specifies the fugitive emission factor for coal as 0.8 tCH₄/ktonne of coal. But for lignite neither IPCC nor AM0029 specifies a value, therefore the conservative value corresponding to open coal mining i.e 0.8 tCH₄/ktonne of lignite is taken for calculating fugitive emission from lignite mining. Moreover lignite is also produced by surface mining method and this can be verified from Neyveli Lignite Corporation's (NLC) website, the leading producer of lignite in India: http://www.nlcindia.com/about/about_01b.htm.</p> <p>6. The equation is corrected.</p>	<p>4. PP has corrected the unit conversion while calculating $COEF_{f,y}$ which is correct, hence, this point is closed.</p> <p>5) As clarified by the PP, there is no separate value provided for fugitive CH₄ upstream emissions for lignite mining in the methodology. As lignite is also extracted through surface mining, the assumption of the same value for lignite is justified, hence, this point is closed.</p>
---	--	---	--



VALIDATION REPORT

due to fugitive upstream methane emission is not as per the applied methodology.			<p>6) The equation was not correctly displayed in webhosted PDD. The equation is now correct and inline with the applied methodology, hence, this point is closed.</p> <p>All the points of CAR 9 are closed, hence, CAR is closed.</p>
<p>CAR 10 section B.6.2</p> <p>Following corrections/justification for the parameters are required -</p> <ol style="list-style-type: none"> 1. The justification provided for the choice of data should also refer to the option selected as per the methodology for BM and OM 2. Pl. provide the value for Calorific value of coal, Naphtha and natural Gas with source. 3. The parameter $EF_{CO_2,f,y}$ is wrongly 	Table 1.3.q.iii	<ol style="list-style-type: none"> 1. Build margin emission factor, which is lowest among all the options, have been selected as the baseline emission factor. The option selected and justification provided in the section B.6.2 of the PDD. 1. The Calorific value for of coal, Naphtha and natural Gas are included with source in section B.6.2. in the revised PDD. 	<ol style="list-style-type: none"> 1. Build margin emission factor, which is lowest among all the options, have been selected as the baseline emission factor and the same has been mentioned in the section B.6.2 of the PDD, hence, this point is closed. 2. The Calorific Values of coal, natural gas and naphtha are provided in the revised PDD in section B.6.2, hence, this point is closed. 3. The required correction is made in the revised PDD, hence, this point is



VALIDATION REPORT

mentioned as Carbon emission factor of natural gas 4. Please provide value of all parameters in the section B.6.2 instead of referring it as 'Refer Annex-6'.		2. The parameter $EF_{CO_2,f,y}$ has been mentioned as CO2 emission factor of natural gas in the revised PDD 4. Section B.6.2 is revised to mention the values of the parameters.	closed. 4. The values are provided in section B.6.2, hence, this point is closed. All the points of CAR 10 is closed, hence, the CAR is closed.
CAR 11 Value of parameter $COEF_{f,y}$ While calculating project emission in section B.6.3 of the PDD, value of $COEF_{f,y}$ is mentioned as 1929.43 tCO ₂ e/Mcum and 1978.08 tCO ₂ e/Mcum, which is not consistent.	Table 1.3.r.ii	The value of $COEF_{f,y}$ has been consistently mentioned as 1978.08 tCO ₂ e/Mcum in the revised PDD.	The value of $COEF_{f,y}$ is corrected to 1978.08 tCO ₂ /million cu. Metres which matches with the calculation provided in the ER spreadsheet. Hence, the CAR-11 is closed
CAR 12 Monitoring Information on how the data and parameters need to be monitored would be collected is provided in tabular format, however following need to be Corrected/clarified. 1. While describing measurement method of $FC_{f,y}$ it is stated that the fuel consumption will be monitored by GSPC. PP to explain the measurement frequency of gas from GSPC i.e. supplier end and at	Table 1.3.t.i	1. It has been stated in the revised PDD that the The total fuel consumption will be monitored by GSPL on daily basis and will be cross-verified by GSEGL fortnightly. This is in accordance with the approved methodology.	1. The monitoring of the parameter $FC_{f,y}$ is revised in the PDD and is in line with the methodology. The monitoring by the gas supplier GSPL is proposed to be done on daily basis, recorded on daily basis and the same will be cross-checked by the PP by means of a gas flow meter installed at the project end, hence, this point is closed.



