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Validation Report

VALIDATION OF THE CDM-PROJECT:
WASTE HEAT RECOVERY AND UTILIZATION FOR
POWER GENERATION AT CHERAT CEMENT COM-
PANY LIMITED, NOWSHERA, PAKISTAN

REPORT NO. 1368941

January 28, 2013

TÜV SÜD South Asia Pvt. Ltd.
Environmental Technology
Carbon Management Service
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INDIA

Report No.	Date of first issue	Revision No.	Revision Date	Certificate No.
1368941	09-11-2010	9	28-01-2013	-

Subject: Validation of the CDM Project / Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan

Accredited TÜV SÜD Unit: TÜV SÜD South Asia Pvt. Ltd. Environmental Technology Carbon Management Service Solitaire, I.T.I. Road, Aundh Pune- 411007 INDIA		
Project Participant(s): <ol style="list-style-type: none"> Cherat Cement Company Limited Beaumont Road Modern Motors House Karachi Sindh 75530 Pakistan (Contracting Company) Carbon Services Private Limited 19 Davis Road 2nd Floor, Al Maalik, Lahore, Punjab, Pakistan First Climate (Switzerland) AG Stauffacherstr.45, Zurich 8004, Switzerland 		Project Site(s): Cherat Cement Factory, P.O. Box 28, Village Lakrai, Nowshera Khyber Pakhtunkhwa formerly, North West Frontier Province, Pakistan Latitude: 33.9063613° Longitude: 71.9103348°
Project Title: Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan		
Applied Methodology / Version: AMS.III.Q /Version 4		Scope(s): 4 Technical Area(s): 4.1, 1.1
First PDD Version (GSP): Date of issuance: 13-07-2009 Version No.: 01 Starting Date of GSP: 06-08-2009 Start date of Re-GSP: 25-05-2011 Date of issuance: 19-05-2011 Version No: 05		Final PDD version: Date of issuance: 15-01-2013 Version No.: 12
Estimated Annual Emission Reduction:		25,761 tCO₂e
Assessment Team Leader: Khalid Mahmood Assessment Team Members: Robert Mitterwallner Auer Paula* Georgios Agrafiotis Luciano Grugni		Technical Reviewers: Thomas Kleiser, Nikunj Agarwal

*: The TA's of this project were covered during the on-site mission by Ms. Paula Auer as per the appointments valid at that time and she is not appointed yet as per new accreditation system.

Summary of the Validation Opinion:

- ☒ The review of the project design documentation and the subsequent follow-up interviews have provided TÜV SÜD with sufficient evidence for the determination of the project's fulfilment of all stated criteria. In our opinion, the project meets all relevant UNFCCC requirements for the CDM. Therefore, TÜV SÜD recommends the project for registration by the CDM Executive Board if the letters of approval of all Parties involved will be available before the expiring date of the applied methodology (ies) or the applied methodology version respectively.
- ☐ The review of the project design documentation and the subsequent follow-up interviews have not provided TÜV SÜD with sufficient evidence for the determination of the project's fulfilment of all stated criteria. Therefore, TÜV SÜD will not recommend the project for registration by the CDM Executive Board and will inform the project participants and the CDM Executive Board of this decision.

Abbreviations

ACM	Approved Consolidated Methodology
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CER	Certified Emission Reduction
CM	Combined Margin
CMP	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
CR / CL	Clarification Request
DNA	Designated National Authority
DOE	Designated Operational Entity
EF	Emission Factor
EIA / EA	Environmental Impact Assessment / Environmental Assessment
ER	Emission Reduction
FSR	Feasibility Study Report
GHG	GreenHouse Gas(es)
IPCC	Intergovernmental Panel on Climate Change
IRL	Information Reference List
IRR	Internal Rate of Return
KP	Kyoto Protocol
MP	Monitoring Plan
NGO	Non Governmental Organisation
OM	Operational Margin
PDD	Project Design Document
PP	Project Participant
TÜV SÜD	TÜV SÜD South Asia Pvt Ltd
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual
WECM	Waste Energy Carrying Medium

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1 INTRODUCTION

1.1 Objective

The objective of the validation process is to provide an independent assessment, by a third party (Designated Operational Entity = DOE), of a proposed project activity. The assessment involves the evaluation of the project basis and design identified in the Project Design Document (PDD) using the defined criteria outlined by the registration under the Clean Development Mechanism (CDM). Validation is part of the CDM project cycle and results in a conclusion by the executing DOE on whether a project activity is valid to be submitted for registration to the CDM Executive Board (CDM-EB). The ultimate decision on the registration of a proposed project activity rests with the CDM-EB and the Parties involved.

The project addressed in this validation report has been submitted under the project title:

Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan

1.2 Scope

The scope of any assessment is defined by the underlying legislation, regulation and guidance given by relevant entities or authorities. In the case of CDM project activities, the scope is set by:

- The Kyoto Protocol, in particular § 12 and modalities and procedures for the CDM
- Decision 2/CMP1 and Decision 3/CMP.1 (Marrakech Accords)
- Further COP/MOP decisions with reference to the CDM (e.g. decisions 4 – 8/CMP.1)
- Decisions and specific guidance outlined by the EB which are published under <http://cdm.unfccc.int>
- Guidelines for Completing the Project Design Document (CDM-PDD), and the Proposed New Baseline and Monitoring Methodology (CDM-NM)
- Baselines and monitoring methodologies (including GHG inventories)
- Management systems and auditing methods
- Environmental issues relevant to the sectoral scope applied for
- Applicable environmental and social impacts, and aspects of CDM project activity
- Sector specific technologies and their applications
- Current technical and operational knowledge of the specific sectoral scope and information on best practice

The validation process is not meant to provide any form of consulting for the project participant (PP). However, stated requests for clarifications, corrective actions, and/or forward actions may provide input for improvement of the project design.

Once TÜV SÜD received a first PDD version, it is made publicly available on the UNFCCC website and on TÜV SÜD's website, which initiated 30 day global stakeholder consultation process (GSP).

The original PDD and the modified PDD form the basis for the final evaluation. Information on both PDD's is presented on page 2 of this report.

The purpose of a validation is to demonstrate compliance or non-compliance of the project with all stated and valid CDM requirements. Additionally, the purpose of validation is to enable the registration of CDM projects, which is only a part of the total CDM project cycle.

2 METHODOLOGY

The project assessment is based on the "Clean Development Mechanism Validation and Verification Manual" version 1.2 and is conducted using standard auditing techniques to assess the correctness of the information provided by the project participants. Before the assessment begins, members of the team covering the technical scope(s), sectoral scope(s) and relevant host country experience for evaluating the CDM project activity are appointed. Once the project is made available for the stakeholder consultation process, members of the team carry out the desk review, follow-up actions, resolution of issues identified, and finally the preparation of the validation report. The prepared validation report and other supporting documents then undergo an internal quality control by the CB "Environment and Energy" before being submitted to the CDM-EB.

In order to ensure transparency, assumptions must be clear and explicitly stated and background material must also be clearly referenced. TÜV SÜD developed a methodology-specific protocol customized for the project. The protocol demonstrates, in a transparent manner, the project criteria (requirements), discussion on each criterion by the assessment team, and the results from validating the identified criteria.

The validation protocol serves the following purposes:

- The organization of details and provision of clarifications on the requirements a CDM project is expected to meet;
- Transparency of the validation process where the validator has to document how a particular requirement has been validated, as well as the results of the validation and any adjustments, if any, made to the project design.

The validation protocol consists of three tables. The different columns in these tables are described in the tables below.

Validation Protocol Table 1: Conformity of Project Activity and PDD				
Checklist Topic / Question	Reference	Comments	PDD in GSP	Final PDD
<i>The checklist is organised in sections following the arrangement of the applied PDD version. Each section is then further sub-divided. The lowest</i>	<i>The section gives reference to documents in which the answer to the checklist question or item is found in</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached. In some cases sub-checklists are ap-</i>	<i>The section is used to present conclusions based on the assessment of the first PDD version. The PDD is either acceptable based on evidence provided <input checked="" type="checkbox"/> or a Corrective Action Request (CAR) is issued due to non-compliance with the checklist question (See below). Clarification Request (CR)</i>	<i>In this section, conclusions are presented in the same manner based on the assessment of the final PDD version and further documents includ-</i>

<i>level constitutes a checklist question / criterion.</i>	<i>case the comment refers to documents other than the PDD.</i>	<i>plied indicating yes/no decisions on the compliance with the stated criterion. Any Request has to be substantiated within this column.</i>	<i>is used when the validation team has identified a need for further clarification. Forward Action Request is issued to highlight issues related to project implementation that require review during the first verification.</i>	<i>ing assumptions presented in the documentation.</i>
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Validation Protocol Table 2: Resolution of Corrective Action and Clarification Requests			
Clarifications and corrective action requests	Ref. to table 1	Summary of project owner response	Validation team conclusion
<i>If the conclusions from table 1 are either a Corrective Action, a Clarification or a Forward Action Request, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 1 where the issue is explained.</i>	<i>The responses given by the client or other project participants during communication with the validation team should be summarised in this section.</i>	<i>This section should summarise the discussion on and revision to project documentation together with the validation team's responses and final conclusions. The conclusions should be reflected in Table 1, under "Final PDD".</i>

In case of a denial of the project activity more detailed information on this decision will be presented in Table 3.

Validation Protocol Table 3: Unresolved Corrective Action and Clarification Requests		
Clarifications and corrective action requests	Id. Of CAR/CR	Explanation of the Conclusion for Denial
<i>If the final conclusions from table 2 results in a denial, the referenced request should be listed in this section.</i>	<i>Identifier of the Request.</i>	<i>This section should present a detailed explanation on why the project is finally considered not to be in compliance with a criterion providing a clear reference to the requirement which is not complied with.</i>

The completed validation protocol is enclosed in Annex 1 to this report.

2.1 Appointment of the Assessment Team

According to the technical scopes and experiences in the sectoral or national business environment, TÜV SÜD has composed a project team in accordance with the appointment rules of the TÜV SÜD certification body "Environment and Energy". The composition of an assessment team has to be approved by the Certification Body (CB) to assure that the required skills are covered by the team. The CB TÜV SÜD operates four qualification levels for team members that are assigned by formal appointment rules:

- Assessment Team Leader (ATL)
- Greenhouse Gas Validator (GHG-A)
- Greenhouse Gas Validator Trainee (T)

➤ Experts (E)

It is required that the sectoral scope/s and the technical area/s linked to the methodology and project have to be covered by the assessment team.

Name	Qualification	Coverage of scope	Coverage of technical area	Coverage of Financial Aspects	Host country experience
Khalid Mahmood	ATL				<input checked="" type="checkbox"/>
Robert Mitterwallner	GHG-A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Ms. Auer Paula*	GHG-A				
Georgios Agrafiotis	GHG-A			<input checked="" type="checkbox"/>	
Luciano Grugni	GHG-A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		

*: -The TA's of this project were covered during the on-site mission by Ms. Paula Auer as per the appointments valid at that time and she is not appointed yet as per new accreditation system.

Technical Reviewers

- Thomas Kleiser, Nikunj Agarwal

2.2 Review of Documents

The first version of the PDD was submitted to the DOE in July 2009 with AM0024 but later during the validation process, the client changed the methodology and submitted the PDD with AMS.III.Q version 4 for re-GSP on May 25th, 2011. Actually it became clear during the validation that existing captive power plant used more than one type of fuels for which AM0024 was not applicable. The PP kept waiting for result of revision request AM_REV_0141 for AM0024 (covering multiple fuels) until November 2010. The decision was taken to merge AM0024 with ACM0012. However, the revision draft for ACM0012, did not address the issue of multiple fuel consumption in the captive power plant. Consequently, the PP decided to switch over to small scale methodology. A request for revision of AMS III Q V3 (SSC_497) was submitted in December 2010 which was finally approved (as AMS III Q Version 4) in EB 60 meeting and became effective on April 15, 2011. The repeat GSP PDD does not affect the project description, project boundary or additionality aspects of the project activity which stay the same both in first GSP PDD and repeat GSP PDD.

The submitted PDD version 11 by the PP and additional background documents related to the project design and baseline have been reviewed to verify the correctness, credibility, and interpretation of the presented information. Furthermore, a cross-check between information provided and information from other sources (where available) has been done as an initial step of the validation process. A complete list of all documents and evidence material reviewed is attached as annex 2 to this report.

2.3 Follow-up Interviews

The previous validation of the project activity under AM0024 already covered on-site interviews and telephone conferences from 2009 to 2010. On 1st October 2009 the project discussion part was done in Cherat office in Karachi and physical site visit was done on (14/05/2010) with project stakeholders to confirm relevant information, and to resolve issues identified in the first document review.

The reason for performing the onsite visit later was the security situation in 2009 in the project activity area. The security situation was better and onsite was performed in May 2010. During the course of validation the client changed the applied methodology from AM0024 to AMS.III.Q version 4. From 08/06/2011 to 10/08/2011, TÜV SÜD again performed interviews, telephone conferences with PP to confirm relevant information, and to resolve issues identified in the document review of project with AMS.III.Q.

The table below provides a list of all persons interviewed in this process.

Name	Organisation
Qazi Sabir	Senior. Project Manager, Carbon Services (Private) Limited
Faisal Munir	Project Engineer, Carbon Services (Private) Limited
Fawad Nagaria	Manager Accountant (Cherat Cement Company Limited)
Abid Munir	Group Company Sectary (Cherat Cement Company Limited)
Deedar Gul	General Manager Production (Cherat Cement Company Limited)
Yasir Masood	Chief Financial Officer (Cherat Cement Limited)

2.4 Cross-check

During the validation process the team has made reference to available information related to similar projects or technologies as the CDM project activity. Project documentation has also been reviewed against the approved methodology/ies applied to confirm the appropriateness of formulae and correctness of calculations.

2.5 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation is to resolve the requests for corrective actions, clarifications, and any other outstanding issues which needed to be clarified for TÜV SÜD's conclusion on the project design. The CARs and CRs raised by TÜV SÜD were resolved during communication between the client and TÜV SÜD. To guarantee the transparency of the validation process, the concerns raised and responses that have been given are documented in more detail in the validation protocol in annex 1.

The final PDD version submitted January 2013 serves as the basis for the final assessment presented. Further changes to the project during the validation process are not considered to be significant with respect to the main CDM objectives. The two CDM main objectives are the reduction of anthropogenic GHG emissions and the contribution to the host country sustainable development.

2.6 Internal Quality Control

Internal quality control is the final step of the validation process and is conducted by the CB "Environment and Energy" which checks the final documentation, which includes the final validation report and all necessary documents. The completion of the quality control indicates that each submitted report has been approved by the CB Committee. In projects where one of the CB Committee members is part of the assessment team, the approval is given by the rest of the committee. After confirmation by the PP, the validation opinion and relevant documents are submitted to the EB through the UNFCCC web-platform.

3 SUMMARY

The assessment work and the main results are described below in accordance with the VVM version 1.2 reporting requirements. The reference documents indicated in this section and annex 1 are stated in Annex 2.

3.1 Approval

The project participants are Cherat Cement Company Limited & Carbon Services (Private) Limited of the Islamic Republic of Pakistan and First Climate (Switzerland) AG of Switzerland. The host Party Pakistan and further participant party Switzerland meet the requirements to participate in the CDM.

The DNA of Pakistan has issued a LoA (IRL 39) on June 10th, 2009 authorizing Cherat Cement Company Limited (Pakistan), Carbon Services (Private) Limited (Pakistan), and First Climate (Switzerland) AG as project participants. The DNA of Switzerland has also issued a LoA (IRL 44) on November 25th, 2010, authorizing First Climate (Switzerland) AG (Switzerland) as a project participant. TÜV SÜD received these letters from the project participants directly and considers the provided letters as authentic.

The Pakistan LoA has further been double-checked with the CDM project webpage sponsored by the Ministry of Environment, Government of Pakistan; in this way the DOE confirms that the LoA has been issued by the host country (http://cdmpakistan.gov.pk/cdm_prjapproval.html).

Furthermore, after checking the provided LoAs, TÜV SÜD confirms that all letters refer to the precise proposed CDM project activity title in line with the title in the PDD "Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan".

Both LoA letters also indicate that each participating Party is a Party to the Kyoto Protocol, and that the participation in the Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan project is voluntary. The Pakistan LoA also confirms that the proposed CDM project activity contributes to the sustainable development of Pakistan (host country). Based on the information given in these letters, TÜV SÜD considers the approval as unconditional with respect to these items.

Both LoAs have been issued by the respective Party's DNA, the Ministry of Environment of Pakistan and the Federal Office for the Environment of Switzerland.

TÜV SÜD considers that the requirements of VVM (§§ 45-48) have been met the participants of the project activity have been approved by the corresponding Parties, which is confirmed by the issued LoAs.

The means of validation used are similar to the ones described in section 3.1, specifically in regard to the approval process of the project activity.

The LoAs do not specify a version number of the PDD or validation report. The corresponding references included in LoA, PDD and validation report are consistent.

3.2 Participation

The participants of the project activity have been approved by the corresponding Parties, which is confirmed by the issued LoAs.

The means of validation used are similar to the ones described in Section 3.1, specifically in regard to the approval process of the project activity.

3.3 Project design document

The PDD is compliant with relevant form and guidance as provided by UNFCCC.

The most recent version of the PDD form was used.

TÜV SÜD considers that the guidelines for the completion of the PDD in their most recent version have been followed. Relevant information was provided by the participants in the applicable PDD sections. Completeness was assessed through the checklist included in annex 1 of this report.

3.4 Project description

The following description of the project as per PDD was verified during the on-site audit:

The objective of the project is to generate electricity by using waste heat from clinker production line at Cherat Cement Company Limited in Khyber Pakhtunkhwa formerly known as North West Frontier province (NWFP), Pakistan. The waste heat will come from one dry clinker production line with a capacity of 3200 tons per day (TPD). To utilize the recovered waste heat, the project activity installs three Heat Recovery Steam Generators (HRSGs) with steam turbine with 7 MW of rated power output on 3200 TPD kiln and utilize the steam for electricity production. Cherat Cement Company Limited has grid connection for electricity which will be only used for backup purpose.

The electricity generated by the project activity will partly displace the electricity which would have been produced in the existing Captive Power plant. The cement plant has a captive power plant of 27.89 MW (IRL 27 and IRL 28) which runs on HFO and Diesel. The proposed project is expected to generate 41,730 MWh of net power (gross power - auxiliary power consumption for the project) and result in emissions reduction of 25,761t CO₂ per year.

The project will contribute to sustainable development by improving energy efficiency of the cement industry in Khyber Pakhtunkhwa province, reducing global emissions of greenhouse gases and creating employment opportunities for local residents.

The information presented in the PDD on the technical design is consistent with the actual planning and implementation of the project activity as confirmed by:

- Review of data and information (see annex 2 e.g. equipment capacity and performance / life-time).
- An on-site visit which has been performed. Relevant stakeholder and personnel with knowledge of the project were interviewed. In case of doubt, further cross checks through additional interviews were conducted.
- Finally, information related to similar projects or technologies as the CDM project activity e.g. electricity and thermal energy indicators have been used to validate the accuracy and completeness of the project description.

In conclusion, TÜV SÜD confirms that the project description, as included in the PDD, is sufficiently accurate and complete in order to comply with the requirements of the CDM.

3.4.1. Debundled component of a large scale project activity

Based on its local and sectoral expertise, TÜV SÜD confirms that the proposed project is not a debundled component of a larger project activity because there is no small scale CDM project activity,

or an application registered by Cherat Cement Company Limited in the same project category in the last two years within 1 km of the project boundary of the proposed small-scale project activity (IRL 3a).

3.5 Baseline and monitoring methodology

3.5.1 Applicability of the selected methodology

The used version 4 of the selected baseline and monitoring methodology AMS.III.Q is valid. Compliance with each applicability condition as listed in the chosen baseline and monitoring methodology AMS-III.Q version 4 and relevant tools have been demonstrated.

- Corresponding section of ACM0012 (version 04.0.0, to estimate the capping factor)

The project uses the waste heat to generate electricity. The recovery of waste heat in the Project activity is new initiative. Historically major portion of the waste heat was vented to the atmosphere with a small portion recovered to pre-heat raw materials for clinker production. After the implementation of the WHR project the raw material shall be pre-heated with the waste heat. It has been clarified by Annex 20 of EB61 report that project activities that recover waste heat in the baseline are eligible to AMS-III.Q anyway subject that “the current practice of recovering small amounts of waste energy continues during the crediting period”. Hence, the project activity on hand is eligible for AMS-III.Q, version 04.

The assessment was carried out for each applicability criteria and included, among other checks, the compliance check of the local project setting with the applicability conditions in regard to baseline setting and eligible project measures. This assessment also included the review of secondary sources, which further demonstrate that applicability conditions have been complied with the methodology-specific protocol included in Annex 1 of this report documents the assessment process, including the steps taken. The results of the compliance check as well as relevant evidence are explicitly presented in Annex 1.

TÜV SÜD confirms that the chosen baseline and monitoring methodology is applicable the project activity.

Emission sources, not addressed by the applied methodology and expected to contribute more than 1% of the overall expected average annual emission reductions, have not been identified.

During the course of request of registration of the project, the following question (Request for Review) was raised by EB.

2: The DOE shall further substantiate the compliance of the project activity with the applicability criteria of the applied methodology, in particular the remaining lifetime of equipments in the project boundary. In doing so, the relevant dates of the equipments shall also be specified. Please refer to paragraph 5 (g) of AMS III.Q version 4.

TÜV SÜD would like to clarify these issues as follows:

Paragraph 5 (g) of AMS III.Q version 4 states the following:

"For those facilities and recipients which are included in the project boundary, that prior to implementation of the project activity (current situation) generated energy on-site (sources of energy in the baseline), the credits can be claimed for minimum of the following time periods:

1. *The remaining lifetime of equipment currently being used; and*
2. *Crediting period;*

The project boundary includes, in addition to the kilns, also the captive power plant which is composed of 4 Wartsila Engine and 4 Caterpillar Engines, which in the pre-project scenario generate energy (electricity) on-site and which are to be displaced by the project activity.

The remaining lifetime letter for the 4 Caterpillar Gensets (IRL 87), issued on December 16th, 2008, states that their remaining technical life time is more than 20 years. This means that the engines are fit to operate till 2028. The details of the engines are given below:

Generator No.	Serial No.	Capacity	Date of Commissioning
1	25Z 03157	1460 KW	1994
2	25Z 03166	1460 KW	1994
3	25Z 03154	1460 KW	1994
4	25Z 03158	1460 KW	1994

Similarly, the remaining lifetime letter for the 4 Wartsila Gensets (IRL 88), issued on December 29th, 2008, have a remaining technical lifetime of not less than 20 years. This means that the engines are fit to operate till 2028. The Wartsila Engine details are given in the table below:

Generator No.	Engine Type	Serial No.	Capacity	Date of Commissioning
1	VASA 16V32E	6675	5100 KW	Feb-1996
2	VASA 16V32E	6676	5101 KW	Feb-1996
3	VASA 16V32E	6677	5102 KW	Feb-1996
4	VASA 18V32	PAAE 019651	5609 KW	Jul-2006

From the above mentioned information and evidences (IRL 87, 88), it is quite clear that the remaining technical lifetime of the 4 Wartsila Engine and 4 Caterpillar Engines provided by the manufacturer is more than 20 years. Since the remaining lifetime of the equipments is after the crediting period (November 30th, 2022) of the project activity, thus the selection of the entire crediting period for claiming emission credits is appropriate and correct and the in line with the requirement of paragraph 5 (g) of AMS III.Q version 4.

3.5.2 Project boundary

The project boundary was assessed considering information gathered from the physical site inspection, interviews, and secondary evidence received on the design of the project.

According to the applied methodology (AMS III.Q version 04) the project boundary is defined as "the physical, geographical site of the facility where the waste heat is produced and transformed into useful energy". The project boundary of the project activity includes the facility that involves fuel consumption and electricity generation by the captive power plant, clinker production process at kiln and electricity generated by the waste heat recovery project are part of the project boundary that is in line with AMS.III Q version 4 § a.

The most relevant documents assessed in order to confirm the project boundary are the following:

- Initial Environmental Examination Report prepared by “Cherat Cement Company Limited” dated February 18th, 2009 (IRL 58)
- Environmental Approval decision on Initial Environment Examination (IEE), issued by Environment Protection Department, Government of the NWFP, Peshawar, Pakistan (IRL19);
- Equipment purchase contract of Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Limited between Cherat Cement Company Limited & Sinoma Energy Conservation Limited (IRL 6)

Details and observations are listed in Annex 1.

The documents have been validated during the validation process using standard audit techniques. Further details of any observation are transparently presented in Annex1.

Therefore, TÜV SÜD confirms that the identified boundary, the selected sources and gases as documented in the PDD are justified for the project activity and fully in line with the requirements set by the applied methodology.

3.5.3 Baseline identification

The baseline scenario equals the scenario prior to the implementation of this project activity. This scenario involves the continued venting of the waste heat into the atmosphere by the pre-heater and the clinker cooler of the kilns and production of electricity in the Captive power plant by using heavy fuel oil (HFO) and Diesel as fuel.

During the on-site visit it was checked and confirmed by the audit team that there is a captive power plant using HFO and Diesel and no waste heat recovery apart from the common practice of preheating the raw material in the raw mill and preheating the coal.

The information presented in the PDD has been validated by an initial document review of all data related to baseline (IRL 3). Further confirmation has been made based on the on-site visit (confirmation of raw mill and coal preheating and no existing waste heat recovery) and a review of information from similar projects and/or technologies. The sources referenced in the PDD have been quoted correctly.

Based on the validated assumptions used for project activity calculations, TÜV SÜD considers that the identified baseline scenario is reasonable.

Taking the definition of the baseline scenario into account, TÜV SÜD confirms that all relevant CDM requirements, including relevant and/or sectoral policies and circumstances, have been identified correctly in the project PDD.

A verifiable description of the baseline scenario has been included in the PDD.

In regard to item 87 of VVM, TÜV SÜD confirms that:

1. All the assumptions and data used by the project participants are listed in the PDD, including their references and sources;
2. All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD;
3. Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence, and can be deemed reasonable;

4. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD;
5. 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.

3.5.4 Algorithm and/or formulae used to determine emission reductions

TÜV SÜD has assessed the calculations of baseline emissions and emission reductions. Corresponding calculations have been carried out based on calculation spreadsheets (IRL 35). The parameters and equations presented in the PDD, and further documentation have been compared with the information and requirements presented in the methodology and respective tools. The equation comparison has been made explicitly following all the formulae presented in the calculation files

The assumptions and data used to determine the emission reductions are listed in the PDD and all the sources have been checked. Based on the information reviewed it can be confirmed that the sources used are correctly quoted and interpreted in the PDD.

The values presented in the PDD are considered reasonable based on the documentation reviewed, further references and the results of the interviews. The baseline methodology has been applied correctly according to requirements. The estimated baseline emissions can be confirmed, as the same have been replicated by the audit team using the information provided.

More detailed information on the verification of the parameters used in the emission reduction calculations can be found in Annex 1 of this report. The algorithms for the determination of the baseline, project, and leakage emissions are discussed in the following sections.

3.5.4.1 Baseline Emissions

TÜV SÜD has assessed the calculations of project emissions, baseline emissions, leakage emissions and emission reductions. Corresponding calculations were carried out based on calculation spreadsheets (IRL 35). The parameters and equations presented in the PDD and further documentation have been compared with the information and requirements presented in the methodology and respective tools. The equation comparison has been made explicitly following all the formulae presented in the calculation files. The calculation of the baseline emissions have been conducted using procedures described in the methodology AMS.III.Q version 4, ACM0012 Version 4.0.0.

The waste heat from the clinker production process has been released to the atmosphere with only a small portion utilized for preheating the incoming raw material and coal. The situation has been confirmed by audit team during on site visit.

According to the methodology baseline emissions for year y are calculated as:

The formula is

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

Where:

$BE_{elec,y}$ Baseline emissions due to displacement of electricity during the year y in tons of CO₂

$EG_{i,j,y}$ The quantity of electricity supplied to the recipient j by generator, that in the absence of the project activity would have been sourced from i^{th} source (in the

	project activity i is existing captive power plant) during the year y in MWh
$EF_{elec,i,j,y}$	The CO ₂ emission factor for the electricity source, displaced due to the project activity, during the year y in tons CO ₂ /MWh
f_{wcm}	Fraction of total electricity generated by the project activity using waste energy. For the project activity this fraction is 1 because the electricity generation is purely from the use of waste heat
f_{cap}	Capping factor to exclude increased waste energy utilization in the project year y due to increased level of activity of the plant, relative to the level of activity in the base years before the project start. The ratio is 1 if the waste energy generated in the project year y is same or less than generated in base years. F_{cap} is estimated according to the corresponding section of ACM0012.

As the baseline generation source is an identified existing plant, the parameter $EG_{i,j,y}$ corresponds to $EG_{is,y}$ and the emission factor $EF_{elec,i,j,y}$ corresponds to $EF_{Elec,is,y}$. The CO₂ emission factor is determined as follows:

$$EF_{Elec,is,j,y} = \frac{EF_{CO2,i,j}}{\eta_{Plant,j}} \times 3.6 * 10^{-3}$$

Where:

$EF_{CO2,i,j}$ The CO₂ emission factor per unit of energy of the fossil fuel used in the baseline generation source i in (tCO₂/TJ), obtained from reliable local or national data if available, otherwise, taken from the country specific IPCC default emission factors

$\eta_{Plant,j}$ The overall efficiency of the existing plant that would be used by j^{th} recipient in the absence of the project activity

$3.6 * 10^{-3}$ Conversion factor, expressed as TJ/MWh

In the baseline, the captive power plant consumes more than one type of fossil fuel (HFO and diesel) therefore CO₂ emission factor per unit of energy of the fossil fuels used in the baseline is weighted emission factor calculated by using the following equation;

$$EF_{CO2,i,j} = \frac{\sum_i (FC_{i,y} \times NCV_i \times COEF_i)}{\sum_i (FC_{i,y} \times NCV_i)}$$

Where:

$EF_{CO2,i,j}$ The CO₂ emission factor per unit of energy of the fossil fuels used in the baseline generation source i in (tCO₂/TJ), obtained from reliable local or national data if available, otherwise, taken from the country specific IPCC default emission factors

$FC_{i,y}$ Consumption of fossil fuel (mass or volume unit) in project situation at captive power plant

NCV_i Net calorific value (energy content per unit mass or energy content per unit volume units) of fossil fuel used in baseline

$COEF_i$ Coefficient of fossil fuel (tCO_2/TJ) used in baseline situation
 i Fossil fuel type

According to AMS-III.Q / Version 04, efficiency of the power plant ($\eta_{plant,j}$) has been determined using option (i) of paragraph 8(a) as provided below.

- Assume a constant efficiency of the captive plant and determine the efficiency, as a conservative approach, for optimal operation conditions i.e., design fuel, optimal load, optimal oxygen content in flue gases, adequate fuel conditioning (temperature, viscosity, moisture, size/mesh etc.), representative or favourable ambient conditions (ambient temperature and humidity)

The existing captive power plant has three types of gensets as listed in Table A.4.2. The highest designed efficiency among the three types of gensets is of Wartsila 18V32 (41.04%, 45.09% & 37.84). As a conservative approach, a constant efficiency of 45.09% for the captive power plant is selected as per option (i) for efficiency of power plant. Hence

$$\eta_{plant,j} = 45.09\%$$

Calculation of f_{wcm}

According to the methodology $f_{wcm} = 1$ because the electricity generation of the project is purely from use of waste heat.

Calculation of f_{cap}

Since there is no historical data on parameters of the waste energy from the cement clinker production and it is not possible to measure it due to different technical reasons, Method-3 for f_{cap} calculation was chosen. Since there is only one heat exchange process (with in only one heat exchanger) in the project scenario where waste energy is transferred from WECM to water for steam generation and further production of electricity case 1 of Method-3 for f_{cap} calculation has been chosen. Due to lack of historical information on the waste heat content of the WECM (and additionally, the fact that heat in the heated air of cement kilns cannot be measured direct continuously, and also cannot be correlated in a reliable way with the clinker production – due to variability of the clinkerisation process inputs), method 1 and 2 are not applicable. The detailed description has been provided in PDD.

Following equation (eq.40 of ACM0012 version 4) is used to determine f_{cap} :

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

Where

$Q_{OE,BL}$ Output/intermediate energy that can be produced (TJ), to be determined on the basis of maximum energy that could be recovered from the WECM (MER), which would have been released (or WECM would have been flared or energy content of WECM would have been wasted) in the absence of CDM project activity.

$Q_{OE,y}$ Quantity of actual output/intermediate energy during year y (TJ)

According to the Feasibility Study Report (IRL 5), in the proposed project, the theoretical electricity output $Q_{OE,BL}$ is 54,600 MWh/year which is based on 7MW gross output capacity of the project activity (IRL 71) and 325 days of Kiln operation per year. The actual output electricity $Q_{OE,y}$ will be determined ex post by actual measurement. For ex-ante calculation, the value of $Q_{OE,BL}$ has been assumed to be the same as $Q_{OE,BL}$. As the project activity does not envisage increased level of activity of the cement plant, this is a reasonable assumption.

The method selected for the calculation of f_{cap} was thoroughly discussed during onsite validation and parameters used for its determination were verified against historical plant operational days and project plant capacity (IRL 29). Historical operational days of plant can be calculated from historical clinker production reports (IRL 29). The kiln at Cherat Cement plant has the *clinker production capacity of 3200 tons per day (TPD)*. The method selected for calculation of f_{cap} (Case 1 of Method 3), which is based on **Final Output Energy (electrical MWh)** of the project plant.

As for our experience with clinker production plants 325 days per year operation of the project plant estimated by the project proponent is quite realistic and reasonable. This can be verified against number of operational days considered by similar Cement Sector CDM projects of Pakistan in section 3.6.3 below of this validation report.

The DOE is requested to state if the methodology provides different options for equations and parameters and if the selection is appropriate as per VVM v1.2 paragraph 90.

In particular, the selected method (method 3, case 1) to determine the f_{cap} given that the waste energy of the project activity is recovered from WECM through an intermediate system using an intermediate source (water/steam). Further, the DOE shall explain how it have validated the QOE, BL (maximum recoverable energy) as per ACM0012 version 4 (page 32)

TÜV SÜD would like to clarify this issue as follows:

Methodology ACM0012 version 4 describes several options in order to define the factor f_{cap} . Given the technical circumstances of this proposed CDM project, Method 3 Case 1 is the applicable approach. The reason of choosing this option is explained in detail above in chapter 3.5.4.1.

The methodology defines Case 1 as follows:

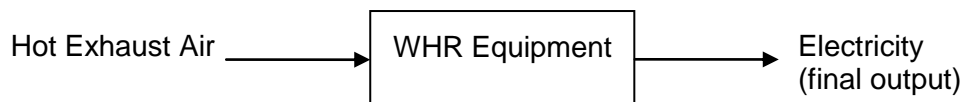
Case 1: *The energy is recovered from WECM and converted to final output energy through waste heat recovery equipment.*

In the present project, the following definitions apply:

- The WECM is the hot exhaust air from the kilns, which carries the waste heat
- The waste heat recovery equipment is the set composed of the WHR boilers and the STG (steam turbine generator)
- The final output energy is the electricity provided by the generator

Hot air exits the kiln and comes directly into contact with the water through a heat exchanger. At this point a heat exchange takes place, the water is heated up and steam is generated. Finally the steam via a steam-turbine generates electricity.

A scheme of the energy transfer is the following:



In the project, waste heat from WECM is recovered using the Waste Heat Recovery Equipment to generate steam, and in the same equipment set, the steam is used to generate electricity **WITHOUT any Intermediate Energy Recovery Equipment** (as mentioned in Case 2). The same has been confirmed against thermodynamic system details and equipment list as provided in the Equipment Purchase contract between Cherat Cement Company Limited and Sinoma Energy Conservation Limited (IRL 6), Basic Design Clarification Document for the 7 MW Waste Heat Recovery Project of CCCL (IRL 71) and Detailed calculation for Performance Guarantee (IRL76).

Based on discussion above, the DOE confirms that the proposed project activity perfectly fits under Case 1 for determination of f_{cap} .

The calculation of $Q_{OE, BL}$ (maximum recoverable energy) is based on gross capacity of the waste heat recovery system (5.95 MW) as mentioned in “Detailed calculation of performance guarantee of 7 MW Waste Heat Recovery Project at Cherat Cement Plant” (IRL 76) provided by the equipment supplier; according to the document, the installed capacity of the Waste Heat Recovery is 7 MW, which under optimal local conditions, can deliver a gross capacity of 5.95 MW which corresponds to a load factor of 85% as indicated in the detailed calculation of performance guarantee (IRL 76).

TÜV SÜD confirms that PP’s approach to calculate maximum recoverable energy based on gross (5.95 MW) instead of installed capacity (7MW) of WHR equipment is therefore conservative.

Based on 325 days/year of clinker production (FSR IRL 5), the “Gross” electricity generation is equal to $5.95 \text{ MW} \times 325 \text{ d/y} \times 24 \text{ h/d} = 46,410 \text{ MWh/year}$.

Thus, the maximum energy that could be theoretically recovered by waste heat recovery equipment is:

$$Q_{OE, BL} = 46,410 \text{ MWh/yr} \times 3.6 \times 10^{-3} = 167.076 \text{ TJ electrical}$$

TÜV SÜD confirms that the determination of $Q_{OE, BL}$ is in compliance with the guidance provided on page 32 of ACM0012 version 4.0.0. Furthermore, the value is deemed conservative since MER or $Q_{OE, BL}$ has been determined based on gross output capacity, instead of installed capacity of the plant.

There are several projects already registered which use similar approach like UNFCCC No, 4208, 3564, 3674.

Based on its local and sectoral expertise and knowledge of this sector, TÜV SÜD confirms that f_{cap} is in line with corresponding section of ACM0012 version 4.0.0 and paragraph 89-92 of VVM v1.2.

2: The DOE shall explain how it has validated the baseline emission, in particular, the proportion of electricity that would have been source from different sources given that there are three types of captive power generators using difference fuel in the pre-project scenario. Please refer to page 5 of AMS III.Q version 4.

TÜV SÜD would like to clarify the issue as follows.

It is clearly described in the PDD that in the absence of the project activity, the project electricity used by cement plant would be supplied by the existing fossil fuel based captive power plant. The existing captive power plant comprises 3 types of captive power generators. Details of these engines, i.e. proportion of electricity generated and fuel types used by each engine, their types, rated capacities and efficiencies are described below in details the tables below.

Historical Proportion of Electricity Generated by Each Engine and Fuel Types Used

	Engine Type	Historical Year			Fuel		Source
		2004 - 2005	2005- 2006	2006- 2007	Pri- mary	Startup / Auxil- iary	
Engine Type 1	VASA 16V32E	32.68%	35.67%	25.94%	HFO	Diesel	Power Generation Data (captive Power plant and fuel consumption baseline data) of Cherat WHR Project (2004- September 2007) (IRL 20)
	VASA 16V32E	36.54%	34.48%	22.93%	HFO	Diesel	
	VASA 16V32E	28.14%	26.33%	20.31%	HFO	Diesel	
Engine Type 2	VASA 18V32	-	0.20%	29.47%	HFO	Diesel	
Engine Type 3	3516	0.00%	0.03%	0.03%	Diesel	-	
	3516	0.98%	1.40%	0.39%	Diesel	-	
	3516	0.81%	0.84%	0.34%	Diesel	-	
	3516	0.86%	1.06%	0.58%	Diesel	-	

Rated Output Capacity and Efficiency of Each Engine

	Engine Type	Manufacturer	Rated Output	Design Efficiency	Source
Engine Type 1	VASA 16V32E	Wartsila	5100 kW	41.04%	Test protocol of Wartsila Engines at Cherat cement Plant (IRL 28)
	VASA 16V32E	Wartsila	5100 kW		
	VASA 16V32E	Wartsila	5100 kW		
Engine Type 2	VASA 18V32D	Wartsila	6750 kW	45.09%	
Engine Type 3	3516	Caterpillar	1460 kW	37.84%	
	3516	Caterpillar	1460 kW		

	3516	Caterpillar	1460 kW		Generators at Cherat WHR project (IRL 27)
	3516	Caterpillar	1460 kW		

The data provided in the above tables clearly reveal that Caterpillar Engines (type 3516) have only been used as a backup option; their historical share in the total electricity generation ranges between 1.34% (2006-2007) to 3.3% (2005-2006). This means that in the absence of the project activity, Wartsila Engines (both type 16V32E and 18V32D) would supply major portion of electricity (more than 96%) to Cement Plant.

Furthermore, in Wartsila engines, HFO is used as primary fuel with diesel being used as startup/auxiliary fuel. The primary fuel for Caterpillar Engines is Diesel. This is evidenced by the historical data (IRL 20) which shows that 97.59% of power generation has been done on HFO and diesel is only used in minor quantities (2.41%) for start-up/auxiliary purposes (see table below).

The efficiency of the captive power plant (η_{Plant}) that is applied for calculation of baseline emissions has been defined as the highest among the 3 types of engines in order to be conservative. The efficiency values of the 3 generator types are (engine type 1 has 41.04%, engine type 2 has **45.09%**, and engine type 3 has 37.84%) that operate on the optimal operation (design) and existing in the pre-project scenario. The value of 45.09% (IRL 28) is chosen as the efficiency of the electricity system. This is conservative and in line with Paragraph 8(a) (i) of AMS III.Q./Version 04 which states that:

*“Assume a constant efficiency of the captive plant and **determine the efficiency, as a conservative approach, for optimal operation conditions** i.e. design fuel, optimal load, optimal oxygen content in flue gases, adequate fuel conditioning (temperature, viscosity, moisture, size/mesh etc.), representative or favorable ambient conditions (ambient temperature and humidity)”*

The PP has selected the weighted average approach for determination of the emission factor of the fuel mix which is in line with the following para on page 6 of the methodology which states that

“In case, in the baseline situation, more than one type of fossil fuel is used in the captive plant, the relative contribution to the total output of each fossil fuel shall be considered and the formulas for baseline emissions shall be adjusted accordingly.”

The steps carried out for the calculation of emission factor of the electricity system has been further elaborated in the ER calculations to enhance clarity (see attached the revised ER calculations; refer to worksheet ER Calc, Cell D15 to D22). These are also mentioned below:

1. Share of each fuel type in the total electricity generation of the plant is calculated using the historical electricity generation data

Average Electricity Generation on HFO (2004/2005 – 2006/2007)	70,8966.52	MWh/yr	Power Generation Data (captive Power plant and fuel consumption baseline data) of Cherat WHR Project (2004-September 2007) (IRL 20)
Average Electricity Generation on Diesel (2004/2005 – 2006/2007)	1,752.67	MWh/yr	Power Generation Data (captive Power plant and fuel consumption baseline data) of Cherat WHR Project (2004-September 2007) (IRL 20)

Total Average Electricity Generation (2004/2005 – 2006/2007)	72,649.19	MWh/yr	Power Generation Data (captive Power plant and fuel consumption baseline data) of Cherat WHR Project (2004-September 2007) (IRL 20)
Share of HFO in total generation	97.59%		Calculated (1,753/72,649)
Share of Diesel in total generation	2.41%		Calculated (79,897/72,649)

2. Specific fuel consumption is calculated using the electricity generation and fuel consumption of each fuel type

Average Electricity Generation on HFO (2004/2005 – 2006/2007)	70,896.52	MWh/yr	Power Generation Data (captive Power plant and fuel consumption baseline data) of Cherat WHR Project (2004-September 2007) (IRL 20)
Average HFO Fuel Consumption (2004/2005 – 2006/2007)	17,495.66	Tons	Power Generation Data (captive Power plant and fuel consumption baseline data) of Cherat WHR Project (2004-September 2007) (IRL 20)
Specific Fuel Consumption of HFO	0.24676	Tons/MWh	Calculated (17,496/70,897)
Average Electricity Generation on Diesel (2004/2005 – 2006/2007)	1,752.67	MWh/yr	Power Generation Data (captive Power plant and fuel consumption baseline data) of Cherat WHR Project (2004-September 2007) (IRL 20)
Average Diesel Fuel Consumption (2004/2005 – 2006/2007)	537,961	Ltr	Power Generation Data (captive Power plant and fuel consumption baseline data) of Cherat WHR Project (2004-September 2007) (IRL 20)
Specific Fuel Consumption of Diesel	307.20	Ltr/MWh	Calculated (537,961/1,753)

3. The net electricity displaced by the project activity is 41,730 MWh/yr. This is based on detailed calculation for Performance Guarantee (IRL 76) and 325 days of operation (FSR IRL 5). $5.35 \text{ MW} \times 24 \text{ hr/day} \times 325 \text{ days/yr} = 41,730 \text{ MWh/y}$.
4. The share of Project Electricity that would have been generated on HFO and Diesel in the baseline situation is determined using their historical ratios (97.59% HFO and 2.41% Diesel) determined earlier.

Total Electricity Generated by Project	41,730	MWh/yr	Detailed calculation for Per-
--	--------	--------	-------------------------------

Activity			formance Guarantee (IRL 76). (5.35*24*325) Feasibility Study Report (IRL 5)
Share of Project Electricity that would have been generated on HFO	40,723	MWh/yr	Emission Reduction (ER) Calculation Sheet (IRL 35)
Share of Project Electricity that would have been generated on Diesel	1,006.74	MWh/yr	Emission Reduction (ER) Calculation Sheet (IRL 35)

5. The amount of fuel that would have been consumed in the baseline scenario, to produce the same electricity as displaced by the project activity, is calculated using the specific fuel consumption.