VALIDATION REPORT

<p>the user end for cross checking in accordance with the methodology..</p> <p>2. For parameter $NCV_{f,y}$ PP has considered 100% NG and 0% RLNG for calculating the value, however during site visit it has been noted that proportion of NG and RLNG as a fuel is not fixed and will be supplied on the basis of availability of NG or RLNG or both with the supplier (combination of fuel). Please clarify.</p> <p>3. For parameter $NCV_{f,y}$ PP need to provide the supporting documents for value considered</p>		<p>2. The method of computing the proportion of NG and RLNG has been mentioned in annex – 4 of the revised PDD.</p> <p>Since the proportion of NG & RLNG will vary as per the actual fuel availability the exact calorific value of the fuel used could not be mentioned.</p> <p>3. The Detailed Project Report has considered the NCV of Liquefied Natural Gas (LNG) as 8421.70 KCal/Kg. Since the liquefaction of natural gas only changes the physical state* of the gas, the same NCV has been considered for Natural gas (NG). The DPR has been submitted to DOE.</p>	<p>2. The revised PDD has included in Annex 4 a formula used for working out the percentage of R-LNG/NG that will be consumed during the actual operation of the plant. The percentage worked out will then be applied in the calculation of the emission reductions that will take place. This provision is included in the CER spreadsheet. However, for the purpose of assumption, the percentage of R-LNG is regarded as zero. Having reviewed this, the validation team closed this point.</p> <p>3. As clarified by the PP, the Detailed Project Report has considered the NCV of Liquefied Natural Gas (LNG) as 8421.70 KCal/Kg. Since the liquefaction of natural gas only changes the physical state of the gas, the same NCV has been considered for Natural gas (NG).</p>
--	--	--	---

* Page no 55; Link: http://www.iea.org/stats/docs/statistics_manual.pdf



VALIDATION REPORT

<p>4. Source of data mentioned for $EF_{co2,f,y}$ is not appropriate.</p> <p>5. For the parameter $EG_{pj,y}$ PP has not mentioned the type/accuracy of meter installed and calibration frequency of the meter.</p> <p>6. For parameter COEF unit mentioned in the table is not as per the applied methodology And values used in calculation is also not consistent in the PDD.</p>		<p>4. Source of data mentioned for $EF_{co2,f,y}$ is revised as per Table 1.4 Chapter 1 (Introduction), Volume 2 (Energy), 2006 IPCC Guidelines for National Greenhouse Gas Inventories.</p> <p>5. For the parameter $EG_{pj,y}$ the type/accuracy of meter installed and calibration frequency have been mentioned in Annex 4 of the PDD.</p> <p>6. Unit has been corrected</p>	<p>4. The source of data (IPCC) is the more conservative among available alternate source (CEA database) and hence its assumption is appropriate, hence, this point is closed.</p> <p>5. The accuracy class of the energy meters is now correctly written as 0.2s in the revised PDD, in Annex 4., hence this point is closed.</p> <p>6. In the revised PDD unit for $COEF_{f,y}$ is now correctly described as $tCo2/m^3$, which is correct. Hence close this point.</p> <p>Since all the points are closed, this CAR is closed.</p>
<p>CAR 13</p> <p>The fixed crediting period is at most 10 years is not mentioned in the section C.2.2 of the PDD</p>		<p>The section C.2.2 is the heading 'Fixed Crediting Period'; the crediting period has been indicated in section C.2.2.2 in-line with the guidelines.</p>	<p>The crediting period is indicated as "Fixed crediting period" and the details of the start date of the crediting period are also mentioned, hence, the CAR is closed.</p>



VALIDATION REPORT

<p>CAR 14</p> <p>Section D.2 mentions The EIA study revealed that there are no significant environmental impacts. Documents related to this are not shown to DOE during validation visit.</p>	<p>Table 1.3.z.ff</p>	<p>EIA study report, carried out by National Environmental Engineering Research Institute (NEERI) and the Environmental clearance received from Ministry of Environment and forest are submitted to DOE.</p>	<p>Project participant has submitted the EIA study report prepared by National Environmental Engineering Research Institute (NEERI), dated May 2006, which does not describe significant aspect due to project activity.</p> <p>In addition, the MOEF clearance vide letter no. J-13011/40/2006-IA.II (T) dated 12/04/2007 issued by the Director, MOEF, Govt. Of India, is submitted, however,</p> <p>Hence, Car 14 is Closed</p>
<p>CAR 15 Section A.4.3</p> <p>Energy/mass Flow diagram of the Plant is not mentioned in the PDD as per completeness guidance of PDD.</p>	<p>(7.h)</p>	<p>Energy and mass flow diagram has been included in section A.4.3 of the revised PDD.</p>	<p>The project participant has revised the PDD and has provided the energy and mass flow diagram in accordance with the PDD completeness guideline.</p> <p>CAR 15 is closed.</p>

**BUREAU
VERITAS****BUREAU
VERITAS**

**APPENDIX B:
COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS**

According to the modalities for the Validation of CDM projects, the DOE shall make publicly available the project design document and receive, within 30 days, comments from Parties, stakeholders and UNFCCC accredited non-governmental organizations and make them publicly available.

BUREAU VERITAS CERTIFICATION published the project documents on the UNFCCC CDM website (<http://cdm.unfccc.int>) on 16/10/2012 and invited comments within 14/11/2012 by Parties, stakeholders and non-governmental organizations. Comments were received for the CDM project “351.43 MW Natural Gas Based Combined Cycle Power Plant at Hazira, Gujarat”. The comments received for the said CDM project are compiled below in tabular format.