Share of Project Electricity that would have been generated on HFO	40,723.26	MWh/yr	Emission Reduction (ER) Calculation Sheet (IRL 35)
Share of Project Electricity that would have been generated on Diesel	1,006.74	MWh/yr	Emission Reduction (ER) Calculation Sheet (IRL 35)
Fuel Consumption of HFO	10049.04	Tons	Emission Reduction (ER) Calculation Sheet (IRL 35)
Fuel Consumption of Diesel	309,267.37	Ltr	Emission Reduction (ER) Calculation Sheet (IRL 35)

6. The emission factor of the electricity system is calculated by using the following equations already discussed above

$$EF_{Elec, is, j, y} = \frac{EF_{CO2, i, j}}{\eta_{Plant, j}} \times 3.6 * 10^{-3}$$

Where

$$EF_{CO2, i, j} = \frac{\sum_i (FC_{i, y} \times NCV_i \times COEF_i)}{\sum_i (FC_{i, y} \times NCV_i)}$$

The emission factor is calculated as 0.62 tCO₂/ MWh which is used for *ex ante* calculation of baseline emissions. Fuel (HFO and Diesel) consumption of captive power plant and Fuel NCVs will be monitored for *ex post* calculation of emission factor of the captive power plant.

The weighted average method approach shows the emission factor calculation is based on the proportion of fuel type contributing to the total electricity generation and thus is in line with the methodology.

After thorough review of the ER calculations and supporting documents provided by the PP, TÜV SÜD confirms that the calculation of baseline emissions is in compliance with the methodology and conservative as well.

Based on discussion above, based in its local and sectoral expertise and knowledge of this sector, TÜV SÜD confirms that the calculation of baseline emissions is in compliance with the methodology and conservative.

3.5.5 Project emissions

For the project emission, the paragraph 13 & 14 of AMS-III.Q / Version 04 have been considered.

There is no auxiliary fuel combusted in the project activity to supplement waste gas and the waste heat recovery system consumes its own electricity for auxiliary needs.

Similarly, the project activity does not incinerate any waste gas to generate energy. Therefore, the project emissions are considered zero and there are no project emissions due to the Project activity. (PE = 0)

3.5.6 Leakage

The equipment used in the project activity is not transferred from outside the boundary and the installed equipment is brand new (IRL 6). Therefore; there is no leakage by the Project activity. (LE = 0).

3.5.7 Emission Reductions

In summary, the calculation of the baseline emissions, project emissions, leakage, and the emission reductions can be considered correct. All the calculations regarding baseline emissions, project emissions, leakages and the emissions reductions are explained in detail in emissions reduction calculation spreadsheet (IRL 35).

3.6 Additionality

The additionality of this project, which is a small-scale project, has been demonstrated following *the Attachment A to Appendix B of the simplified modalities and procedure for small scale CDM project activity categories* which describe that “Project Participants shall provide an explanation to show that the project activity would not have occurred anyway due at least to one of the following barriers:” investment barrier, technological barrier, prevailing practice barrier or other barriers”.

The Project participants used the investment barrier to demonstrate the additionality.

The approach used in the PDD has been assessed initially through the document review, during which the following documents were reviewed:

- Feasibility Study Report (FSR) of Cherat Cement Limited Waste Heat Recovery Plant (IRL 5),
- IRR Calculation Spreadsheet (IRL 14)
- Letter from All Pakistan Cement Manufacturer’s Association confirming that waste heat recovery is not a common practice in the cement industry (IRL 33)

On site, the additionality was discussed principally with Mr. Qazi Sabir, Senior Project Manager at Carbon Services (Private) Limited and Mr. Deedar Gul, General Manager Production at Cherat Cement Company Limited. Further documents have been reviewed on-site (for details see Information Reference List in Annex 2).

Finally, the data, rationales, assumptions, justifications, and documentation provided have been verified using local knowledge as well as sectoral and financial expertise. The same has been cross checked against:

- The Board meeting of high officials of Cherat Cement Company Limited to make decision to proceed with the approval procedure under CDM revenue’s support (IRL 38).

- CDM Service Agreement Contract between Cherat Cement Company Limited & First Climate (Switzerland) AG (IRL 36)
- Email confirmation from DNA Pakistan that Waste Heat Recovery Based Power Generation is not a Common Practice in cement Industry of Pakistan (IRL 50).

Based on the aforementioned approach, TÜV SÜD confirms that the documentation provided is appropriate for this project.

3.6.1 Prior consideration of the clean development mechanism

The starting date of the project activity is November 29th 2007 which corresponds to signing of purchasing contract for major equipment of the project activity (IRL 6) when the first real action was done is in line with **(CDM Glossary of terms version 5)**. In order to confirm the same, the assessment team has reviewed the following documents.

- Equipment purchase contract of Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan between Cherat Cement Company Limited & Sinoma Energy Conservation Limited (IRL 6)

In addition, the assessment team cross checked this information with Mr. Qazi Sabir, Senior Project Manager at Carbon Services (Private) Limited and Mr. Deedar Gul, General Manager Production at Cherat Cement Company Limited during various discussions on site.

The starting date of the project activity is determined to be November 29th, 2007 which is before 02 August 2008, as well as prior to the GSP (6 August, 2009) and repeated GSP (May 25th, 2011). The PPs presented the following information to the assessment team:

- A letter was sent from Pakistan Sugar Mill Association (PSMA) to the Chief Executives of all sugar mills including Mirpurkhas Sugar Mill which is a subsidiary of Ghulam Farooq Group along with Cherat Cement Company Limited about Income Potential from Carbon credits (IRL 9).
- The Board meeting of Cherat Cement Limited (IRL 38) indicates that the project participants were aware of the CDM prior to the starting date, and that the benefits of the CDM were a decisive factor in the decision to proceed with this project. This fulfill the requirement of EB 62 Annex 13 page 1 § 6 a.

The original of the documentation presented have been reviewed and crosschecked based on interviews with Mr. Qazi Sabir, Senior Project Manager at Carbon Services (Private) Limited and Mr. Deedar Gul, General Manager Production at Cherat Cement Company Limited. Hence the documents are considered credible to confirm the prior consideration of CDM. Additionally, in order to confirm that the PP has taken real actions to continue the activity as CDM the following timeline has been reviewed against the respective documents presented in the table below.

Timeline of project activity

Date	Activity	Document	Auditor conclusion
18 December 2006	CDM Awareness	Copy of letter (IRL 9)	A letter was sent from Pakistan Sugar Mill Association (PSMA) to the Chief Executives of all sugar mills including Mirpurkhas Sugar Mill which is also a subsidiary of Ghulam Farooq Group along with Cherat Cement Company Limited about Income Potential from Car-

Date	Activity	Document	Auditor conclusion
			bon credits. TÜV SÜD has checked the authenticity of this CDM awareness letter. TÜV SÜD confirms that this is in line with EB 62, Annex 13 paragraph 6 (b).
25 October 2007	Investment Decision	Copy of "Extract of Minutes of the Board Directors meeting of Cherat Cement Company Limited (IRL 38)	Project approved at the highest management level, well before the starting date. TÜV SÜD has checked the authenticity of investment decision. TÜV SÜD confirms that this is in line with EB 62, Annex 13 paragraph 6 (b).
29 November 2007	Starting date of the project activity	Equipment purchase contract between Cherat Cement Company Limited and Sinoma Energy Conservation Ltd (IRL 6)	TÜV SÜD has checked the authenticity of equipment purchase contract. TÜV SÜD confirms that this is in line with EB 62, Annex 13 paragraph 6 (b).
4 April 2008	CDM consulting Contract between Cherat Cement and First Climate (Switzerland) AG (Former Factor Consulting)	Copy of CDM service agreement Contract between Cherat Cement Company Limited & First Climate (Switzerland) AG (IRL 37)	TÜV SÜD has checked the authenticity of CDM consulting contract. TÜV SÜD confirms that this is in line with EB 62, Annex 13 paragraph 6 (b).
11 November 2008	Letter of Intent for Civil Works	Letter from Mr. S. Nasim Ahmad, Resident Director, Cherat Cement Company Limited to A.S. Enterprises (IRL 40)	TÜV SÜD has checked the authenticity of letter of intent for civil works. TÜV SÜD confirms that this is in line with EB 62, Annex 62 paragraph 6 (b).
10 June 2009	Letter of approval from DNA Pakistan	Copy of LoA Pakistan (IRL 39)	TÜV SÜD has checked the authenticity of letter approval issued by DNA Pakistan. TÜV SÜD confirms that this is in line with EB 62, Annex 13 paragraph 6 (b).
10 July 2009	Validation contract with TÜV SÜD	Validation Contract (IRL 49)	The validation contract between PP and DOE is in line with EB 62, Annex 13 paragraph 6 (b).
6 August 2009	Start of the Global Stakeholder Process on UNFCCC website	UNFCCC website	-
1 February 2010	Project commissioning	Copy of Cherat Company Information letter (IRL 73)	
25 May 2011	Start of the repeated Global Stakeholder Process on UNFCCC website	UNFCCC website	-

This confirms that the project complies with the requirements to demonstrate the prior consideration of the CDM.

3.6.2 Investment analysis

The PP uses the investment barrier to demonstrate the additionality.

The financial returns of the proposed project without CDM revenues are insufficient to justify the investment.

The parameters used in the financial calculations have been validated based on a review of the sources presented in the PDD, inter alia: FSR (IRL 5), investment costs, O&M costs, overhaul costs, electricity generation (plant load factor), fuel costs, and have been cross-checked on site.

The FSR has been the basis of the decision to proceed with the investment in the project, the period of time between the finalization of the FSR (October 19th, 2007) (IRL 5) and the investment decision (October 25th, 2007) (IRL 38) 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.

The values used in the PDD and associated annexes are fully consistent with the FSR, The input values applied for the investment analysis were further cross-checked with following documents in order to evaluate their plausibility and appropriateness.

- IRR Calculation Spreadsheet (IRL 14)
- Contract for supply of major equipment of the project activity between Cherat Cement Company Limited & Sinoma Energy Conservation Limited (IRL 6)
- Quarterly Report of the State Bank of Pakistan (Financial Year 2004) that shows that KI-BOR was also introduced as a reference rate for corporate lending in February 2004 (IRL 11)

<http://sbp.org.pk/reports/quarterly/fy04/thirdQtr/Money%20Market.pdf>

<http://sbp.org.pk/ecodata/kibor/2007/>

The input parameters used in the financial analysis were compared with the data reported for other similar WHR CDM projects in Pakistan under validation and registered project as shown in Table 1, comparing investment costs and percentage of O&M costs relative to total investment costs.

Table 1: Cement WHR projects (with the available data) comparison in Pakistan

Project Name	MW	Investment Cost [PKR]	O&M costs [PKR] O&M-I [%]
DGKCC Waste Heat Recovery and Utilization for 10.4 MW Power Generation at Dera Ghazi Khan Plant UNFCCC registration No.4591 http://cdm.unfccc.int/Projects/DB/TUEV-UED1300284763.81/view	10.4MW	1,563,000,000	78,150,000.00 (5% of total investment cost)
Waste Heat Recovery and Utilization for Power Generation at Lucky Cement Limited Pezu Plant http://cdm.unfccc.int/Projects/Validation/DB/5THY9Y15CINFMYJXYV51WVXMFRHX83/view.html	10MW	960,000,000	48,000,000 (5% of total investment cost)

Waste Heat Recovery and Utilization for Power Generation at Lucky Cement Limited, Karachi Plant http://cdm.unfccc.int/Projects/Validation/DB/JZDZOGOA8Z0GM9JZYUINTLHLIRU2IN/view.html	15MW	1,301,778,622	65,088,931 (5% of total investment cost)
Waste Heat Recovery based 15 MW Power Generation Project at Bestway Cement Limited, Chakwal, Pakistan (UNFCCC Registration no. 3555 * http://cdm.unfccc.int/Projects/Validation/DB/DLZHSFAMK6BA3FCS3SCCTDCIGSIKKN/view.html	15MW	-	-
Waste Heat Recovery and Utilization for Power Generation at Maple Leaf Cement Factory Limited, Iskanderabad, Pakistan http://cdm.unfccc.int/Projects/Validation/DB/P740TN7NRBRKEWN9AM3RM0L6BN0CXU/view.html	13.9MW	2,016,210,843	104,400,000 (5.1% of total investment cost)
Waste Heat Recovery Power Plant at Fecto Cement Limited http://cdm.unfccc.int/Projects/Validation/DB/BRBHLN7AWUFXK6Q16JXXFNNOEE9Y14/view.html	6MW	7183200 USD= Equivalent to 610,572000 PKR	Information not available-
Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan http://cdm.unfccc.int/Projects/Validation/DB/XN4SGWEQVUD7QMVZCW9KRWCI6D97D4/view.html	7MW	966,090,433	48,304,521.64 (5% of total investment cost)

**: Additionality of this project has been claimed by first of its kind.*

Project Investment Cost:

The total investment costs of the project are 966,090,433 PKR (Pakistani Rupees) derived from the FSR which includes machinery and material, training, management and technical services, duties, taxes and freight charges as well as local costs. The depreciation period of 20 years has been used in the project and the fair value of the project investments will be 117,332,767.22 PKR at the end of the analysis period. Depreciation and financial expenses are only used for tax calculation and added back to net profits for the calculation of the project IRR. During the course of validation, the project investment cost was validated based on the formal presentation by PP and cross verified against equipment purchase contract signed between Cherat Cement Company Limited and Sinoma Energy Conservation Limited on November 29th, 2007 (IRL 6, civil work contract (IRL 40)).

Table 2: Investment Cost and other input parameters

Information	Value in PKR	Source of data	Cross check & Audit team conclusion
Project Investment (machinery and material, training, management and technical services, duties, taxes and freight charges and local costs)	966,090,433	Feasibility Study Report (IRL 5) Civil work contract (IRL 40)	The total actual investment costs of 993 million have been cross-checked against the actual equipment purchase contract costs invoices (Imported plant & Machinery-Sinoma

			China) (IRL 6) and Freight, Duties, Taxes & Others costs (IRL 61), which means that actual investment costs are 2.8% higher than estimated in FSR (IRL 5). Based on its financial expertise and knowledge in the sector, TÜV SÜD confirms that the investment costs of the project are reasonable.
O&M Cost	48,304,521.64 5% of total investment every per year with annual increase of 13%)	An independent Consultants Letter, East West Commercial Enterprise (IRL 22)	The estimated O&M costs of the project activity have been cross checked against the third party audit report prepared Minoo N. Bamjee & Company Chartered Accountants Karachi (IRL 77). The third party report indicates that for period of one full year (July 2010 till June 2011), the actual O&M costs of WHR project are 50.24 million which are slighter higher than estimated (48.30 million) in FSR (IRL 5). Furthermore, based on comparison of other similar project, the O&M costs of the project are in reasonable range of 5% of total investment costs. Based on its financial expertise and knowledge in the sector, TÜV SÜD confirms that the O&M costs of the project are reasonable.
O&M Overhaul Cost	Major Overhaul Cost (4.5% of the investment	Feasibility Study Report (IRL 5)	After checking the independent Consultants

	costs with annual increase of 13%) <table><tr><td>Year 5</td><td>80,098,155</td></tr><tr><td>Year 10</td><td>147,575,659</td></tr><tr><td>Year 15</td><td>271,898,585</td></tr></table>		Year 5	80,098,155	Year 10	147,575,659	Year 15	271,898,585	An independent Consultants Letter, East West Commercial Enterprise (IRL 22)	Letter, East West Commercial Enterprise (IRL 22) letter and based on financial expertise and knowledge of the sector, TÜV SÜD confirms that the O&M Overhaul Cost of the project are reasonable.
Year 5	80,098,155									
Year 10	147,575,659									
Year 15	271,898,585									
HFO Cost (PKR/ton)	21,763	Feasibility Study Report (IRL 5) CCCL Average Fuel Cost for Financial Year 2006-2007 (IRL 74)								
Diesel Cost (PKR/Ltr.)	31.70	Feasibility Study Report (IRL 5) CCCL Average Fuel Cost for Financial Year 2006-2007 (IRL 74)	<ul style="list-style-type: none">• Petroleum Exploration and Production Policy 2007 (IRL 81).• Annual Energy Outlook 2006 (IRL 32)• Pakistan Energy Yearbook 2006 (IRL 72)• Energy Prices Future Evolution Calculation (IRL 82) Based on its local and sectoral expertise and knowledge in the sector, TÜV SÜD confirms that the approach used to determine the fuel and escalation rates of the baseline fuels is appropriate.							
Project Loan period	7 years	Feasibility Study Report (IRL 5) Loan offer from Bank (IRL 10)								
Grace Period	2 Years	Feasibility Study Report (IRL 5) Loan offer from Bank (IRL 10)	Based on its local and sectoral expertise, TÜV SÜD confirms that the applied project load period, grace period and number of repayments are appropriate and applicable to the project activity.							
Number of Repayments	10 bi-annual repayments in 5 years	Feasibility Study Report (IRL 5) Loan offer from Bank (IRL 10)								
Commercial Lend-	13.50%	KIBOR rates (IRL 52)								

ing Rate (Benchmark)		Loan offer from Bank (IRL 10)	sectoral expertise, TÜV SÜD confirms that the applied benchmark is appropriate and applicable to the project activity.
Tax on net income	35% per year	Income Tax Ordinance issued by Government of Pakistan (IRL 51)	Based on its local and sectoral expertise, TÜV SÜD confirms that the applied tax on net income is appropriate and applicable to the project activity.
The technical life-time of equipment	20 Years	Feasibility Study Report (IRL 5)	The technical life time of equipment of the project activity has been cross checked against the letter from letter from EAST-WEST Commercial Enterprise on behalf of Sinoma Energy Conservation Limited (IRL 22). Based on its local and sectoral expertise and knowledge of this sector, TÜV SÜD confirms that technical life time of plant is appropriate.
Depreciation period & Salvage value	20 Years	Feasibility Study Report (IRL 5)	The depreciation period considered in FSR is 20 years which is based on from letter from EAST-WEST Commercial Enterprise on behalf of Sinoma Energy Conservation Limited (IRL 22). Furthermore, the consideration of zero salvage value after 20 years lifetime of the project equipment is appropriate. Based on its local and sectoral expertise and knowledge of this sec-

			tor, TÜV SÜD confirms that applied depreciation period and the consideration of zero salvage value for calculation of investment analysis is appropriate for this project.	
Operational Hours and Electricity production & Auxiliary Consumption	Operational Characteristics of Steam Turbo-Generator		Feasibility Study Report (IRL 5)	During the onsite visit, the operational hours, Electricity production & Auxiliary Consumption were discussed in detail. According to historical data of the Cherat Cement Plant, Number of operational days depends upon market demand of cement in the local and international market which is variable throughout the year. According to FSR (IRL 5) in the project situation, Cherat Cement Company Limited plans to run the cement manufacturing plant for 325 days which is quite realistic and achievable production plan. The 325 operation days of cement plant Company Limited has been cross checked against the clinker production report (IRL 46, 47, 48). Based on it local and sectoral expertise and knowledge of this sector, TÜV SÜD confirms that the 325 operational days are realistic in Cherat Cement Company limited. According to DOE experience with similar projects, this is a rather conservative figure in terms of
	Operational days per annum	325		
	Operational hours per day	24		
	Net capacity guaranteed by the supplier (MW)	5.35		
	Net electricity generation (MWh/year)	$5.35 \times 325 \times 24 = 41,730$		

			<p>additionality.</p> <p>The net electricity generation capacity (performance guarantee value provided by the supplier) of the power plant is 5.35 MW which is calculated from the gross generation capacity (5.95 MW) by deducting the auxiliary consumption (10%) (IRL 71). TÜV SÜD confirms, from the analysis of similar project in the same sector and technology, that the values of 5.95 MW, 5.35 MW and 10% auxiliary consumption are reasonable.</p> <p>Furthermore, TÜV SÜD confirms that with consideration of 1% of auxiliaries in the project activity, the IRR of the project activity still remains below the benchmark of 13.50%.</p>
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Operations & Maintenance Cost, Major Overhaul Cost and fuel cost

The operations & Maintenance cost (O&M) (48,304,521.64 PKR) and major overhaul cost (80,098,155 PKR) estimated in the FSR (IRL 5) are based on information provided by East West Commercial Enterprise (Third party Consultancy firm) (IRL 22). According to the consultancy firm the O&M cost in WHR projects in Cement Industry in Pakistan are 5 to 6% of CAPEX (Investment costs) while overhaul cost are 4-5% of CAPEX with a frequency of 4-5 years. Based on information from "the Consultancy firm" the project participants selected the O&M cost of 5% instead of 6%, which is a conservative choice while the overhaul cost are considered 4.5% (average of overhaul cost range) instead of 5%, which is a conservative choice. In the FSR, the O&M and overhaul Costs are escalated with an annual increase of 13%. This increase is due to rapidly increasing labour wages and costs associated with technical services.

TÜV SÜD discussed and checked during onsite that the escalation rate of annual O&M and overhaul costs (13%) in the FSR (IRL 5) was based on the following evidences:

- Analysis of Consumer Price Index in Pakistan (IRL 78)

As part of answer to first question for Request of Review, TÜV SÜD states the following (for more information to this question, please refer to the text below where this question has been answered in detail):

Cherat Cement Company Limited's maintenance contract with the equipment supplier (Wartsila) for their power generation equipment clearly mentions that a price adjustment (in the maintenance contract price) based on Consumer Price Index announced by Central Bureau of Statistics, Government of Pakistan, shall take place annually (IRL 79). The PP presented a trend analysis of the Consumer Price Index (IRL 78), to forecast average CPI in the host country (Pakistan) for the next twenty years from project decision (IRL 78). It was based on annual average Consumer Price Index (CPIs) from financial year 2002-2003 to 2006-2007 and all the raw data were taken from Annual Report of State Bank of Pakistan (SBP) for financial year 2006-2007 (IRL 80) available at SBP website (<http://www.sbp.org.pk/reports/annual/arfy07/>). The sources of all CPI related data as presented in the SBP annual reports are Federal/Central Bureau of Statistics and Economic Survey of Pakistan. CPI forecast calculation shows an average CPI of 13% from July 2007 to June 2027 (IRL 78). This is the result of a logarithmic extrapolation curve, which results to be the most conservative one among other possible functions (linear, exponential, polynomial, etc.). The table below shows the comparison of the possible estimates of the CPI, according to different extrapolations (polynomial has been excluded because it provides negative results, which are in contrast with the direct observations):

Type of extrapolation	Average CPI for period 2007-2025
Linear	13%
Polynomial (power 2)	-101%
Exponential	270%
Power	20%

As part of answer to first question for Request of Review, TÜV SÜD states the following (for more information to this question, please refer to the text below where this question has been answered in detail):

Furthermore, during the validation of the project, Cherat Cement Company Limited provided the yearly historical trend of increase in O&M costs from financial year 2006 and 2007 to DOE (IRL 68). Based on assessment of this, the O&M costs include salaries and wages, stores and spares, insurance and repair and maintenance. All the values to determine O&M costs were taken from annual reports of Cherat Cement Company Limited, which are audited by third party auditors (Statutory Auditors for the period 2006-2007: Ford Rhodes Sidat Hyder, Chartered Accountants, now known as "Ernst & Young Ford Rhodes Sidat Hyder", a member firm of Ernst & Young Global Limited) and are also available at Cherat Cement's website <http://www.gfg.com.pk/cheratcement/ccreport.html> (IRL 60). The historical trend in O&M costs shows an increase of 13%.

In summary, TÜV SÜD conducted the checks on the following evidences:

- maintenance contract by the supplier (Wartsila) of a power equipment installed in the cement plant (IRL 79); based on this evidence and on its local and sectoral expertise and knowledge

of this sector, TÜV SÜD confirms that the approach of using CPI as proxy for the O&M escalation rate is reasonable;

- CPI analysis by the PPs (IRL 78); TÜV SÜD confirms that the PP chose the conservative extrapolation option, according to which average CPI is expected to be 13%;
- Cherat Cement's historical trend of O&M Cost from financial year 2006 to 2007 (IRL 68)
- Third party letter by Minoo N. Bamjee and Company (IRL 85) which states that O&M cost escalation based on CPI approach and historical cost is reasonable, and also that based on their work, the O&M cost escalation at the time of investment decision was over 15%. Based on discussion above TÜV SÜD confirms that using CPI as proxy for the O&M escalation cost is reasonable, and the value of 13% is reasonable compared to the observed increase of 15%.

This clearly demonstrates the fact that PP's approach to employ CPI Forecast to predict annual increase in O&M Cost is appropriate.

According to technology supplier (Sinoma Energy Conservation Limited) (IRL 6), after every 5 years, an overhaul of the installed equipment is necessary which will cost 80,098,155 PKR which are 4.5% of the investment costs indexed by the annual increase of 13%, as per the O&M Costs.

The same analysis conducted for the O&M costs escalation rate is applicable to the overhaul costs escalation rate, as these present the same evolution dynamic, linked to the domestic market of labour and technical services.

According to DOE experience with similar projects in the host country (Pakistan), 5% of O&M costs compared to the total investment costs is a rather conservative figure and hence, deemed reasonable. The O&M costs 5 % and major overhaul costs of 4.5% every five years have been cross checked against the letter provided by East West Commercial Enterprise (an independent third party consultancy) (IRL 22). East West Commercial Enterprise is the local representative of Sinoma Energy (supplier of the project technology) in Pakistan.

- O&M costs information provided by East West Commercial Enterprise (Third party Consultancy firm) (IRL 22), according to the Consultancy firm the O&M costs in WHR projects in Cement Industry are 5 to 6 % of CAPEX while Overhaul cost are 4-5% of CAPEX while the frequency of Overhaul cost is every 4-5 years.

TÜV SÜD confirms that with consideration of zero overhaul costs of the project activity, the IRR of the project activity leads to 12.04% but still remains below the value of benchmark of 13.50%.

It is mentioned on page 56 of third party audit report prepared by ERNSYT & Young Ford Rhodes Sidat Hyder Chartered Accountant for year 2011; the total annual O&M costs of Cherat Cement Company Nowshera Plant were 529 million PKR (IRL 62). It is discussed and confirmed by PP during onsite visit that the O&M costs cover the individual sub-items: Salaries, wages and benefits, Insurance, Store and spares consumed and Repair and Maintenance (IRL 63); according to evidence submitted by Cherat Cement Company Limited (IRL 63), the total O&M costs for one year after operation of the project activity from June 2010 till July 2011 were 50.24 Million PKR as compared to estimated O&M costs (48.3 million PKR) in the FSR (IRL 5). Based on its local and sectoral expertise, TÜV SÜD confirms that the estimated 5% operational and maintenance costs in FSR for proposed project are realistic and appropriate.

The fuel costs for electricity generation (for financial year 2006-2007) for HFO and Diesel are 21,763 PKR /ton and 31.7 PKR/liter, respectively (IRL 5). These costs were verified against average fuel costs for financial year 2006-2007 (IRL 74) provided by the PP during on-site validation.

Detailed calculations for the increase in fuel costs are presented in Future Price Evolution Spreadsheet (IRL 75). The increase in fuel costs is evaluated on the basis of the Annual Energy Outlook 2007 (AEO 2006) prepared by the Energy Information Administration available on www.eia.doe.gov and fuel prices provided in Pakistan Energy Year Book 2007 (IRL 72), because, as confirmed by Petroleum Exploration and Production Policy 2007, fuel costs should be evaluated on the basis of the international market trends. The results of the future price increase estimated by the AEO 2006 were adjusted by the yearly inflation rate and by the exchange rate from US Dollars to Pakistani Rupee. The average price increase for 20 years (from 2007 to 2026) resulted in 1.92% for HFO and 0.93% for Diesel.

The DOE has validated the escalation rates of baseline fuels by checking the following documents:

- Petroleum Exploration and Production Policy 2007 (IRL 81). (Petroleum Production Policies are available from 2003 to 2007, however guidance related to determine fuel prices are same across all these policies. The PP just referred the most recent policy available at the time of investment decision).
- Annual Energy Outlook 2006 (IRL 32)
- Pakistan Energy Yearbook 2007 (IRL 72)
- Energy Prices Future Evolution Calculation (IRL 82)

As per Petroleum Policy of Pakistan, the international fuel prices form an integral part of fuel price determination in Pakistan. The fuel prices in Pakistan are decided by independent national bodies who, as per petroleum policy, index these to crude oil prices in the international market (IRL 81); any future change in fuel prices in Pakistan is thus intrinsically linked to fluctuations in crude oil prices in the international market. Consequently, forecasting any increase in the fuel prices solely on the basis of national historical fuel prices would yield unrealistic results as it would not take into account the effect of variation in international crude oil prices. In this regard, it cannot be considered correct to refer, for example, to the Fuel Consumer Index reported by the State Bank of Pakistan, as the reported figures reflect the actual fuel escalation, as influenced by contingent domestic economic events, and cannot be used for prediction of future prices on the long term.

Based on its local and sectoral expertise, TÜV SÜD confirms that the approach used by the PP to determine escalation in fuel prices (Energy Prices Future Evolution Calculation, IRL 82) is appropriate as it takes into account both international as well as national trends in fuel price variation. Energy Prices Future Evolution Calculation (IRL 82), submitted by PP, forecasts the increase in fuel prices from 2007 to 2026. The calculation is based on the following data;

- Five years historical data (2002 to 2006) for fuel prices in the national market as provided in Pakistan Energy Year Book 2007 (IRL 83)
- Five years historical data (2002 to 2006) for fuel prices in the international market as provided in Annual Energy Outlook 2006 (IRL 84)
- Fuel prices projections (2007 to 2026) in the international market as provided in Annual Energy Outlook 2006 (IRL 84)

On the basis of the discussion provided above TÜV SÜD confirms that the approach adopted by PP to determine the escalation rates of the baseline fuels is appropriate.

All the input values provided in the Energy Prices Future Evolution Calculation (IRL 82) were cross-checked against IRL 83 and 84 and found to be correct.

In addition to this, the confirmation of the suitability of the fuel evolution estimate has been provided by an independent third party, the chartered accounting company *Minoo N. Bamjee & Com-*

pany, who confirms that “assumptions of 1.92% and 0.93% in the fuel price of HFO and diesel respectively are reasonable” (IRL 85).

TÜV SÜD has checked and verified the future price evolution calculations along with the supporting evidences and found these to be correct.

Based on its local and sectoral expertise and knowledge, TÜV SÜD confirms that financial calculations are in line with VVM version 1.2 § 111, a, b & c.

During the course of request of registration of the project, the following question (Request for Review) was raised by EB.

1: The DOE shall further substantiate the suitability of input values to the investment analysis, in particular, (i) the appropriateness of the methods in determining the escalation rates given that the escalation rate of the O&M costs and overhaul cost is based on historical data (page 35 of the validation report) whereas the escalation rates of the baseline fuel prices are based on future anticipation (page 37 of the validation report); (ii) the source of the yearly inflation rates in the website of inflationdata.com (row 15 of table "Basic Info AEO06" in spreadsheet "Enclosure 1.xls") used in calculating the escalation rates of baseline fuel prices is not specified, and it is also not clear whether these yearly inflation rates are applicable to the baseline fuels in Pakistan; Please refer to paragraph 111 (a) and (b) of VVM version 1.2.

(i) the appropriateness of the methods in determining the escalation rates given that the escalation rate of the O&M costs and overhaul cost is based on historical data (page 35 of the validation report) whereas the escalation rates of the baseline fuel prices are based on future anticipation (page 37 of the validation report).

TÜV SÜD would like to clarify these issues as follows:

TÜV SÜD confirms that the methods applied to determine the escalation rates of O&M costs and baseline fuel prices are similar as both the methods are based on historical as well as future anticipation data. The reasons for similarities and appropriateness of these methods are explained and substantiated below:

Escalation in O&M Cost

It should be noted that the plant data i.e. historical trend of increase in O&M costs (13%) for financial year 2006 and 2007 (IRL 68), did not form the basis of determining escalation in O&M and overhaul costs. In fact, the plant data was used to cross-check the average increase in O&M and Overhaul costs determined by the PP using Consumer Price Index Analysis. This is further explained below:

As already mentioned in section 3.6.2, the PP has conducted Consumer Price Index (CPI) analysis to determine the escalation in O&M Costs. This is done as per Cherat Cement's Maintenance Contract with Wartsila (IRL 19) which states that an annual price adjustment shall take place based on the CPI index announced by the Government of Pakistan. Correspondingly, the CPI analysis has been conducted using **historical CPI data** from the Annual Report of the State Bank of Pakistan (SBP) (FY 2003 to 2007) to identify a growth trend (the logarithmic growth is identified as the best and most conservative fit) and to calculate the **expected inflation (Future Anticipation) over 20 years (2007 to 2026)**. Then the average value is taken (13%). TÜV SÜD confirms that PP's approach to employ CPI Forecast to predict annual increase in O&M Cost is appropriate and in line with their maintenance contract with Wartsila.

The appropriateness of escalation rate of O&M cost has been further cross-checked against the following evidences:

- Historical trend of increase in O&M costs (13%) for financial year 2006 and 2007 (IRL 68),
- Third party letter by Minoo N. Bamjee and Company which states that O&M cost escalation based on CPI approach and historical cost is reasonable, considering that based on their work, the O&M cost escalation at the time of investment decision was over 15% in 2007 (IRL 85).

Escalation of Baseline Fuel Prices

It should be noted that the increase in baseline fuel prices is not solely based on predicted data (**Future Anticipation**) but also takes into account national and international historical fuel prices. In fact, the fuel price escalation has been calculated as per the guidance provided in the Petroleum Exploration and Production Policy of Pakistan according to which international fuel prices form an integral part of the fuel price determination in Pakistan. The fuel prices in Pakistan are decided by independent national bodies who, as per Petroleum Policy, index these to crude oil prices in the international market; any future change in fuel prices in Pakistan is thus intrinsically linked to fluctuations in crude oil prices in the international market.

Thus, as per the Petroleum Policy, the increase in fuel prices has been determined using both the **historical and projected international fuel prices (Future Anticipation) provided by AEO** and the historical national fuel prices from Pakistan Energy Year Book (PEYB). The precise calculation steps are explained in part (ii) of this question.

Furthermore, the appropriateness of this approach has been further verified by a 3rd party chartered accountancy firm, Minoo N. Bamjee and Company (IRL 85).

(ii) the source of the yearly inflation rates in the website of inflationdata.com (row 15 of table "Basic Info AEO06" in spreadsheet "Enclosure 1.xls") used in calculating the escalation rates of baseline fuel prices is not specified, and it is also not clear whether these yearly inflation rates are applicable to the baseline fuels in Pakistan; Please refer to paragraph 111 (a) and (b) of VVM version 1.2.

Yearly inflation rates given at row 15 of table "Basic Info_AEO06" in spreadsheet "Energy Prices Evolution.xls" are precisely taken from the web page

http://www.inflationdata.com/Inflation/Inflation_Rate/HistoricalInflation.aspx which aggregates them from the tables of Consumer Price Index (CPI-U) compiled by the American Bureau of Labor Statistics (http://www.bls.gov/cpi/cpi_dr.htm).

The precise reasons as to why the yearly inflation rates are applicable to baseline fuels in Pakistan are provided below:

As already explained above, according to the guidance provided in the *Petroleum Exploration and Production Policy of Pakistan*, international fuel prices form an integral part of the fuel price determination in Pakistan. The fuel prices in Pakistan are decided by independent national bodies who, as per Petroleum Policy, index these to crude oil prices in the international market; any future change in fuel prices in Pakistan is thus intrinsically linked to **fluctuations** in crude oil prices in the international market. Therefore, if the increase in fuel prices is solely determined on the basis on national historical data, it would not only be contradiction to the Petroleum Policy, but would make the whole calculation inappropriate.

Thus, as per the Petroleum Policy, the increase in fuel prices has been determined using both the historical and projected international fuel prices provided by AEO and the historical national fuel prices from Pakistan Energy Year Book (PEYB). The precise calculation steps are further explained below:

1. Historical International fuel prices along with their projections, as provided at <http://www.eia.gov/oiaf/servicerpt/bmy/index.html>, are given in sheet “AE02006” of the Energy Price Evolution worksheet.
2. An inflationary trend is added to the international fuel price projections (sheet “Basic Info_AEO06” of the Energy Price Evolution worksheet) based on the consumer price index values provided by the American Bureau of Labor Statistics. The inflation data is available at http://www.inflationdata.com/Inflation/Inflation_Rate/HistoricalInflation.aspx
3. Determination of correlation between the International Historical Fuel Prices (AEO) and National Historical Fuel Prices (PEYB) and using these correlation factors to forecast the baseline fuel prices in USD.
4. The forecasted baseline fuel prices are converted from USD to PKR using the expected exchange rates. Please refer to sheet “Fut.Price.Evol_HFO” and “Fut.Price.Evol_DIESEL” of the Energy Prices Evolution calculations.

Moreover, Future Price Evolution Calculation shows that the use of international inflation rates for the calculation of expected future prices is appropriate because there is a high correlation ($R^2 = 0.99$ for HFO and $R^2 = 0.96$ for diesel) between the historical international prices (AEO) and the Pakistani fuel prices for the period 2002-2006, as reported by the Pakistani Energy Year Book (see worksheets Fut.Price.Evol_HFO and Fut.Price.Evol_Diesel, in Cherat_Energy Prices Evolution.xls).

Furthermore, this approach has also been verified by the third party chartered accountancy firm Minoo N. Bamjee and Company (IRL 85).

The above mentioned steps are fully in line with guidance provided in the Petroleum Policy (IRL 81). Furthermore, **the consistency and appropriateness of this approach has been further verified by a 3rd party chartered accountancy firm, Minoo N. Bamjee and Company (IRL 85).**

Based on its local and financial expertise and knowledge of this sector and the third party available evidences, TÜV SÜD confirms that the methods used by PP to calculate escalation in O&M cost and fuel prices fulfill the requirements of paragraph 111(a) and (b) of VVM version 1.2 and hence it is appropriate.

3: The DOE is requested to include information on how it has validated the input values to the financial calculations as per VVM v 1.2 paragraph 114 (a).

(i) The DOE shall explain how it has validated the suitability of the auxiliary electricity consumption given that the installed capacity is 7MW whereas the net output of the project activity is only 5.35 MW, in doing so, please also explain how it has validated the annual power generated;

(ii) It is not clear why an additional overhaul cost has been considered given that an Operational & Maintenance Cost has already been included in the financial analysis. Please also provide a breakdown of the assumed O&M cost and the actual annual O&M cost for year 2011 as per the audit report prepared by ERNSYT & Young Ford Rhodes Sidat Hyder Chartered Accountant.

TÜV SÜD would like to clarify these issues as follow.

The net electricity generation capacity of 5.35MW is based on the "Detailed calculation for Performance Guarantee" (IRL 76) provided by supplier as third party for the 7 MW system cogeneration system. The document reveals that the installed capacity of the Waste Heat Recovery is 7 MW, which under optimal local conditions, can deliver a gross capacity of 5.95 MW and once auxiliaries (10%) are taken into account, the system has a net capacity of 5.35 MW. Consequently, the expected annual power generation, based on the net guaranteed value, and 325 days of operation (FSR, IRL 5) is $5.35 \times 24 \times 325 = 41,730$ MWh/yr.

After checking the document "Detailed calculation for Performance Guarantee" (IRL 76) and based on is local and sectoral expertise and knowledge of this sector, TÜV SÜD confirms that the net capacity of 5.35 MW is realistic and annual power generation of $5.35 \times 24 \times 325 = 41,730$ MWh/yr is realistic.

Furthermore, TÜV SÜD confirms that with consideration of 1% of auxiliaries in the project activity, the IRR of the project activity still remains below the benchmark of 13.50%.

O&M costs and overhaul costs are different in nature and have different supporting document references, for this reason these have been accounted for separately in the investment analysis.

O&M costs include salaries, wages and staff benefits, consumables and spare parts, plant insurance, and repair and maintenance services, basically all items needed for the regular ordinary operation of the plant (IRL 77).

In contrast, overhaul cost refers to a periodical (5 years) ad-hoc refurbishing of the main equipment (IRL 6), which is provided by the equipment supplier as a third party service.

With regard to the breakdown of the O&M costs, TÜV SÜD checked and confirms that there is no such detail in the FSR (IRL 5) and not in the letter provided by the independent consultant East West Commercial Enterprise. However, breakdown is available for the year 2011 (as audited by third party called "Minoo N. Bamjee and Company") and it shows that the assumed O&M cost is plausible.

It is to be noted that the O&M cost audited by third party called "ERNSYT & Young Ford Rhodes Sidat Hyder Chartered Accountant" relates to the entire cement plant, so the O&M cost for the WHR unit are just a part of them.

Description	Assumed O&M Cost (IRL 5, FSR and IRL 22	Actual O&M Cost for WHR Plant 2011	Actual O&M Cost for entire Cement Plant
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	an independent Consultants Letter, East West Commercial Enterprise)	(IRL 77, WHR O&M Certificate provided by Minoo N. Bamjee and Company)	2011 (IRL 62, Annual Report 2011 prepared by ERNST & Young Ford Rhodes Sidat Hyder Chartered Accountant)
Salaries, Wages & Benefits	48,304,521.64	23,621,628	329,222,000
Stores and Spares Consumed		18,365,367	148,294,000
Insurance		6,550,650	40,829,000
Repair & Maintenance		1,708,401	11,217,000
Total	48,304,521.64	50,246,046	529,562,000

Based on discussion above and on its local and sectoral expertise and knowledge of this sector, TÜV SÜD confirms that the O&M costs are different in nature from overhaul cost and as per the equipments supplier as third party.

Furthermore, TÜV SÜD confirms that with consideration of zero overhaul costs of the project activity, the IRR of the project activity leads to 12.04% but still remains below the benchmark of 13.50%.

In conclusion, based on its local and sectoral expertise and knowledge, TÜV SÜD confirms that the input parameters are in line with VVM version 1.2 § 114 (a).

Benchmark

The applied benchmark in the PDD and IRR Spread sheet of proposed project is 13.50 %. The applied benchmark represents the local commercial lending rate and has two distinct components;

1. Karachi Inter-bank Offer Rate (KIBOR)
2. Credit spread over the KIBOR charged by the local bank.

KIBOR was officially introduced by State Bank of Pakistan as a third party as a reference rate for all corporate (both for lender as well as borrower) in Pakistan in February 2004. This KIBOR was officially introduced in February 2004 but it was also valid at the time of investment decision dated October 25th, 2007. KIBOR is always determined by State Bank of Pakistan. The credit spread calculation is performed by local banks in Pakistan which determine it based on various project specific risks or characteristics of a project type.

- KIBOR rate of 2007 are available at the website of State Bank of Pakistan (IRL 52):
<http://sbp.org.pk/ecodata/kibor/2007/>
- Press release by State Bank of Pakistan: <http://www.sbp.org.pk/press/2004/jan-21-04.pdf> (IRL 53)
- Third Quarterly report of State Bank of Pakistan FY04 (IRL 11):
<http://sbp.org.pk/reports/quarterly/fy04/thirdQtr/Money%20Market.pdf>

The commercial lending rate is determined by taking a six month tenor average KIBOR of 10.00% for September 2007 and adding to it a credit spread of 350 basis points which is based on offer by United Bank Limited, a local bank in Pakistan (IRL 45). The benchmark thus evaluated was (10.00% + 3.50%) 13.50%. It is evident from the bank loan offer conditions letter from United Bank Limited that loan will be awarded by considering the six month KIBOR rate and 3.50% to 3.75% bases points. PP selected six month KIBOR and 3.50% points. It means that selection of 3.50% instead of 3.75% bases points is conservative value in term of selection of benchmark.

The applied benchmark is in compliance with the requirements of EB 62, Annex 5. It is discussed in detail during onsite visit of Cherat Cement plant that the project activity could be implemented by another entity instead of Cherat Cement Company Limited like any Energy Service Company (ESCO) that would bear all the project related costs and recover its investment by claiming a portion of savings generated by the project activity. As the KIBOR and average spread are determined by the third party (State Bank of Pakistan & Local Bank "United Bank Limited), it is clear that the approach used for the calculation of benchmark (KIBOR + basis point) is appropriate.

- Furthermore, appropriateness of selection of benchmark has been crosschecked with Citibank letter provided by PP (IRL 69) which states that appropriate benchmark for CDM projects is the combination of bases points (200 to 350) plus six to three month KIBOR rate. The Citi Bank letter constitutes a third party opinion regarding credit spread range and establishes the fact that the corporate lending rate evaluated by Cherat Cement (which is based on UBL's loan offer letter- KIBOR + 350 basis points) is appropriate. It should be noted that this Citibank letter has nothing to do with project activity because it was issued on November 4th, 2008 after Board decision. This letter (IRL 69) is mentioned here to cross check the correctness of applied approach of benchmark in the project activity although it was after board decision. Financial information was requested by Omar Malik (Carbon Services Private Limited) and information was provided by Citi Bank Pakistan about the benchmark, Karachi Inter Bank offer rates (KIBOR).

Furthermore, the appropriateness of selection of benchmark has been crosschecked with a news article published on May 24th, 2007 in Dawn Newspaper Pakistan which states that *"The cost of short-term financing for export is the lowest in Pakistan amongst its competitors both in nominal as well as real terms. The State Bank provides finance to banks at the rate of 7.5 per cent (6.5 per cent concessionary finance rate +1 per cent spread) subsidizing to the extent of 2.34 per cent as against the commercial lending rate of 12.57-13.57 percent"* (IRL 43). It means that the normal range of commercial lending rate prevalent at the time of investment decision was from 12.57% to 13.57% and project activity benchmark 13.50% lies within this range.