Sr. No.	Details of the commenter	Date of Comment	Comment [unedited]	Response by project participant	Explanation on how account is taken by DOE
1.	Comments by Gujarat Forum on CDM	(within the period 16 th October 2011 – 14 th November 2011):	<p>The project is not appropriate for the following points</p> <ul style="list-style-type: none"> → The investment analysis is incomplete and fails to provide the data and assumptions necessary for reader to reproduce the result. → No information has been provided regarding the cost of fuel switch in the PDD. 	<ul style="list-style-type: none"> → List of assumptions with source are in PDD and "input" sheets of all excel sheets. → This is not a fuel switch project activity, Hence the comment is not applicable 	<ul style="list-style-type: none"> → The validation team has thoroughly checked the input sources, they are found appropriate, hence this point is closed. → The candidate CDM project activity is not a fuel switch. It is a grid connected natural gas based electricity



VALIDATION REPORT

Sr. No.	Details of the commenter	Date of Comment	Comment [unedited]	Response by project participant	Explanation on how account is taken by DOE
			<p>→ As per the EIA report the noise level recorded in the individual process units exceeded the stipulated standards of Central Pollution Control Board (CPCB).</p>	<p>→ EIA report of this project does not mention any significant impact noise environment. Further, the GSEGL has planned to develop a green belt surrounding the plant with this impact on noise environment would be insignificant.</p>	<p>generation, hence, this question not relevant, hence, closed.</p> <p>→ The validation team reviewed the EIA report, as reported above, there are no significant impact like noise environment, hence, this point is closed.</p>



VALIDATION REPORT

Sr. No.	Details of the commenter	Date of Comment	Comment [unedited]	Response by project participant	Explanation on how account is taken by DOE
			<p>→ In India there is huge shortage of Natural Gas especially the irregular and interrupted supply of the Gas. At the same time the project proposed to use Natural gas which would further aggravated the problem. In that case the present user of the natural gas would be forced to switch to the alternative such as fossil fuel and ultimately the GHG would be released.</p> <p>→ Hazira is already heavy industrialised area and one more industry will adversely affect the area in environmental prospect. Secondly, Gujarat is a semi arid zone and many areas</p>	<p>→ Surplus availability of gas in this country with references are provided in the PDD.</p> <p>→ Proposed project is Natural Gas based Combined Cycle power plant, which has very minimal impact on the</p>	<p>→ The PP has provided information on Surplus availability of gas in India with references, which is appropriate and justified in the validation report, hence, this point is closed.</p> <p>→ The proposed project activity would use Fresh water intake from Tapi river would also be</p>



VALIDATION REPORT

Sr. No.	Details of the commenter	Date of Comment	Comment [unedited]	Response by project participant	Explanation on how account is taken by DOE
			come under dark water zone. Water is not available even for the irrigation purpose. Company proposed that it will take water from Tapi River which will further intensify the problem and the surrounding villagers, farmer especially marginal farmers would be adversely affected by the companies operation. Lots of complaints have already been found in the area regarding effluence and pollution by industries which are still not solved.	surrounding environment compared to coal based power plant. This does not produce any solid waste. Impact on Air and Water environment is also very minimal. Further, the company has proposed to develop a green belt around plant, which will improve flora and fauna. Fresh water intake from Tapi river would also be within the prescribed limit by Central Pollution Control	within the prescribed limit by Central Pollution Control Board. As this is permitted by CPCB, a central government body, having reviewed this, the validation team closed this point.



VALIDATION REPORT

Sr. No.	Details of the commenter	Date of Comment	Comment [unedited]	Response by project participant	Explanation on how account is taken by DOE
			<p>→ No plan has been submitted regarding use of 2% of the net revenue accrued from the sale of CER toward achieving the sustainable development goals.</p> <p>Gujarat Forum on CDM: gujaratforumoncdm@gmail.com</p>	<p>Board.</p> <p>→ The parent company Gujarat State Petroleum Corporation has been involved in corporate social responsibility and attending to project related environment protection, conservation, and enrichment and development of local communities at project site. The company has a simple philosophy that guides its activities in these matters, "Giving back is a means</p>	<p>→ As clarified by the PP, that 2% of revenue accrued from the sale of CER for the identified project activity would be used for community. This community development project would be identified based on the Sustainability Development guidelines by Department of Public Enterprises, having</p>



VALIDATION REPORT

Sr. No.	Details of the commenter	Date of Comment	Comment [unedited]	Response by project participant	Explanation on how account is taken by DOE
				towards going ahead". Apart from the regular CSR activities by GSPC, GSEGL will identify projects related to community development in and around Hazira and earmark 2% of revenue accrued from the sale of CER for the identified project activity. This community development project would be identified based on the Sustainability Development guidelines by	reviewed this, the validation team closed this point.



VALIDATION REPORT

<i>Sr. No.</i>	<i>Details of the commenter</i>	<i>Date of Comment</i>	<i>Comment [unedited]</i>	<i>Response by project participant</i>	<i>Explanation on how account is taken by DOE</i>
				Department of Public Enterprises*.	

* http://www.dpemou.nic.in/MOUFiles/SD_Guidelines.pdf