In conclusion, the benchmark selected by the PP is appropriate as it is based on the components which are determined by third parties and was valid at the time of investment decision.

Benchmark determined by relevant National Authority

It has been confirmed by TÜV SÜD that there is no benchmark established by the Government of Pakistan for WHR based power projects. There are some benchmarks established by Government of Pakistan but only for hydropower and thermal power projects which are irrelevant in the context of the current project activity. Based on its local and sectoral expertise, TÜV SÜD confirms that there is no benchmark available in Pakistan for WHR based power projects.

Comparison of the Chosen Benchmark with Other Benchmarks

As per guidance provided in *Paragraphs 13 of Annex 5 of EB62*, Weighted Average Costs of Capital (WACC) and benchmark determined by relevant national authority are also appropriate benchmarks for a project IRR which could be used to conduct the investment analysis for the project activity.

The calculated WACC for financial year 2007 for Cherat Cement by IGI Securities is 14.12% (IRL 54). However, it is less conservative when compared with the commercial lending rate of 13.50%.

Likewise, there is no benchmark established by the Government of Pakistan for WHR based power projects.

The benchmark mentioned in EB 62 annex 5 as default values of the expected return on equity is 15.5%. So the applied benchmark in the project activity (i.e. 13.5%) is conservative as compared to 15.5%.

Based on the discussion above and also on its local and sectoral expertise and knowledge in the sector; TÜV SÜD confirms that the applied benchmark of 13.50% in the proposed project is conservative.

Sensitivity analysis

The sensitivity analysis was analyzed in detail and TÜV SÜD confirms that the underlying assumptions, parameters and chosen values are appropriate and that the calculations have been performed correctly. Sensitivity analysis was performed on the project investment, O&M cost, HFO cost and plant load factor, which are the parameters which contribute to at least 20% of the total revenues/costs of the project.

In the sensitivity analysis test, variation of $\pm 10\%$ has been considered. as per the latest guidance from EB and as indicated in the guidance on the investment analysis from EB 62 (Annex 15); TÜV SÜD considers that all the variables chosen for conducting the sensitivity analysis as well as their variation ranges ($\pm 10\%$) are reasonable as these are in compliance with the latest guidance on investment analysis. The main results of investment analysis show that IRR for Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan has been calculated with and without CDM revenues.

The project IRR without CDM revenues is 7.60% which means that the proposed project is not economically attractive and fulfils the requirement of additionality.

TÜV SÜD was able to verify that the IRR will touch the benchmark only the above mentioned parameters change by values as mentioned below:

Key Indicators	Variation of the parameter indicator needed to reach benchmark
Project Investment costs	-16.90%
HFO Price	-10.98%
O&M Cost	-45.45%
Plant Load Factor	-10.72%

The IRR of the proposed project with CERs revenue increases to 14.07%, which is higher than the benchmark IRR of 13.50%. So the proposed project is economically attractive with CDM revenues. Either an investment cost decrease of 16.90 % or an increase of more than 10.98 % in HFO price or a decrease of 44.45% in O&M costs or an increase of 10.72% in the plant load factor would turn the project non additional. Based on its local and sectoral expertise, TÜV SÜD confirms that this is unlikely to happen. for the following reasons: total investment cannot decrease because the project has been already fully implemented and actual cost confirms the expected figure at the time of investment decision (actual cost was higher); decrease in the initial HFO cost is impossible because it

is calculated on the historical data, for which evidence has been provided (IRL 74); decrease in the O&M cost is unlikely because it is based on the quotation offered by the technical service providers and salaries and wages, which are affected by ramping inflation in the country, as supported by evidence IRL 68; increase in the load factor of 10.72% means a load factor of 94%, which, based on TÜV SÜD experience and the comparison provided in the table below, is not technically viable for power equipment as applied in the project activity (reasonable range for steam turbines is 80%-85%).

Project Name	MW	Plant Load Factor
DGKCC Waste Heat Recovery and Utilization for 10.4 MW Power Generation at Dera Ghazi Khan Plant http://cdm.unfccc.int/Projects/Validation/DB/XDNBLIDFFBLQR11A0SD86KIXIF5KUM/view.html	10.4MW	85%
Waste Heat Recovery and Utilization for Power Generation at Lucky Cement Limited Pezu Plant http://cdm.unfccc.int/Projects/Validation/DB/5THY9Y15CINFMYJXYV51WVXMFRHX83/view.html	10MW	80%
Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan http://cdm.unfccc.int/Projects/Validation/DB/XN4SGWEQVUD7QMVZCW9KRWCI6D97D4/view.html	7MW	85%
Waste Heat Recovery based 15 MW Power Generation Project at Bestway Cement Limited, Chakwal, Pakistan (UNFCCC Registration no. 3555) http://cdm.unfccc.int/Projects/Validation/DB/DLZHSFAMK6BA3FCS3SCCTDCIGSIIKN/view.html	15MW	82%
Waste Heat Recovery and Utilization for Power Generation at Maple Leaf Cement Factory Limited, Iskanderabad, Pakistan http://cdm.unfccc.int/Projects/Validation/DB/P740TN7NRBRKEWN9AM3RM0L6BN0CXU/view.html	13.9MW	90%
Waste Heat Recovery Power Plant at Fecto Cement Limited http://cdm.unfccc.int/Projects/Validation/DB/BRBHLN7AWUFXK6Q16JXXFNNOEE9Y14/view.html	6MW	-
Waste Heat Recovery and Utilization for Power Generation at Lucky Cement Limited, Karachi Plant http://cdm.unfccc.int/Projects/Validation/DB/JZDZOGO8Z0GM9JZYUINLHLIRU2IN/view.html	15MW	80%

The approach taken is fully in line with the given requirements and the minimum required range of +/- 10% is fully covered. The results indicate that it is highly unlikely that the project IRR would overcome the benchmark IRR without CDM revenues, thereby demonstrating that the project activity is not viable without CDM revenues. The assessment team was able to verify the results of the sensitivity analysis and confirms that the necessary increase and decrease in these parameters in order to overcome the benchmark is impossible.

The financial calculations have been verified and no mistakes have been found.

3.6.3 Barrier analysis

No other barrier analyses (technological barrier, barrier due to prevailing practice and other barriers) were applied for this project.

3.6.4 Common practice analysis

Common practice analysis is not required for small scale project.

3.7 Monitoring plan

The monitoring plan presented in the PDD complies with the requirements of the applicable methodology AMS.III.Q version 4. The assessment team has verified all parameters in the monitoring plan against the requirements of the methodology; no relevant deviations have been found.

The procedures have been reviewed by the assessment team through document review and interviews with the relevant personnel. This information, together with a physical site inspection, allows the assessment team to confirm that the proposed monitoring plan is feasible, and in line with the project design. The major parameters to be monitored have been discussed with the PPs, in particular with regard to the location of meters, data management, and the quality assurance and quality control procedures to be implemented in the context of the project.

According to the monitoring plan in the PDD, the net quantity of electricity supplied by the project activity to the recipient plant as for para 17a, $EG_{i,j,y}$ [MWh], will be measured continuously by an energy meter. Para 18 of AMS-III.Q is not applicable here since generated power is not exported to other facilities or to the grid. The QA/QC procedure planned is to cross check the results of the direct measurements with annual energy balances. The assessment team checked that QOE, y is a monitoring parameter in the MP as for para 19 of AMS-III.Q. Para 20 of AMS-III.Q is not applicable here as there is no auxiliary fuel combusted in the project activity to supplement waste gas and the waste heat recovery system consumes its own electricity for auxiliary needs. Similarly, the project activity does not incinerate any waste gas to generate energy. Furthermore, the applicable requirements specified in "General Guidelines to SSC CDM methodologies" as of para 21 of AMS-III.Q are deemed to be fulfilled by the MP.

Therefore, the PPs will be able to implement the monitoring plan and the achieved emission reductions can be reported ex-post and verified.

3.8 Sustainable development

The project will lead to sustainable development through employment generation, generation of clean energy, and introduction of energy efficient technologies to the host country. The project has received the host country approval letter which also indicates that the project will contribute to the sustainable development in Pakistan (IRL 39).

3.9 Local stakeholder consultation

The relevant local stakeholders have been invited through advertising on November 18th, 2008 both in local English and Urdu newspaper, *Daily The Frontier Star* and *Daily SURKHAB*, respectively. The evidences for the invitation to stakeholder consultation meeting are IRL 16, 17 and IRL 18 is related to the participants who attended the meeting on November 20th 2008. The assessment team has reviewed the documentation in order to validate the inclusion of relevant stakeholders. Using local expertise it can be confirmed that the communication method used to invite the stakeholders is appropriate. The summary of comments presented in the PDD has been cross checked with the documentation of the stakeholder consultation and it is found to be complete.

The relevant comments presented by the local stakeholders have been taken into due account by the PP; the same has been cross checked with the information obtained during the interviews.

As a result, TÜV SÜD considers the applied process for the local stakeholder consultation as adequate and appropriate.

3.10 Environmental impacts

The project participants undertook an analysis of environmental impacts of the project. An EIA as for item 161 of the VVM was not required for this project in accordance with the host country requirements. No significant negative impacts are caused by the project activity. The assessment team reviewed the documentation of the presented information. IRL 19 confirms the correctness of the approach used by the PP, Environmental Approval, issued by Environment Protection Department, Government of the Khyber Pakhtunkhwa, formerly NWFP province, Pakistan). We conclude that the PP followed the requirements of the host country in regard to environmental impacts.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

TÜV SÜD published the project documents on the UNFCCC website, and invited comments by affected Parties, stakeholders, and non-governmental organisations during a 30 day period.

The following table presents all gathered key information:

GSP

website: http://www.netinform.de/KE/Wegweiser/Guide2_1.aspx?ID=6269&Ebene1_ID=26&Ebene2_ID=2041&mode=1 https://cdm.unfccc.int/Projects/Validation/DB/Y1EJLWQAP09NS8CD2M6YHC5BKIGHT4/view.html	
Starting date of the global stakeholder consultation process: 2009-08-06	
Comment submitted by: None	Issues raised: -
Response by TÜV SÜD: -	

Repeated GSP

website: http://www.netinform.de/KE/Wegweiser/Guide2_1.aspx?ID=6269&Ebene1_ID=26&Ebene2_ID=2041&mode=1 https://cdm.unfccc.int/Projects/Validation/DB/Y1EJLWQAP09NS8CD2M6YHC5BKIGHT4/view.html	
Starting date of the global stakeholder consultation process: 2011-05-25	
Comment submitted by: None	Issues raised: -
Response by TÜV SÜD: -	
Comments	PP response
TÜV SÜD response	

Re-GSP comment of Stakeholder:

TÜV SÜD received the comment during the re-GSP of the project stated below.

Please clarify the below comments.

1. It is evident from the PDD that the values are consistent and it is definitely forged and cooked up values to show a non CDM project as a CDM project. What is this? DoE to check the Detailed Project Report and Feasibility Report which is submitted to the other agencies and Banks by Project owner and ensure that the values match with the DPR/FR submitted to DoE also. After careful study of PDD it is found that DPR/FR is in different versions made and submitted with different purposes to different agencies which is totally unacceptable, illegal and unethical. PP/Consultant may show some undertaking letter from bank manager to DoE stating that both DPR's are same. These kinds of letters should not be accepted and entertained by DoE. While collecting the DPR/FR from banks and other agencies, all DPR/FR pages should be counter signed by Banks and other agencies so that the real DPR/FR given to other parties by the PP/Consultant is same as the one submitted to DOE. In this particular project there is clear cut evidence that DPR/FR values are changed/ fabricated mischievously and intentionally. This must be probed fully. DOE must take a written undertaking from the PP/Consultant about the list of parties to whom this DPR/FR is submitted and for what purposes. Then DOE should cross check with all the parties and confirm that the same DPR/FR is submitted to all the parties correctly without any changes. DOE must not accept any reports and undertakings from PP/Consultant. DOE must make independent evaluation and use totally different parties without informing the PP or Consultant to cross check the facts. DOE to write to the party who prepared the DPR/FR which is submitted to the banks and other agencies and the same is verified against the one submitted to the DOE by PP/Consultant. This project is a fabricated and fake CDM project and must be rejected by the DOE right away. DOE should not support this kind of projects otherwise CDM EB should suspend this DOE for at least one year. Submitted by: zhong zhou li, zhongzhouli8@gmail.com

1. The PPs are of the opinion that this comment does not contain sufficient specific reference to the underlying project to be deemed credible. It has been observed (see EXCEL file provided in attachment) that the author, Zhong Zhou Li, has copy pasted the same comment on at least 33 projects, which have GSP starting dates between 27/04/2011 and 26/05/2011. Although the projects are from 8 different sectors, 7 different countries, under 9 different DOEs, yet the same comment has been spammed on all the projects. This strongly undermines the credibility and the appropriateness of the analysis, which, rather looks as a general one. It seems very unlikely that 33 different projects are affected by the same comment. Also, terminology used in the comment is not consistent with the one applied in the PDD (eg. there is no "Detailed Project Report" or DPR/FR mentioned in the PDD), which again contributes to the suspect that the comment is not really relevant to this project. In addition, it has to be acknowledged the fact that the suggested tests and checks have been, wherever reasonable and appropriate, performed by the DOE, indeed.

1. During the onsite of the project activity TÜV SÜD discussed and checked and crosschecked the input parameter that applied in FSR, PDD and IRR spreadsheet. The DOE conclusions about input parameters has been provided in chapter 3.6 of this validation report (please see above). There is no PDR of project. It was also discussed during onsite and PP confirms that FSR was prepared internally and was never shared with other intuitions or departments.

<p>2. It is evident from the PDD that the values are consistent and it is definitely forged and cooked up values to show a non CDM project as a CDM project. What is this? DoE to check the Detailed Project Report and Feasibility Report which is submitted to the other agencies and Banks by Project owner and ensure that the values match with the DPR/FR submitted to DoE also. After careful study of PDD it is found that DPR/FR is in different versions made and submitted with different purposes to different agencies which is totally unacceptable, illegal and unethical. PP/Consultant may show some undertaking letter from bank manager to DoE stating that both DPR's are same. These kinds of letters should not be accepted and entertained by DoE. While collecting the DPR/FR from banks and other agencies, all DPR/FR pages should be counter signed by Banks and other agencies so that the real DPR/FR given to other parties by the PP/Consultant is same as the one submitted to DOE. In this particular project there is clear cut evidence that DPR/FR values are changed/ fabricated mischievously and intentionally. This must be probed fully. DOE must take a written undertaking from the PP/Consultant about the list of parties to whom this DPR/FR is submitted and for what purposes. Then DOE should cross check with all the parties and confirm that the same DPR/FR is submitted to all the parties correctly without any changes. DOE must not accept any reports and undertakings from PP/Consultant. DOE must make independent evaluation and use totally different parties without informing the PP or Consultant to cross check the facts. DOE to write to the party who prepared the DPR/FR which is submitted to the banks and other agencies and the same is verified against the one submitted to the DOE by PP/Consultant. This project is a fabricated and fake CDM project and must be rejected by the DOE right away. DOE should not support this kind of projects otherwise CDM EB should suspend this DOE for at least one year. Submitted by: zhong zhou li, zhongzhouli8@gmail.com</p>	<p>2. This second comment repeats verbatim the previous one, so same reply from the PP applies.</p>	<p>2. During the onsite of the project activity TÜV SÜD discussed and checked and crosschecked the input parameter that applied in FSR, PDD and IRR spreadsheet. The DOE conclusions about input parameters has been provided in chapter 3.6 of this validation report (please see above). There is no PDR of project. It was also discussed during onsite and PP confirms that FSR was prepared internally and was never shared with other intuitions or departments.</p>
<p>3. It looks like from the PDD the start date of the project is tampered for sure. This must be verified and let the truth come out. The culprits of forgery and malpractices must be brought to book. Why DOE has taken up such a bad project? Is there any pressure on DOE or some cake offered to DOE? They DOE must terminate this project immediately. DOE to check the offer letters originals and get the same verified in writing from the OEM's and submitted parties. Where is the OEM supplier agreement original? DOE to check for the</p>	<p>3. Similarly to the previous reply, the credibility of this comment is highly questionable due to its generality and lack of specific evidence that the project under discussion has really been considered. The comment is rich in unsupported statements like "For sure...", "I am sure...",</p>	<p>3. DOE has checked the equipment purchase contract and date of signing of equipment purchase contract is the start date of the project activity, this has been discussed in details in chapter 3.6.1 and 3.6.2 of this validation report.</p>

<p>same. Is it prepared later with date and amounts changed to suit the project workings? For sure yes. This is not acceptable. DOE to check all purchase orders originals with the receiver of purchase orders i.e. the supplier of equipment. This PO confirmation to the DOE must be in writing from a board level person of the equipment supplier to avoid any malpractices and forgery. Then DOE to check for the invoices dates, payment amounts and date of payments made with all original documents and reconfirm with the parties involved and the banks for the accuracy of amounts, dates and parties involved. Same analysis and due diligence work to be repeated for "Notice to Proceed" as written in the case of Purchase order as above. DOE to check all "Notice to Proceed" originals with the receiver of "Notice to Proceed" i.e. the supplier of equipment or Engineering Procurement & Construction Contractor. This "Notice to proceed" and EPC contract confirmation to the DOE must be in writing from a board level person of the equipment supplier and EPC contractor to avoid any malpractices and forgery. Then DOE to check for the invoices dates, payment amounts and date of payments made with all original documents and reconfirm with the parties involved and the banks for the accuracy of amounts, dates and parties involved. DOE to check OEM supplier agreements, EPC contractor agreements, "Notice to proceed" letters, and Invoices raised. I'm sure DOE will catch the malpractices happened in this project. All the parties involved in this matter must be brought to justice. DOE must not support this kind of forgeries and malpractices. DOE cannot afford to close their eyes to this kind of malpractices. Submitted by: xiangbo yao, xiangboyao@gmail.com</p>	<p>etc. Also, the PPs can confirm that most of the checks suggested has been carried out during the desk review and the field visit, with the clear goal to confirm the authenticity of the documents provided and the reasonability of the technical and financial data presented in the PDD, as in fact suggested in this comment.</p>	
<p>4. DOE to ensure that the PDD values are consistent and ensure that the CDM project is a genuine project.</p>	<p>4. All the comments that follow are substantially similar to the ones provided above and are quite generic. It seems that the author did not really analyze the PDD of the project, as he is presenting various cases (see the sentence where it is said "This project is having a debt component?" and a bit below "If the project is fully equity project then..."), which clearly show that the comment is generic, and the author did not even check which case (debt or equity) specifically ap-</p>	<p>4. DOE has checked the input values applied in IRR and PDD, Please see chapter 3.6 of this validation report above.</p>

	<p>plies to this project.</p> <p>Above all, rather than finding any substantial issue with the project activity itself, the author seems to be suggesting a sort of “guidelines” for the DOE as to how to do conduct the validation. The PP believes that Validation and Verification Manual issued by UNFCCC provides a comprehensive guidance in this regard; hence, the comments put forward by the author are redundant</p> <p>Furthermore, it is pertinent to mention here that during the course of validation the PP has provided the DOE with all the requisite supporting documents, evidences and information (which are reliable, transparent, verifiable and authentic) and based on these the DOE has conducted the requisite checks/cross-checks to verify the authenticity or genuineness of all the claims made in the PDD with regard to FSR, Investment Analysis Emission Reduction Calculations (and the input parameters used therein), CDM awareness, seriousness of CDM consideration, starting date of the project activity, equipment purchase agreement, baseline and project data, etc.</p>	
5. DoE to check the Detailed Project Report and Feasibility Report which is submitted to the other agencies and Banks by Project owner and ensure that the values match with the DPR/FR submitted to DoE also.	5. See response provided in point 4 above	5. DOE has checked the values, Please see chapter 3.6 of this validation report above.
6. Careful study must be done so that the DPR/FR is not in different versions made and submitted with different purposes to different agencies, which is totally unacceptable, illegal and unethical.	6. See response provided in point 4 above	6. DOE has checked the input values applied in IRR and PDD, Please see chapter 3.6 of this validation report above.
7. Project owner should show some undertaking letter from bank manager to DoE stating that both DPR's are same. These kinds of letters should not be accepted and entertained by DoE at face value, but must be checked independently. While collecting the DPR/FR from banks and other agencies, all DPR/FR pages should be counter signed by Banks and other agencies so that the real DPR/FR given to	7. See response provided in point 4 above	7. TÜV SÜD checked the FSR of project and there is no PDR of project. DOE has checked the input values applied in IRR and PDD, Please see chapter 3.6 of this validation report

<p>other parties by the PP/Consultant is same as the one submitted to DOE.</p> <p>8. DPR/FR values must be probed fully. DOE must take a written undertaking from the PP/Consultant about the list of parties to whom this DPR/FR is submitted and for what purposes. Then DOE should cross check with all the parties and confirm that the same DPR/FR is submitted to all the parties correctly without any changes. DOE must not accept any reports and undertakings from PP/Consultant. DOE must make independent evaluation and use totally different parties without informing the PP or Consultant to cross check the facts.</p> <p>9. DOE to write to the party who prepared the DPR/FR which is submitted to the banks and other agencies and the same is verified against the one submitted to the DOE by PP/Consultant.</p> <p>10. DOE must not entertain this project any more if found the DPR/FR is tampered with at any point in time. PP cannot give different DPR's and FR's. They must submit only the one given to Banks and other agencies while obtaining loans and decision making time.</p> <p>11. Has the PP considered the CDM revenues while envisaging the project? Without CDM the project was not viable, is it right? This project is having a debt component? Then how bankers or lenders gave the loan? Have the bankers or lenders considered the CDM revenues while agreeing to give loan to this projects? If not this project should be rejected right away by DOE by terminating the contract forthwith. If yes, where is the proof? What is the date of the evidence document from bank? Is this document printed now days or earlier. DOE to independently check the same. If the document is available from Bank it must be checked from all angles so that it is genuine and not forged and date changed by putting back dated. This is normally done, DOE to be aware of this please. Please check the communication the PP had during that time with banks, emails and postal receipts and the weights and dates mentioned on the receipts. Do not believe in courier bills and receipts since these can be cooked up easily. Insist on government owned postal service receipts only. If the project is fully equity pro-</p>	<p>8. See response provided in point 4 above</p> <p>9. See response provided in point 4 above</p> <p>10. See response provided in point 4 above</p> <p>11. See response provided in point 4 above</p>	<p>above.</p> <p>8. DOE has checked the input values applied in IRR and PDD, Please see chapter 3.6 of this validation report above.</p> <p>9. DOE has checked the input values applied in IRR and PDD, for more details, please see chapter 3.6 of this validation report above.</p> <p>10. TÜV SÜD checked the FSR of project and there is no PDR of project. DOE has checked the input values applied in IRR and PDD, Please see chapter 3.6 of this validation report above. Based on its local and sectoral expertise, TÜV SÜD can confirm that banks do not require any FSR of project for loan offer or loan approval.</p> <p>11. TÜV SÜD checked the input parameters and TÜV SÜD financial expert has checked the FSR of project. DOE has checked the input values applied in IRR and PDD, Please see chapter 3.6 of this validation report above.</p>
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<p>ject then on what basis the PP has invested full equity in to the project while considering the CDM revenue? DOE to check the same in detail and bring out the facts. Is there any past record of this PP to invest or not to invest at returns what he is talking about in this project? Proper evidences must be reviewed and digged out by the DOE and take decision on the project based on established facts. Do not ask documents from PP, DOE to collect the same from different sources to do independent evaluation.</p> <p>12. Is the project equipment purchased second hand equipment or sourced from cheap foreign sources? If yes, the issue must be probed by DOE since invoices will invariably be inflated and forged. Total project costs mentioned by PP will not be the same as originals. Hence no additionality. These facts must be probed in full by DOE by checking all documents and money transactions along with bank statements and certified accounts by a legally acceptable financial analyst.</p> <p>13. From DOE side which auditor has done marketing and business development for acquiring this business of validating this project? With whom he or she was co-coordinating at PP or CER buyer? The same person who has done the marketing and business development to acquire the business do validation or participate in any manner what so ever in the validation process? One cannot do like that. It is against the accreditation rules and norms followed since ages. DOE should send auditors from different offices or countries to do this validation audit. DOE must take care of impartiality and accreditation rules. Due to the targets set by the DOE managements auditors are doing marketing and meeting clients and giving promises that the project will be taken care. Is it acceptable and fair? This must be stopped. No auditor should do marketing. Only non-auditing staff should do marketing. DOE to ensure the same please.</p> <p>14. If applicable only: Is these machines, equipment was a part of any bundle of CDM activity envisaged and developed earlier. DOE to check the same through independent sources also. Once some bundles are non-additional and getting negative validation from a DOE, PP is rolling out the same project as an individual project which is not a CDM project at all. DOE to verify the same from independent sources and also take undertaking in the form of an affidavit from the PP's that any misrepresentation or false statement with respect this would attract strict legal action from UNFCCC and DOE. Furthermore the registered project must be de-registered in case of any future findings contradicting the submissions made by the project owner.</p>	<p>12. See response provided in point 4 above</p> <p>13. See response provided in point 4 above</p> <p>14. See response provided in point 4 above</p>	<p>12. TÜV SÜD checked onsite and confirms that installed equipment of project activity is brand new. For more details, please see chapter 3.6 of this validation report above.</p> <p>13. TÜV SÜD confirms that audit team was not involved in any marketing activity.</p> <p>14. TÜV SÜD confirms that project activity is not bundled project.</p>
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<p>15. DOE to be more careful so that this is a genuine CDM project. What is the exact project cost? The project cost is covering what? Each value considered must be validated with proof. The machinery is second hand purchased or fresh and new from an OEM? In either case DOE to check all the quotations, proposals, purchase orders, invoices, way bills, transport bills, proof of payments like bank statements. DOE to check with banks by way of written confirmation the amount transacted, to whom the money is paid, when the money is paid, is the party paid is the correct party as shown in the purchase orders. It may so happen that the values, party names, dates are fabricated and misrepresented in this project. DOE should terminate their contract for this project immediately. This is the only way out to protect the value of CDM process. If the PP is purchasing second hand or second quality equipment and inflating the purchase order values and invoices, this must be probed thoroughly and real values to taken for additionality calculation. Then I'm sure the additionality is not there at all in such a situation.</p> <p>16. How is the base line defined in this project? Is Base line hypothetically defined with no proper evidences and proper justification? In such case, DOE cannot take the base line as suggested by the PDD. Please check that there are real emission reductions beyond the real and factual base line. It may so happen that this project qualifies for no CER's. DOE cannot assume values and things as giving by this PP. whatever values are considered throughout the project in all documents including the real DPR (not the one prepared for CDM, the one given to the banks and others), they must be validated, verified and double checked. Do not ask PP for DPR. Ask the parties who have been given DPR by the PP. Get directly from the bank and others by each page of the DPR and Feasibility report signed. Such document can be considered as a real DPR or FR. UNFCCC CDM process cannot be degraded by fabricating and misinterpreting the project base line and additionality. Submitted by: sud, sudcdm2@gmail.com</p>	<p>15. See response provided in point 4 above</p> <p>16. See response provided in point 4 above</p>	<p>15. The additionality of project has been discussed in detail in chapter 3.6 of this validation report above.</p> <p>16. The baseline of the project activity has been discussed in detail in chapter 3.5.3 of this validation report above.</p>
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5 VALIDATION OPINION

TÜV SÜD has performed a validation of the following proposed CDM project activity:

Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan

Standard auditing techniques have been used for the validation of the project. A methodology-specific protocol for the project has been prepared to conduct the validation process in a transparent and comprehensive manner.

The review of the project design documentation, subsequent follow-up interviews and further verification of references have provided TÜV SÜD with sufficient evidence to determine the fulfilment of stated criteria in the protocol. In the opinion of TÜV SÜD, the project meets all relevant UNFCCC requirements for the CDM if the underlying assumptions do not change. TÜV SÜD recommends the project for registration by the CDM Executive Board.

An analysis, as provided by the applied methodology, demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are additional to any that would occur in the absence of the project activity. Considering that the project is implemented as designed, the project is likely to achieve the estimated amount of annual emission reductions of 25,761 tCO₂e and a total estimated of 257,610 ER tCO₂e as specified within the final PDD version

The validation has been performed following the requirements of the CDM VVM and on the basis of the contractual agreement. The single purpose of this report is its use during the registration process as part of the CDM project cycle.

Pune, 28/01/2013



Certification Body "Environment and Energy"
TÜV SÜD South Asia Pvt Ltd

Validation of the CDM Project:

Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited,
Nowshera, Pakistan



South Asia

Annex 1: Validation Protocol

Validation Protocol

Project Title: "Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited,
Nowshera, Pakistan"

Date of Completion: 28-01-2013

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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS	PPD in GSP	Final PDD
A. General description of project activity				
A.1. Title of the project activity				
A.1.1. Does the used project title clearly enable to identify the unique CDM activity?	1	Yes, The used project title "Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan" clearly identifies the CDM activity.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.2. Are there any indication concerning the revision number and the date of the revision?	1	Yes, They are. The PDD in GSP is version 01 submitted in July 2009 with applied methodology AM0024. During the validation of the project the client changed the applied methodology and submitted the PDD for re-GSP with AMS.III.Q version 4 in May 2011. The change of methodology was due to Reply to AM_REV_0141 (methodology to be merged with ACM0012, but issues regarding the multiple fuel usage in baseline not addressed).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.3. Is this consistent with the time line of the project's history?	1	Yes, the date of the version of PDD is consistent with the time line of the project's history.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.2. Description of the project activity				
A.2.1. Is the description delivering a transparent overview of the project activities?	1,2	Cherat cement factory has a single kiln with clinker production capacity of 3200 Tonnes per Day (TPD). The kiln utilizes coal and HFO as fuel. The waste heat from the kiln is currently vented to the atmosphere, with a portion of the heat recovered and recycled to heat up incoming raw material. The factory was not having any grid connection at the time of investment decision but Cherat Cement connected to grid on March 1 st , 2010 and grid will be used as backup power source. The total installed capacity of cap-	CAR1	<input checked="" type="checkbox"/>

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Project Title: "Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited,
Nowshera, Pakistan"

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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS	PPD in GSP	Final PDD
		<p>tive power plant is 27.89 MW which runs on HFO and Diesel. The project activity involves the installation of three Heat Recovery Steam Generators (HRSGs), having total capacity of 27.1 TPH, on 3200 TPD kiln and utilize the steam for 7 MW electricity generation to displace the fossil fuels based electricity generated in the existing captive power plant.</p> <p><u>Corrective Action Request No.1.</u></p> <p>At least once in the PDD the abbreviation has to be explained, e.g. HFO, TDP. This is applicable for all abbreviations in the PDD.</p>		
A.2.2. What proofs are available demonstrating that the project description is in compliance with the actual situation or planning?	1,2	<p>According the PDD, following documents was presented to DOE.</p> <ul style="list-style-type: none"> • December 2006 Letter from Pakistan Sugar Mill Association (PSMA) to the Chief Executives of all sugar mills including Mirpurkhas Sugar Mill which is also a subsidiary of GFG group along with Cherat Cement Company and some other companies (awareness of CDM) • October 2007 Extracts from the minutes of the board meeting of Cherat Cement Company Limited. In Karachi regarding the WHR project, Board of Director discussed the financial matters (feasibility Study Report based on the preliminary quotations provided by technology supplier) of WHR project at Cherat Cement Company Limited and decided that without CDM benefits, the project is not feasible to proceed. Board of directors of Cherat Cement Company Limited decided to proceeds the WHR project as CDM project so that extra CDM revenues will help the project overcome the financial barriers. • December 2007 Equipment purchase contract was signed 	CR1	<input checked="" type="checkbox"/>

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Project Title: "Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited,
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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS	PPD in GSP	Final PDD
		<p>for WHR power plant between Cherat Cement Company Cement Limited and (EASTWEST COMMERCIAL INTERPRISE) (supplier for WHR equipment).</p> <ul style="list-style-type: none"> • April 2008: Email from Omar Malik, Director, Carbon Services (private) Limited Pakistan to Mr. Azam Faruque (Chief Executive of Cherat Cement). Later on CDM consulting contract was signed between First Climate (Earlier Factor Consulting + Management AG) and Cherat Cement Company Limited • November 2008 Start of civil works of WHR project • November 2009, Project pre-commissioning • December 2009, full commissioning of project is expected. <p>It was discussed during the onsite that the pre-commissioning of the project will be completed in the end of the November 2009</p> <p><u>Clarification Request No. 1.</u> Please clarify that whether pre-commissioning of Cherat Waste Heat Recovery Project has been done or not.</p>		
A.2.3. Is the information provided by these proofs consistent with the information provided by the PDD?	1,2	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.2.4. Is all information presented consistent with details provided by further chapters of	1,2	See CR 1, and CAR 1	See CR 1, and	<input checked="" type="checkbox"/>

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Project Title: "Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited,
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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS	PPD in GSP	Final PDD
the PDD?			CAR 1	
A.3. Project participants				
A.3.1. Is the form required for the indication of project participants correctly applied?	1	Yes, The form for the indication of PPs is correctly applied.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.3.2. Is the participation of the listed entities or Parties confirmed by each one of them?	1	<u>Clarification Request No. 2.</u> <ul style="list-style-type: none"> – The LoA of the parties involved have to be provided to the DOE. – Please provide the Modalities of Communication (MoC). 	CR2	<input checked="" type="checkbox"/>
A.3.3. Is all information on participants / Parties provided in consistency with details provided by further chapters of the PDD (in particular annex 1)?	1	See Annex 1 of PDD.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.4. Technical description of the project activity				
<i>A.4.1. Location of the project activity</i>				
A.4.1.1. Does the information provided on the location of the project activity allow for a clear identification of the site(s)?	1,5	Yes, The geographical coordinates of the project has been provided in chapter A.4 of the PDD.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.4.1.2. How is it ensured and/or demonstrated, that the project proponents can implement the project at this site (ownership, licenses, contracts etc.)?	1,5	<u>Clarification Request No. 3.</u> Proofs of operation license of cement plant and construction license of the project activity have to be provided to the DOE.	CR3	<input checked="" type="checkbox"/>

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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS	PPD in GSP	Final PDD
A.4.2. Category(ies) of project activity				
A.4.2.1. To which category(ies) does the project activity belonging to? Is the category correctly identified and indicated?	1,2	The project activity belongs to sectoral scopes <ul style="list-style-type: none"> Sectoral Scope 4 – Manufacturing industries Both are correctly indicated in the PDD.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.4.3. Technology to be employed by the project activity				
A.4.3.1. Does the technical design of the project activity reflect current good practices?	1,2,5	<u>Clarification Request No. 4.</u> The contracts with the supplier of HRSGs and steam turbine including technical data or at least the offer have to be provided to the DOE. <u>Corrective Action Request No.2.</u> The indicated figure for net electricity (41730 MWh/yr) generated by the project activity needs to be justified in more detail taking into account a statement about a credible load factor of the project activity.	CR4 CAR2	<input checked="" type="checkbox"/>
A.4.3.2. Does the description of the technology to be applied provide sufficient and transparent input/ information to evaluate its impact on the greenhouse gas balance?	1,2,5 18, 48	Yes, The applied technology is brand new and it will produce electricity by using the waste heat that was going to atmosphere in absence of project activity (IRL 18, 48).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.4.3.3. Does the implementation of the project activity require any technology transfer from annex-I-countries to the host country(ies)?	1,2,5	Yes, The technology is transferred from China to the Pakistan.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.4.3.4. Is the technology implemented by the project activity environmentally safe?	1,2,5	Yes,	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS	PPD in GSP	Final PDD
		Technology implemented by the project activity is environmentally safe.		
A.4.3.5. Is the information provided in compliance with actual situation or planning?	1,2,5	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.4.3.6. Does the project use state of the art technology and / or does the technology result in a significantly better performance than any commonly used technologies in the host country?	1,2,5 6, 50	Yes, It is clear from the equipment purchase that the project use state of the art technology because project activity involves installation of new equipment which is not common practice in Pakistan as well (IRL 6, 50).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.4.3.7. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	1,2,5	<u>Clarification Request No. 5.</u> Please provide information in the PDD that the project technology likely to be substituted by other or more efficient technologies within the project period or not.	CAR5	<input checked="" type="checkbox"/>
A.4.3.8. Does the project require extensive initial training and maintenance efforts in order to be carried out as scheduled during the project period?	1,2,5	<u>Clarification Request No. 6.</u> Evidences about initial training and maintenance for the implementation and operation of the project activity has to be provided to the DOE.	CAR6	<input checked="" type="checkbox"/>
A.4.3.9. Is information available on the demand and requirements for training and maintenance?	1,2,5	See CR 6	See CR 6	<input checked="" type="checkbox"/>
A.4.3.10. Is a schedule available for the implementation of the project and are there any risks for delays?	1,2,5	Yes, The project timeline is indicated in a table in chapter B.5 of the PDD, risks for delays of implementation:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS	PPD in GSP	Final PDD
A.4.4. Estimated amount of emission reductions over the chosen crediting period				
A.4.4.1. Is the form required for the indication of projected emission reductions correctly applied?	1,37	Yes, The form for the indication of projected emission reductions is correctly applied.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.4.4.2. Are the figures provided consistent with other data presented in the PDD?	1,37	<u>Corrective Action Request No.3.</u> a) For all default figures provided in the ER excel file calculation sheet appropriate sources have to be indicated in order to trace these figures.	CAR3	<input checked="" type="checkbox"/>
A.4.5. Public funding of the project activity				
A.4.5.1. Is the information provided on public funding provided in compliance with the actual situation or planning as available by the project participants?	1,6	<u>Clarification Request No. 7.</u> A written statement that public funding is excluded for this project needs to be submitted to the DOE.	CR 7	<input checked="" type="checkbox"/>
A.4.5.2. Is all information provided consistent with the details given in remaining chapters of the PDD (in particular annex 2)?	1,6	See CR7	See CR7	<input checked="" type="checkbox"/>
A.4.6. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity				

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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS	PPD in GSP	Final PDD										
A.4.6.1. Is there a registered small-scale CDM project activity or an application to register another small-scale CDM project activity: with the following characteristics:		<table><tr><th>Debundling checklist</th><th>Yes / No</th></tr><tr><td>The same project participants?</td><td>No</td></tr><tr><td>In the same project category and technology/measure?</td><td>No</td></tr><tr><td>Registered within previous two years? Or in registration process?</td><td>No</td></tr><tr><td>Whose boundary is within 1 km of the project boundary of the small scale project activity under consideration?</td><td>No</td></tr></table> <p>TÜV SÜD confirms that the proposed project is not a debundled component of a larger project activity because there is no small scale CDM project activity, or an application registered by Cherat Cement Limited in the same project category in the last two years within 1 km of the project boundary of the proposed small-scale project activity (IRL 3a).</p>	Debundling checklist	Yes / No	The same project participants?	No	In the same project category and technology/measure?	No	Registered within previous two years? Or in registration process?	No	Whose boundary is within 1 km of the project boundary of the small scale project activity under consideration?	No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Debundling checklist	Yes / No													
The same project participants?	No													
In the same project category and technology/measure?	No													
Registered within previous two years? Or in registration process?	No													
Whose boundary is within 1 km of the project boundary of the small scale project activity under consideration?	No													
A.4.6.2. If the answer to all the above question is 'Yes' then: Does the total size of the small scale project activity combined with previously registered small scale CDM project activity exceeds the limits of small scale CDM project activities?		N/A.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>										

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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS	PPD in GSP	Final PDD								
B. Application of a baseline and monitoring methodology												
B.1. Title and reference of the approved baseline and monitoring methodology												
B.1.1.1. Are reference number, version number, and title of the baseline and monitoring methodology clearly indicated?	1,2	Yes, the applicable Small Scale baseline methodology AMS-III.Q, Waste Energy Recovery (gas/heat/pressure) Projects (version 04)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								
B.1.1.2. Is the applied version the most recent one and / or is this version still applicable?	1,2	Yes. At the time of second GSP uploading, AMS-III.Q (version 4) has been the most recent one.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								
B.2. Justification of the choice of the methodology and why it is applicable to the project activity												
B.2.1.1. Is the applied methodology considered the most appropriate one?	1,2	Yes, The applied methodology AMS.III.Q version 4 is the most appropriate and recent one.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								
Integrate the required amount of sub-checklists on the applicability criteria as given by the applied methodology and comment on at least every line answered with “No”;												
B.2.1. Criterion 1: The applicability is limited to project activities that use waste heat generated in clinker making process to produce electricity. The category is for project activities that utilize waste gas and/or waste heat at existing facilities as an energy source for: a) Cogeneration; or b) Generation of electricity; or c) Direct use as process heat; or	1,2	<table><tr><th>Applicability checklist</th><th>Yes / No</th></tr><tr><td>Criterion discussed in the PDD?</td><td>Yes</td></tr><tr><td>Compliance provable?</td><td>Yes</td></tr><tr><td>Compliance verified?</td><td>Yes</td></tr></table> <p>The audit team confirms by document review (IRL 1,2, 35) and onsite visit (IRL 3, 3a) that project activity utilizes waste heat from existing kilns as energy source of generation of electricity which is case b according to methodology applicability criteria 1.</p>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	Yes	Compliance provable?	Yes	Compliance verified?	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	Yes											
Compliance provable?	Yes											
Compliance verified?	Yes											

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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS	PPD in GSP	Final PDD								
d) Generation of heat in elemental process (e.g. steam, hot water, hot oil, hot air); or e) Generation of mechanical energy												
B.2.2. Criterion 2: The category is also applicable to project activities that use waste pressure to generate electricity at existing facilities.	1,2	<table><tr><th>Applicability checklist</th><th>Yes / No</th></tr><tr><td>Criterion discussed in the PDD?</td><td>NA</td></tr><tr><td>Compliance provable?</td><td>NA</td></tr><tr><td>Compliance verified?</td><td>NA</td></tr></table> <p>The project involves use of waste heat only.</p>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	NA	Compliance provable?	NA	Compliance verified?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	NA											
Compliance provable?	NA											
Compliance verified?	NA											
B.2.3. Criterion 3: The recovery of waste gas/heat/pressure should be a new initiative (no waste gas/heat/pressure was recovered from the project activity source prior to the implementation of the project activity).	1,2	<table><tr><th>Applicability checklist</th><th>Yes / No</th></tr><tr><td>Criterion discussed in the PDD?</td><td>Yes</td></tr><tr><td>Compliance provable?</td><td>Yes</td></tr><tr><td>Compliance verified?</td><td>Yes</td></tr></table> <p>In the baseline scenario there was no use of waste heat at the kilns. This has been confirmed by on-site visit.</p> <p><u>Clarification Request No. 8.</u></p> <p>Please provide the Energy Bills and Financial Statements audited</p>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	Yes	Compliance provable?	Yes	Compliance verified?	Yes	CR 8	<input checked="" type="checkbox"/>
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	Yes											
Compliance provable?	Yes											
Compliance verified?	Yes											

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		by competent authorities.										
B.2.4. Criterion 4: Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO2 equivalent annually;	1,2	<table><tr><th>Applicability checklist</th><th>Yes / No</th></tr><tr><td>Criterion discussed in the PDD?</td><td>NA</td></tr><tr><td>Compliance provable?</td><td>NA</td></tr><tr><td>Compliance verified?</td><td>NA</td></tr></table> <p>It is estimated that the project activity results in emission reductions 25.761 kt CO2 equivalent annually which is less than 60 kt CO₂.</p>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	NA	Compliance provable?	NA	Compliance verified?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	NA											
Compliance provable?	NA											
Compliance verified?	NA											
B.2.5. Criterion 5: a) The energy produced with the recovered waste gas/heat/or waste pressure should be measurable;	1,2	<table><tr><th>Applicability checklist</th><th>Yes / No</th></tr><tr><td>Criterion discussed in the PDD?</td><td>Yes</td></tr><tr><td>Compliance provable?</td><td>Yes</td></tr><tr><td>Compliance verified?</td><td>Yes</td></tr></table> <p>The energy that is produced from waste heat is electricity and it is measurable (monitoring parameter).</p>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	Yes	Compliance provable?	Yes	Compliance verified?	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	Yes											
Compliance provable?	Yes											
Compliance verified?	Yes											
B.2.6. Criterion 5: b) Energy generated in the project activity may be used within the industrial facility or exported to other industrial facilities (included in the project boundary);	1,2	<p>It is obvious that the power generated by the project substitutes partly the power generated by the existing captive power plant. It has been confirmed during onsite that the industrial facility has grid connection that will be used as backup purpose. Furthermore, no other potential consumers outside the boundary have been identified during on-site visit. Hence, it is obvious that the power generated by the project activity will be used within the project boundary by consumers of the cement manufacturing plant.</p>	CR9	<input checked="" type="checkbox"/>								

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		<table><tr><td>Applicability checklist</td><td>Yes / No</td></tr><tr><td>Criterion discussed in the PDD?</td><td>Yes</td></tr><tr><td>Compliance provable?</td><td>Yes</td></tr><tr><td>Compliance verified?</td><td>Yes</td></tr></table> <p>Clarification Request No. 9.</p> <p>How can it be proved that electricity from WHR project will not be exported to the grid? Please add more information about this issue in PDD.</p>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	Yes	Compliance provable?	Yes	Compliance verified?	Yes			
Applicability checklist	Yes / No												
Criterion discussed in the PDD?	Yes												
Compliance provable?	Yes												
Compliance verified?	Yes												
B.2.7. Criterion 5: c) Electricity generated in the project activity may be exported to the grid or used for captive purposes; However, the methodology is not applicable to projects where the waste gas/heat/pressure recovery project is implemented in a single-cycle power plant (e.g. gas turbine or diesel generator) where heat (energy) generated on site is not utilizable for any other purposes on-site except to generate power. Such project activities shall consider AMS-III.AL “Conversion from single cycle to combined cycle power generation”. The projects recovering waste energy from such power plants for the purpose of generation of heat only can apply this methodology;	1,2	<table><tr><td>Applicability checklist</td><td>Yes / No</td></tr><tr><td>Criterion discussed in the PDD?</td><td>NA</td></tr><tr><td>Compliance provable?</td><td>NA</td></tr><tr><td>Compliance verified?</td><td>NA</td></tr></table> <p>The WHR project is not implemented in a single cycle power plant but utilizes the waste heat of in the kilns of the cement plant.</p>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	NA	Compliance provable?	NA	Compliance verified?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Applicability checklist	Yes / No												
Criterion discussed in the PDD?	NA												
Compliance provable?	NA												
Compliance verified?	NA												

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<p>B.2.8. Criterion 5:</p> <p>d) For a project activity which recovers waste gas/heat/pressure for power generation from multiple sources (e.g. kiln and single-cycle power plant), this methodology can be used in combination with AMS-III.AL provided that:</p> <p>(i) Within the project activity it is possible to distinguish two distinct waste energy sources such that:</p> <ul style="list-style-type: none">Waste energy source-I (e.g. kiln) belongs to such waste heat sources which are eligible under AMS-III.Q;Waste energy source-II (e.g. single-cycle power unit) belongs to such waste heat sources which are eligible under AMS-III.AL; <p>(ii) It is possible, for each waste energy source, to determine the baseline according to the specific methodology referred to;</p> <p>(iii) It is possible to objectively allocate the electricity produced in the project activity to each waste energy source, by means of one of the following methods:</p> <ul style="list-style-type: none">Through separate measurements of the electricity produced by utilizing waste energy from each waste energy source; orThrough separate measurements of the energy content of the waste energy carrying medium (WECM) streams used for electricity production; orThrough separate measurements of the energy content of the waste energy streams that are associated with each waste energy source and used for electricity production or for the WECM generation in a common waste heat recovery system (e.g. if steam is generated by waste heat from a kiln and waste heat from an internal combustion engine in a common waste heat recovery boiler);	1,2	<p>See comments to Criterion 5c).</p> <table><tr><th>Applicability checklist</th><th>Yes / No</th></tr><tr><td>Criterion discussed in the PDD?</td><td>NA</td></tr><tr><td>Compliance provable?</td><td>NA</td></tr><tr><td>Compliance verified?</td><td>NA</td></tr></table>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	NA	Compliance provable?	NA	Compliance verified?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	NA											
Compliance provable?	NA											
Compliance verified?	NA											

Table 1 is applicable to AMS III.Q, version 04

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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS	PPD in GSP	Final PDD								
B.2.9. Criterion 5: e) The emission reductions are claimed by the generator of energy using waste energy;	1,2	<div>The generator of the power is the project participant of the host country.</div> <table><tr><td>Applicability checklist</td><td>Yes / No</td></tr><tr><td>Criterion discussed in the PDD?</td><td>Yes</td></tr><tr><td>Compliance provable?</td><td>Yes</td></tr><tr><td>Compliance verified?</td><td>Yes</td></tr></table>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	Yes	Compliance provable?	Yes	Compliance verified?	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	Yes											
Compliance provable?	Yes											
Compliance verified?	Yes											
B.2.10. Criterion 5: f). in cases where the energy is exported to other facilities (included in the project boundary), the following are required: (i) All historical information from the recipient plants; (ii) An official agreement exists between the owners of the project energy generation plant (henceforth referred to as generator, unless specified otherwise) with the recipient plant(s) that the emission reductions would not be claimed by the recipient plant(s) for using a zero-emission energy source;	1,2	<div>Apart from the facilities allocated to the cement manufacturing process, there are no other facilities within the project boundary.</div> <table><tr><td>Applicability checklist</td><td>Yes / No</td></tr><tr><td>Criterion discussed in the PDD?</td><td>NA</td></tr><tr><td>Compliance provable?</td><td>NA</td></tr><tr><td>Compliance verified?</td><td>NA</td></tr></table> <div>The electricity that is generated from the WHR plant is not exported to other facilities but is used within the cement plant.</div>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	NA	Compliance provable?	NA	Compliance verified?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	NA											
Compliance provable?	NA											
Compliance verified?	NA											

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<p>B.2.11. Criterion 5:</p> <p>(g) For those facilities and recipients included in the project boundary, that prior to implementation of the project activity (current situation) generated energy on-site (sources of energy in the baseline), the credits can be claimed for minimum of the following time periods:</p> <p>I. The remaining lifetime of equipments currently being used; and</p> <p>II. Crediting period;</p>	<p>1,2</p> <p>IRL</p> <p>3a</p>	<table border="1"> <tr> <th>Applicability checklist</th> <th>Yes / No</th> </tr> <tr> <td>Criterion discussed in the PDD?</td> <td>Yes</td> </tr> <tr> <td>Compliance provable?</td> <td>Yes</td> </tr> <tr> <td>Compliance verified?</td> <td>Yes</td> </tr> </table> <p>The clinker producing kilns within the project boundary produced waste heat (energy) in the baseline.</p> <p>Apart from the small share of waste heat that is used to pre-heat the raw meal, the waste heat from clinker kilns is as well released into the atmosphere prior to the project implementation. This has been confirmed by on-site visit (IRL 3a). Although, para 3 of AMS-III.Q, version 04 requires that “no waste heat was recovered from the project activity source prior to the implementation of the project activity”, it has been clarified by Annex 20 of EB61 report that project activities that recover waste heat in the baseline are eligible to AMS-III.Q anyway subject that “the current practice of recovering small amounts of waste energy continues during the crediting period”. Hence, the project activity on hand is eligible for AMS-III.Q, version 04.</p>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	Yes	Compliance provable?	Yes	Compliance verified?	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	Yes											
Compliance provable?	Yes											
Compliance verified?	Yes											

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<p>B.2.12. Criterion 5:</p> <p>(h) The waste gas/heat/pressure utilized in the project activity would have been flared or released into the atmosphere in the absence of the project activity. This shall be proven by one of the following options:</p> <p>(i) By direct measurements of energy content and amount of the waste gas/heat/pressure for at least three years prior to the start of the project activity;</p> <p>(ii) Energy balance of relevant sections of the plant to prove that the waste gas/heat/pressure was not a source of energy before the implementation of the project activity. For the energy balance the representative process parameters are required. The energy balance shall demonstrate that the waste gas/heat/pressure was not used and also provide conservative estimations of the energy content and amount of waste gas/heat/pressure released;</p> <p>(iii) Energy bills (electricity, fossil fuel) to demonstrate that all the energy required for the process (e.g. based on specific energy consumption specified by the manufacturer) has been procured commercially. Project participants are required to demonstrate through the financial documents (e.g. balance sheets, profit and loss statement) that no energy was generated by waste gas/heat/pressure and sold to other facilities and/or the grid. The bills and financial statements should be audited by competent authorities;</p> <p>(iv) Process plant manufacturers' original specification/information, schemes and diagrams from the construction of the facility could be used as an estimate of quantity and energy content of waste gas/heat/pressure produced for rated plant capacity per unit of product produced.</p>	1,2	<table><tr><td>Applicability checklist</td><td>Yes / No</td></tr><tr><td>Criterion discussed in the PDD?</td><td>Yes</td></tr><tr><td>Compliance provable?</td><td>Yes</td></tr><tr><td>Compliance verified?</td><td>Yes</td></tr></table> <p>Please see comments in CR in section B.2.3</p>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	Yes	Compliance provable?	Yes	Compliance verified?	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	Yes											
Compliance provable?	Yes											
Compliance verified?	Yes											

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<p>B.2.13. Criterion 6: For the purpose of this category waste energy is defined as: a by-product gas/heat/pressure from machines and industrial processes having potential to provide usable energy, for which it can be demonstrated that it was wasted. For example gas flared or released into the atmosphere, the heat or pressure not recovered (therefore wasted). Gases that have intrinsic value in a spot market as energy carrier or chemical (e.g., natural gas, hydrogen, liquefied petroleum gas, or their substitutes) are not eligible under this category.</p>	1,2	<table><tr><td>Applicability checklist</td><td>Yes / No</td></tr><tr><td>Criterion discussed in the PDD?</td><td>Yes</td></tr><tr><td>Compliance provable?</td><td>Yes</td></tr><tr><td>Compliance verified?</td><td>Yes</td></tr></table> <p>The project activity utilizes waste energy (heat) from the clinker manufacturing kilns (industrial process).</p>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	Yes	Compliance provable?	Yes	Compliance verified?	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	Yes											
Compliance provable?	Yes											
Compliance verified?	Yes											
B.3. Description of the project boundary												
<p>B.3.1. Does the project boundary include physical, geographical site where the project activity takes place?</p> <p>In detail, does the project boundary include:</p> <ul style="list-style-type: none">- The facility where the waste energy (heat/gas/steam) occurs?- The facility where the waste energy is transformed to useful energy?- The facility where the produced energy from the WHR plant is being used?	1,2	<p>The project boundary of the Project activity includes Cherat cement plant where the waste heat is produced as well as electricity is produced using the recovered waste heat.</p> <p><u>Corrective Action Request No.4.</u></p> <p>Please clarify why the grid has not been included in the project boundary</p>	CAR4	<input checked="" type="checkbox"/>								
<p>B.3.2. Do the spatial and technological boundaries as verified on-site comply with the</p>	1,2	See comments in section B.3.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								

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discussion provided by / indication included to the PDD?				
B.3.3. Is a flow diagram of the project boundary, physically delineating the project activity, based on the description provided in section "A.4.3 to be employed by the project activity" presented?	1,2	See comments in section B.3.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.4. Description of how the baseline and its development				
B.4.1. Have all technically feasible baseline scenario alternatives to the project activity been identified and discussed in the PDD? Why can this list be considered as being complete?	1,2	<p>The PDD states that:</p> <ul style="list-style-type: none"> – The current use of waste heat from the kiln is to use a small part for the preheating of raw material and fuel and then venting the remaining waste heat into the atmosphere. – There is no other demand of waste heat as part of the baseline. – The use of waste heat for the preheating of raw material and fuel is part of the clinker making process and, thus, within the boundary. 	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.4.2. Does the project identifies correctly and excludes those options not in line with regulatory or legal requirements?	1,2	There are no legal and other requirements to implement the project activity.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.4.3. Have applicable regulatory or legal requirements been identified?	1,2	See chapter D for more information.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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B.4.4. Does the PDD identify the most likely baseline scenario in absence of the project activity?	1,2	Yes, The baseline scenario is identified as release of waste heat to the atmosphere and import of grid power from fossil fuels based power plants.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.4.5. Is this identification supported by official and/or verifiable documents (e.g. studies, web pages, certificates, etc)?	1,2	See section B.2.10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.4.6. Is the identified baseline scenario in line with regulatory or legal requirements?	1,2	See chapter D for more information.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.4.7. Is the identified baseline scenario in accordance with the selected baseline methodology?	1,2	See section B.2.10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality):				
B.5.1. In case of applying step 2 / investment analysis of the additionality tool: Is the analysis method identified appropriately (step 2a)?	1,2	The additionality of the project activity is demonstrated according to Attachment A to Appendix B of the simplified modalities and procedures for small scale CDM project activity categories, "project participants shall provide an explanation to show that the project activity. n/a. The project does not apply the additionality tool.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.5.2. In case of Option I (simple cost analysis): Is it demonstrated that the activity produces no economic benefits other than CDM income?	1,2	Not applicable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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B.5.3. In case of Option II (investment comparison analysis): Is the most suitable financial indicator clearly identified (IRR, NPV, cost benefit ratio, or (levelized) unit cost)?	1,2	n/a The project does not apply the additionality tool.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.5.4. In case of Option III (benchmark analysis): Is the most suitable financial indicator clearly identified (IRR, NPV, cost benefit ratio, or (levelized) unit cost)?	1,2	n/a The project does not apply the additionality tool.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.5.5. In case of Option II or Option III: Is the calculation of financial figures for this indicator correctly done for all alternatives and the project activity?	1,2	n/a The project does not apply the additionality tool.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.5.6. In case of Option II or Option III: Is the analysis presented in a transparent manner including publicly available proofs for the utilized data?	1,2	n/a The project does not apply the additionality tool.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.5.7. In case of applying step 3 (barrier analysis) of the additionality tool: Is a complete list of barriers developed that prevent the different alternatives to occur?	1,2	n/a The project does not apply the additionality tool.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.5.8. In case of applying step 3 (barrier analysis): Is transparent and documented evidence provided on the existence and significance of these barriers?	1,2	n/a The project does not apply the additionality tool.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.5.9. In case of applying step 3 (barrier analysis): Is it transparently shown that the execution of at least one of the alternatives is not prevented by the identified barriers?	1,2,5,9,12,13	Yes,	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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B.5.10. Have other activities in the host country / region similar to the project activity been identified and are these activities appropriately analyzed by the PDD (step 4a)?	1,2,5 ,9,12 ,13	Not applicable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.5.11. If similar activities are occurring: Is it demonstrated that in spite of these similarities the project activity would not be implemented without the CDM component (step 4b)?	1,2,5 ,9,12 ,13	Not applicable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.5.12. Is it appropriately explained how the approval of the project activity will help to overcome the economic and financial hurdles or other identified barriers (step 5)?		Not applicable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
If the additionality tool has not been used please answer B.5.13 to B.5.18				
B.5.13. If the starting date of the project activity is before the date of validation, is evidence available to prove that incentive from the CDM was seriously considered in the decision to proceed with the project activity?	1,5,9 ,12, 13 40	<ul style="list-style-type: none"> – The starting date of the project is November 29th, 2007 which is the date of equipment purchase contract between Cherat Cement Company Limited and Sinoma Energy Conservation Ltd. This is before the start of validation. The equipment purchase contract has been submitted to DOE (IRL 6). – The evidence of early CDM consideration has been submitted to DOE (Letter from Pakistan Sugar Mill Association (PSMA) to the Chief Executives of all sugar mills including Mirpurkhas Sugar Mill which is also a subsidiary of GFG group along with Cherat Cement Company and some other companies) (IRL 9). – Extract of Minutes of the Board Directors meeting of Cherat Cement Company Limited (IRL 38). 	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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		So it is evident that the PP were aware of CDM revenues before the start date of the project and it is also clear from Board Decision that CDM revenues were the decisive factor to proceed with the project act CDM project.																	
B.5.14. Is a complete list of barriers developed that prevents the project activity to occur?	1,5,9,12,13	Investment analysis is chosen to demonstrate the additionality.	☑	☑															
B.5.15. Does this list include at least one of the following barriers?	1,5,9,12,13	<table><tr><th>Barrier</th><th>Discussed?</th><th>Verified?</th></tr><tr><td>Investment</td><td>Yes</td><td>Yes</td></tr><tr><td>Technology</td><td>NA</td><td>NA</td></tr><tr><td>Due to prevailing practice</td><td>NA</td><td>NA</td></tr><tr><td>others</td><td>NA</td><td>NA</td></tr></table>	Barrier	Discussed?	Verified?	Investment	Yes	Yes	Technology	NA	NA	Due to prevailing practice	NA	NA	others	NA	NA	☑	☑
Barrier	Discussed?	Verified?																	
Investment	Yes	Yes																	
Technology	NA	NA																	
Due to prevailing practice	NA	NA																	
others	NA	NA																	
B.5.16. Does the discussion sufficiently take into account relevant national and/or sectoral policies?	1,5,9,12,13	Yes. TÜV SÜD confirms that based on its local and sectoral expertise that there are no there are no legal obligation on Project participant to install the waste heat recovery system.	☑	☑															
B.5.17. Is transparent and documented evidence provided on the existence and significance of these barriers?	1,5,9,12,13	The investment analysis is done in line with the Attachment A to Appendix B of the simplified modalities and procedures for small scale CDM project activity categories and chosen the investment barrier to demonstrate the additionality of the project. The investment analysis is conducted in line with the “Guidance on the Investment Analysis” by EB 62 Report annex 5. The investment analysis is based on the calculation of project IRR. <u>Benchmark.</u> According to EB 62 annex 5, Project IRR is calculated to demonstrate additionality and has been compared against local com-	CR10 CR11 CR12	☑															

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		<p>mercial lending rate in Pakistan.</p> <p>The local lending and borrowing rates in Pakistan are based on Karachi Inter-bank Offered Rate (KIBOR) plus the credit spread over the KIBOR charged by the local bank. For this project activity, Cherat Cement Company Limited considered an average 6 month tenor average KIBOR of 10.02 % for September 2007 and adopted 350 basis points as reasonable credit spread. The benchmark thus evaluated was $(10.02 \% + 3.5\%) = 13.52\%$.</p> <p><u>Clarification Request No. 10.</u></p> <p>Please clarify the following questions.</p> <ul style="list-style-type: none"> - Who decides the KIBOR - Please clarify who decides the basis points. - Why 350 basis points are considered - At what time project participants considered 350 basis points and what is base of consideration of 350 basis points. - Please provide the unprotected and correctly formulae applied IRR calculation spreadsheet to DOE. <p><u>Clarification Request No. 11.</u></p> <ul style="list-style-type: none"> - The benchmark value in FSR is 13.50% while it repeated GSP-PDD the benchmark value is 13.52%; please clarify the difference. - The project IRR in FSR is 7.60% while the project IRR in first GSP PDD is 8.24% while the project IRR in repeated GSP is 7.86%. Please describe these three different ap- 		

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		<div>plied values.</div> <div>- Please describe why the fuel costs values for electricity generation are different in GSP-PDD and in repeated GSP-PDD.</div> <div>Clarification Request No. 12.</div> <div>Please provide all the relevant evidence related to benchmark, Investment Cost, operational & Maintenance cost,</div>				
B.5.18. Is it appropriately explained how the approval of the project activity will help to overcome the identified barriers?	1,5,1 2,13	Yes Project IRR with CER is 14.13% and it exceeds the benchmark IRR 13.50%.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
B.6. Emissions reductions						
B.6.1. Explanation of methodological choices						
B.6.1.1. Is it explained how the procedures provided in the methodology are applied by the proposed project activity?	1,2, 37	Yes, the procedure follows the approved methodology.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
B.6.1.2. Is every selection of options offered by the methodology correctly justified and is this justification in line with the situation verified on-site?	1,2, 37	Yes, the procedure follows the approved methodology and justified in PDD.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
B.6.1.3. Determination of project emissions (Comment on any line answered “No”)						
B.6.1.4. Component 1: emissions from use of fossil fuel		<table><tr><td>Project emission checklist</td><td>Yes / No</td></tr></table>	Project emission checklist	Yes / No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Project emission checklist	Yes / No					

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		<table><tr><td>Component discussed in the PDD?</td><td>Yes</td></tr><tr><td>Formulae correctly applied?</td><td>Yes</td></tr></table> The project emissions are zero.		Component discussed in the PDD?	Yes	Formulae correctly applied?	Yes		
Component discussed in the PDD?	Yes								
Formulae correctly applied?	Yes								
B.6.1.5.Are the formulae required for the determination of baseline emissions correctly presented, enabling a complete identification of parameters to be used and / or monitored?	1,2	Yes, the formulae required for the determination of baseline emissions is correctly applied.		☑	☑				
B.6.1.6.Are the formulae required for the determination of leakage emissions correctly presented, enabling a complete identification of parameter to be used and / or monitored?	1,2, 37	The project activity involves the brand new technology and that is why the leakage is considered as zero.		☑	☑				
B.6.1.7.Are the formulae required for the determination of emission reductions correctly presented?	1,2, 37	Yes, The formulae required for the determination of emission reductions is correctly applied.		☑	☑				
B.6.2. Data and parameters that are available at validation									
B.6.2.1. Is the list of parameters presented in chapter B.6.2 considered to be complete with regard to the requirements of the applied methodology?	1,2, 37	Yes, The list of parameters presented in chapter B.6.2 considered being complete with regard to the requirements of the applied methodology.		☑	☑				
B.6.2.2. Integrate the required amount of sub-checklists for monitoring parameter and comment on any line answered with “No”									
B.6.2.3. Parameter Title: Annual electricity supplied to the grid prior to retrofit (applicable only for retrofit and modifi-	1,2, 37	Data Checklist	Yes / No	☑	☑				
		Title in line with methodology?	NA						
		Data unit correctly expressed?	NA						

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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS			PPD in GSP	Final PDD																		
cation activities)		Appropriate description of parameter?	NA																					
		Source clearly referenced?	NA																					
		Correct value provided?	NA																					
		Has this value been verified?	NA																					
		Choice of data correctly justified?	NA																					
		Measurement method correctly described?	NA																					
B.6.2.4. Parameter Title: Emission factor of the grid (CM) Note: CM should be calculated as per the procedures described in the “Tool to calculate the emission factor for an electricity system”	1,2, 37	<table><tr><th>Data Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Choice of data correctly justified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr></table>			Data Checklist	Yes / No	Title in line with methodology?	NA	Data unit correctly expressed?	NA	Appropriate description of parameter?	NA	Source clearly referenced?	NA	Correct value provided?	NA	Has this value been verified?	NA	Choice of data correctly justified?	NA	Measurement method correctly described?	NA	☑	☑
Data Checklist	Yes / No																							
Title in line with methodology?	NA																							
Data unit correctly expressed?	NA																							
Appropriate description of parameter?	NA																							
Source clearly referenced?	NA																							
Correct value provided?	NA																							
Has this value been verified?	NA																							
Choice of data correctly justified?	NA																							
Measurement method correctly described?	NA																							
B.6.2.5. Parameter Title: Operating margin (OM) emission factor of the grid Note: OM should be calculated as per the procedures described in the “Tool to calculate the emission factor for an electricity system”	1,2, 37	<table><tr><th>Data Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Choice of data correctly justified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr></table>			Data Checklist	Yes / No	Title in line with methodology?	NA	Data unit correctly expressed?	NA	Appropriate description of parameter?	NA	Source clearly referenced?	NA	Correct value provided?	NA	Has this value been verified?	NA	Choice of data correctly justified?	NA	Measurement method correctly described?	NA	☑	☑
Data Checklist	Yes / No																							
Title in line with methodology?	NA																							
Data unit correctly expressed?	NA																							
Appropriate description of parameter?	NA																							
Source clearly referenced?	NA																							
Correct value provided?	NA																							
Has this value been verified?	NA																							
Choice of data correctly justified?	NA																							
Measurement method correctly described?	NA																							
B.6.2.6. Parameter Title: fuel consumption of each power source	1,2, 37				☑	☑																		

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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS		PPD in GSP	Final PDD																		
		<table><tr><th>Data Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Choice of data correctly justified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr></table>	Data Checklist	Yes / No	Title in line with methodology?	NA	Data unit correctly expressed?	NA	Appropriate description of parameter?	NA	Source clearly referenced?	NA	Correct value provided?	NA	Has this value been verified?	NA	Choice of data correctly justified?	NA	Measurement method correctly described?	NA			
Data Checklist	Yes / No																						
Title in line with methodology?	NA																						
Data unit correctly expressed?	NA																						
Appropriate description of parameter?	NA																						
Source clearly referenced?	NA																						
Correct value provided?	NA																						
Has this value been verified?	NA																						
Choice of data correctly justified?	NA																						
Measurement method correctly described?	NA																						
B.6.2.7. <u>Parameter Title:</u> emission coefficient of each fuel	1,2, 37	<table><tr><th>Data Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Choice of data correctly justified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr></table>		Data Checklist	Yes / No	Title in line with methodology?	NA	Data unit correctly expressed?	NA	Appropriate description of parameter?	NA	Source clearly referenced?	NA	Correct value provided?	NA	Has this value been verified?	NA	Choice of data correctly justified?	NA	Measurement method correctly described?	NA	☑	☑
Data Checklist	Yes / No																						
Title in line with methodology?	NA																						
Data unit correctly expressed?	NA																						
Appropriate description of parameter?	NA																						
Source clearly referenced?	NA																						
Correct value provided?	NA																						
Has this value been verified?	NA																						
Choice of data correctly justified?	NA																						
Measurement method correctly described?	NA																						
B.6.2.8. <u>Parameter Title:</u> electricity generation of each power source	1,2, 37	<table><tr><th>Data Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr></table>		Data Checklist	Yes / No	Title in line with methodology?	NA	Data unit correctly expressed?	NA	Appropriate description of parameter?	NA	☑	☑										
Data Checklist	Yes / No																						
Title in line with methodology?	NA																						
Data unit correctly expressed?	NA																						
Appropriate description of parameter?	NA																						

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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS		PPD in GSP	Final PDD																		
		<table><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Choice of data correctly justified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr></table>		Source clearly referenced?	NA	Correct value provided?	NA	Has this value been verified?	NA	Choice of data correctly justified?	NA	Measurement method correctly described?	NA										
Source clearly referenced?	NA																						
Correct value provided?	NA																						
Has this value been verified?	NA																						
Choice of data correctly justified?	NA																						
Measurement method correctly described?	NA																						
B.6.2.9. <u>Parameter Title:</u> fraction of time with low costs /must run plant at the margin (for simple adjusted OM only)	1,2, 37	<table><tr><th>Data Checklist</th><th>Yes / No / NA</th></tr><tr><td>Title in line with methodology?</td><td>N/A</td></tr><tr><td>Data unit correctly expressed?</td><td>N/A</td></tr><tr><td>Appropriate description of parameter?</td><td>N/A</td></tr><tr><td>Source clearly referenced?</td><td>N/A</td></tr><tr><td>Correct value provided?</td><td>N/A</td></tr><tr><td>Has this value been verified?</td><td>N/A</td></tr><tr><td>Choice of data correctly justified?</td><td>N/A</td></tr><tr><td>Measurement method correctly described?</td><td>N/A</td></tr></table>		Data Checklist	Yes / No / NA	Title in line with methodology?	N/A	Data unit correctly expressed?	N/A	Appropriate description of parameter?	N/A	Source clearly referenced?	N/A	Correct value provided?	N/A	Has this value been verified?	N/A	Choice of data correctly justified?	N/A	Measurement method correctly described?	N/A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Data Checklist	Yes / No / NA																						
Title in line with methodology?	N/A																						
Data unit correctly expressed?	N/A																						
Appropriate description of parameter?	N/A																						
Source clearly referenced?	N/A																						
Correct value provided?	N/A																						
Has this value been verified?	N/A																						
Choice of data correctly justified?	N/A																						
Measurement method correctly described?	N/A																						
B.6.2.10. <u>Parameter Title:</u> Electricity imports	1,2, 37	<table><tr><th>Data Checklist</th><th>Yes / No / NA</th></tr><tr><td>Title in line with methodology?</td><td>N/A</td></tr><tr><td>Data unit correctly expressed?</td><td>N/A</td></tr><tr><td>Appropriate description of parameter?</td><td>N/A</td></tr><tr><td>Source clearly referenced?</td><td>N/A</td></tr><tr><td>Correct value provided?</td><td>N/A</td></tr><tr><td>Has this value been verified?</td><td>N/A</td></tr><tr><td>Choice of data correctly justified?</td><td>N/A</td></tr><tr><td>Measurement method correctly described?</td><td>N/A</td></tr></table>		Data Checklist	Yes / No / NA	Title in line with methodology?	N/A	Data unit correctly expressed?	N/A	Appropriate description of parameter?	N/A	Source clearly referenced?	N/A	Correct value provided?	N/A	Has this value been verified?	N/A	Choice of data correctly justified?	N/A	Measurement method correctly described?	N/A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Data Checklist	Yes / No / NA																						
Title in line with methodology?	N/A																						
Data unit correctly expressed?	N/A																						
Appropriate description of parameter?	N/A																						
Source clearly referenced?	N/A																						
Correct value provided?	N/A																						
Has this value been verified?	N/A																						
Choice of data correctly justified?	N/A																						
Measurement method correctly described?	N/A																						

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B.6.2.11. <u>Parameter Title:</u> CO ₂ emission coefficient of fuels used in connected grids	1,2, 37	<table><tr><th>Data Checklist</th><th>Yes / No / NA</th></tr><tr><td>Title in line with methodology?</td><td>N/A</td></tr><tr><td>Data unit correctly expressed?</td><td>N/A</td></tr><tr><td>Appropriate description of parameter?</td><td>N/A</td></tr><tr><td>Source clearly referenced?</td><td>N/A</td></tr><tr><td>Correct value provided?</td><td>N/A</td></tr><tr><td>Has this value been verified?</td><td>N/A</td></tr><tr><td>Choice of data correctly justified?</td><td>N/A</td></tr><tr><td>Measurement method correctly described?</td><td>N/A</td></tr></table>	Data Checklist	Yes / No / NA	Title in line with methodology?	N/A	Data unit correctly expressed?	N/A	Appropriate description of parameter?	N/A	Source clearly referenced?	N/A	Correct value provided?	N/A	Has this value been verified?	N/A	Choice of data correctly justified?	N/A	Measurement method correctly described?	N/A	☑	☑
Data Checklist	Yes / No / NA																					
Title in line with methodology?	N/A																					
Data unit correctly expressed?	N/A																					
Appropriate description of parameter?	N/A																					
Source clearly referenced?	N/A																					
Correct value provided?	N/A																					
Has this value been verified?	N/A																					
Choice of data correctly justified?	N/A																					
Measurement method correctly described?	N/A																					
B.6.2.12. EG _{i,j,y} The <u>quantity of electricity</u> supplied to the recipient j by generator, that in the absence of the project activity would have been sourced from i th source (i can be either grid or identified source) during the year y in MWh,	1,2, 37	<table><tr><th>Data Checklist</th><th>Yes / No / NA</th></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Correct value provided?</td><td>Yes</td></tr><tr><td>Has this value been verified?</td><td>Yes</td></tr><tr><td>Choice of data correctly justified?</td><td>Yes</td></tr><tr><td>Measurement method correctly described?</td><td>Yes</td></tr></table>	Data Checklist	Yes / No / NA	Title in line with methodology?	Yes	Data unit correctly expressed?	Yes	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes	Correct value provided?	Yes	Has this value been verified?	Yes	Choice of data correctly justified?	Yes	Measurement method correctly described?	Yes	☑	☑
Data Checklist	Yes / No / NA																					
Title in line with methodology?	Yes																					
Data unit correctly expressed?	Yes																					
Appropriate description of parameter?	Yes																					
Source clearly referenced?	Yes																					
Correct value provided?	Yes																					
Has this value been verified?	Yes																					
Choice of data correctly justified?	Yes																					
Measurement method correctly described?	Yes																					
If the baseline generation source is an identified existing plant.																						

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B.6.2.13. NCV _{HFO} : Net Calorific value of Heavy Fuel Oil (HFO).	1,2, 37			☑	☑
		Data Checklist	Yes / No / NA		
		Title in line with methodology?	Yes		
		Data unit correctly expressed?	Yes		
		Appropriate description of parameter?	Yes		
		Source clearly referenced?	Yes		
		Correct value provided?	Yes		
		Has this value been verified?	Yes		
		Choice of data correctly justified?	Yes		
Measurement method correctly described?	Yes				
B.6.2.14. NCV _{diesel} : Net Calorific value of diesel (DI).	1,2, 37			☑	☑
		Data Checklist	Yes / No / NA		
		Title in line with methodology?	Yes		
		Data unit correctly expressed?	Yes		
		Appropriate description of parameter?	Yes		
		Source clearly referenced?	Yes		
		Correct value provided?	Yes		
		Has this value been verified?	Yes		
		Choice of data correctly justified?	Yes		
Measurement method correctly described?	Yes				
B.6.2.15. E _{HFO, historical} : Electricity generated on	1,2,			☑	☑

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HFO at captive power plant in historical year	37	Data Checklist	Yes / No / NA		
		Title in line with methodology?	Yes		
		Data unit correctly expressed?	Yes		
		Appropriate description of parameter?	Yes		
		Source clearly referenced?	Yes		
		Correct value provided?	Yes		
		Has this value been verified?	Yes		
		Choice of data correctly justified?	Yes		
		Measurement method correctly described?	Yes		
B.6.2.16. E diesel, historical : Electricity generated on diesel by captive power plant in historical years	1,2, 37	Data Checklist	Yes / No / NA	☑	☑
		Title in line with methodology?	Yes		
		Data unit correctly expressed?	Yes		
		Appropriate description of parameter?	Yes		
		Source clearly referenced?	Yes		
		Correct value provided?	Yes		
		Has this value been verified?	Yes		
		Choice of data correctly justified?	Yes		
		Measurement method correctly described?	Yes		

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B.6.2.17. FC _{HFO, historical} : HFO consumption by captive power plant in historical years	1,2, 37			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Data Checklist	Yes / No / NA		
		Title in line with methodology?	Yes		
		Data unit correctly expressed?	Yes		
		Appropriate description of parameter?	Yes		
		Source clearly referenced?	Yes		
		Correct value provided?	Yes		
		Has this value been verified?	Yes		
		Choice of data correctly justified?	Yes		
		Measurement method correctly described?	Yes		
B.6.2.18. FC _{diesel, historical} : Diesel consumption at captive power plant in historical year	1,2, 37			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Data Checklist	Yes / No / NA		
		Title in line with methodology?	Yes		
		Data unit correctly expressed?	Yes		
		Appropriate description of parameter?	Yes		
		Source clearly referenced?	Yes		
		Correct value provided?	Yes		
		Has this value been verified?	Yes		
		Choice of data correctly justified?	Yes		
		Measurement method correctly described?	Yes		

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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS	PPD in GSP	Final PDD																		
B.6.2.19. COEF _{HFO} : Emission Coefficient of HFO	1,2, 37	<table><tr><th>Data Checklist</th><th>Yes / No / NA</th></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Correct value provided?</td><td>Yes</td></tr><tr><td>Has this value been verified?</td><td>Yes</td></tr><tr><td>Choice of data correctly justified?</td><td>Yes</td></tr><tr><td>Measurement method correctly described?</td><td>Yes</td></tr></table>	Data Checklist	Yes / No / NA	Title in line with methodology?	Yes	Data unit correctly expressed?	Yes	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes	Correct value provided?	Yes	Has this value been verified?	Yes	Choice of data correctly justified?	Yes	Measurement method correctly described?	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Data Checklist	Yes / No / NA																					
Title in line with methodology?	Yes																					
Data unit correctly expressed?	Yes																					
Appropriate description of parameter?	Yes																					
Source clearly referenced?	Yes																					
Correct value provided?	Yes																					
Has this value been verified?	Yes																					
Choice of data correctly justified?	Yes																					
Measurement method correctly described?	Yes																					
B.6.2.20. COEF _{diesel} : Emission Coefficient of diesel	1,2, 37	<table><tr><th>Data Checklist</th><th>Yes / No / NA</th></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Correct value provided?</td><td>Yes</td></tr><tr><td>Has this value been verified?</td><td>Yes</td></tr><tr><td>Choice of data correctly justified?</td><td>Yes</td></tr></table>	Data Checklist	Yes / No / NA	Title in line with methodology?	Yes	Data unit correctly expressed?	Yes	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes	Correct value provided?	Yes	Has this value been verified?	Yes	Choice of data correctly justified?	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Data Checklist	Yes / No / NA																					
Title in line with methodology?	Yes																					
Data unit correctly expressed?	Yes																					
Appropriate description of parameter?	Yes																					
Source clearly referenced?	Yes																					
Correct value provided?	Yes																					
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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS	PPD in GSP	Final PDD
		Measurement method correctly described? Yes		
Baseline emissions from electricity (BE _{elec} , y) to provide mechanical energy generated by waste energy.				
<p>B.6.2.1. In case, in the baseline situation, more than one type of fossil fuel is used in the captive plant, the relative contribution to the total output of each fossil fuel shall be considered and the formulas for baseline emissions shall be adjusted accordingly.</p> <p>Efficiency of the power plant ($\eta_{Plant,j}$) shall be one of the following:</p> <p>(i) Assume a constant efficiency of the captive plant and determine the efficiency, as a conservative approach, for optimal operation conditions i.e. design fuel, optimal load, optimal oxygen content in flue gases, adequate fuel conditioning (temperature, viscosity, moisture, size/mesh etc.), representative or favourable ambient conditions (ambient temperature and humidity); or</p> <p>(ii) Highest of the efficiency values provided by two or more manufacturers for</p>	1,2,37	<p>The Cherat Cement Company used more than one type of fossil fuel in the captive plant in the baseline scenario. To consider the relative contribution to the total output of each fossil fuel shall be considered and the formulas for baseline emissions shall be adjusted accordingly.</p> <p>Clarification Request No. 13. Please clarify in detail how the efficiency of the power plant ($\eta_{Plant,j}$) has been calculated.</p>	CR13	<input checked="" type="checkbox"/>

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<p>power plants with specifications similar to that which would have been required to supply the recipient with the electricity that it receives from the project activity; or</p> <p>(iii) Assume a captive power generation efficiency of 60% based on the net calorific values as a conservative approach.</p>				
B.6.2.2. HG _{j,y} , Net quantity of heat supplied to the recipient plant j	1,2, 37	Not Applicable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.6.2.3. What parameters are given to calculated f_{WCM} ?	1,2, 37	See section B.6.2.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.6.2.4. How has f_{WCM} been calculated?	1,2, 37	The parameter is set to 1 because, according to the methodology, the electricity generation is purely from use of waste energy.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.6.2.5. What parameters are given to calculated f_{CAP} ?	1,2, 37	See section B.6.2.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.6.2.6. How has f_{CAP} been calculated? Is that in line with ACM0012?	1,2, 37	<p><u>Clarification Request No. 14.</u></p> <ul style="list-style-type: none"> - The calculation of the project load factor of 70% has to be justified and evidenced. - Please clarify the use of the waste heat to meet the internal energy demand of the clinker production lines - Please clarify the total energy demand of the industrial facility 	CR14	<input checked="" type="checkbox"/>

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		- Please clarify the specific energy consumption of the clinker production.		
B.6.3. Ex-ante estimation of emission reductions				
B.6.3.1. Is the projection based on the same procedures as used for future monitoring?	1,2, 37	Yes, The same procedures are used for future monitoring which only considers the baseline emissions, no project emissions and no leakage.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.6.3.2. Are the GHG calculations documented in a complete and transparent manner?	1,2, 37	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.6.3.3. If there is more than one component of the project activity, then, are emission reduction calculations provided separately for each component?	1,2, 37	Not Applicable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.6.3.4. Is the data provided in this section consistent with data as presented in other chapters of the PDD?	1,2, 37	Yes, The data provided is consistent with data presented in other chapters of the PDD.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.6.4. Summary of ex-ante estimation of emission reductions				
B.6.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	1,2, 37	The project definitely will result in fewer GHG emissions than the baseline scenario.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.6.4.2. Is the form/table required for the indication of projected emission reductions correctly applied?	1,2, 37	Yes, The form is correctly applied according to the PDD template.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.6.4.3. If the project activity involves more than one component, is separate table in-	1,2, 37	Not Applicable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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cluded for each of the component.																
B.6.4.4.Do these values comply with small-scale criteria for every year?	1,2, 37	Yes, since the estimated emission reductions are less than 60,000 tCO ₂ .		☑												
B.6.4.5.Is the projection in line with the envisioned time schedule for the project's implementation and the indicated crediting period?	1,2, 37	Yes.	☑	☑												
B.6.4.6.Is the data provided in this section in consistency with data as presented in other chapters of the PDD?	1,2, 37	Yes, The data provided is consistent with data presented in other chapters of the PDD.	☑	☑												
B.7. Application of the monitoring methodology and description of the monitoring plan																
B.7.1. Data and parameters monitored																
B.7.1.1. Is the list of parameters presented in chapter B.7.1 considered to be complete with regard to the requirements of the applied methodology?	1,2	Yes. The list presented is complete.	☑	☑												
B.7.1.2. Comment on any line answered with “No”																
B.7.1.3. <u>Parameter Title</u> : Thermal and/or electrical energy produced	1,2	<table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Correct value provided for estimation?</td><td>Yes</td></tr></table>	Monitoring Checklist	Yes / No	Title in line with methodology?	Yes	Data unit correctly expressed?	Yes	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes	Correct value provided for estimation?	Yes	☑	☑
Monitoring Checklist	Yes / No															
Title in line with methodology?	Yes															
Data unit correctly expressed?	Yes															
Appropriate description of parameter?	Yes															
Source clearly referenced?	Yes															
Correct value provided for estimation?	Yes															

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		Has this value been verified?	Yes																										
		Measurement method correctly described?	Yes																										
		Correct reference to standards?	Yes																										
		Indication of accuracy provided?	Yes																										
		QA/QC procedures described?	Yes																										
		QA/QC procedures appropriate?	Yes																										
B.7.1.4. <u>Parameter Title:</u> In case of thermal energy: the enthalpy of the thermal energy output stream like hot water/ steam should be monitored.	1,2	<table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided for estimation?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr><tr><td>Correct reference to standards?</td><td>NA</td></tr><tr><td>Indication of accuracy provided?</td><td>NA</td></tr><tr><td>QA/QC procedures described?</td><td>NA</td></tr><tr><td>QA/QC procedures appropriate?</td><td>NA</td></tr></table>		Monitoring Checklist	Yes / No	Title in line with methodology?	NA	Data unit correctly expressed?	NA	Appropriate description of parameter?	NA	Source clearly referenced?	NA	Correct value provided for estimation?	NA	Has this value been verified?	NA	Measurement method correctly described?	NA	Correct reference to standards?	NA	Indication of accuracy provided?	NA	QA/QC procedures described?	NA	QA/QC procedures appropriate?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Monitoring Checklist	Yes / No																												
Title in line with methodology?	NA																												
Data unit correctly expressed?	NA																												
Appropriate description of parameter?	NA																												
Source clearly referenced?	NA																												
Correct value provided for estimation?	NA																												
Has this value been verified?	NA																												
Measurement method correctly described?	NA																												
Correct reference to standards?	NA																												
Indication of accuracy provided?	NA																												
QA/QC procedures described?	NA																												
QA/QC procedures appropriate?	NA																												

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B.7.1.5. <u>Parameter Title:</u> Amount of waste gas or the amount of energy contained in the waste heat or waste pressure	1,2 IRL 22, 23, 24,	<table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NO</td></tr><tr><td>Data unit correctly expressed?</td><td>NO</td></tr><tr><td>Appropriate description of parameter?</td><td>NO</td></tr><tr><td>Source clearly referenced?</td><td>NO</td></tr><tr><td>Correct value provided for estimation?</td><td>NO</td></tr><tr><td>Has this value been verified?</td><td>NO</td></tr><tr><td>Measurement method correctly described?</td><td>NO</td></tr><tr><td>Correct reference to standards?</td><td>NO</td></tr><tr><td>Indication of accuracy provided?</td><td>NO</td></tr><tr><td>QA/QC procedures described?</td><td>NO</td></tr><tr><td>QA/QC procedures appropriate?</td><td>NO</td></tr></table> <p><u>Corrective Action Request No.5.</u> Please clarify the quantity and energy content of the waste energy produced for the rated plant capacity/per unit of product produced.</p>	Monitoring Checklist	Yes / No	Title in line with methodology?	NO	Data unit correctly expressed?	NO	Appropriate description of parameter?	NO	Source clearly referenced?	NO	Correct value provided for estimation?	NO	Has this value been verified?	NO	Measurement method correctly described?	NO	Correct reference to standards?	NO	Indication of accuracy provided?	NO	QA/QC procedures described?	NO	QA/QC procedures appropriate?	NO	CAR5	<input checked="" type="checkbox"/>
Monitoring Checklist	Yes / No																											
Title in line with methodology?	NO																											
Data unit correctly expressed?	NO																											
Appropriate description of parameter?	NO																											
Source clearly referenced?	NO																											
Correct value provided for estimation?	NO																											
Has this value been verified?	NO																											
Measurement method correctly described?	NO																											
Correct reference to standards?	NO																											
Indication of accuracy provided?	NO																											
QA/QC procedures described?	NO																											
QA/QC procedures appropriate?	NO																											
B.7.1.6. <u>Parameter Title:</u> Metering the amount of mechanical energy generated /supplied	1,2	<table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr></table>	Monitoring Checklist	Yes / No	Title in line with methodology?	NA	Data unit correctly expressed?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																		
Monitoring Checklist	Yes / No																											
Title in line with methodology?	NA																											
Data unit correctly expressed?	NA																											

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		Appropriate description of parameter?	NA		
		Source clearly referenced?	NA		
		Correct value provided for estimation?	NA		
		Has this value been verified?	NA		
		Measurement method correctly described?	NA		
		Correct reference to standards?	NA		
		Indication of accuracy provided?	NA		
		QA/QC procedures described?	NA		
		QA/QC procedures appropriate?	NA		
B.7.1.7. <u>Parameter Title:</u> Metering the temperature and pressure of WECM	1,2			☑	☑

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		Correct reference to standards?	NA																										
		Indication of accuracy provided?	NA																										
		QA/QC procedures described?	NA																										
		QA/QC procedures appropriate?	NA																										
B.7.1.8. <u>Parameter Title: f_{cap}</u>	1,2	<table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>No</td></tr><tr><td>Data unit correctly expressed?</td><td>No</td></tr><tr><td>Appropriate description of parameter?</td><td>No</td></tr><tr><td>Source clearly referenced?</td><td>No</td></tr><tr><td>Correct value provided for estimation?</td><td>No</td></tr><tr><td>Has this value been verified?</td><td>No</td></tr><tr><td>Measurement method correctly described?</td><td>No</td></tr><tr><td>Correct reference to standards?</td><td>No</td></tr><tr><td>Indication of accuracy provided?</td><td>No</td></tr><tr><td>QA/QC procedures described?</td><td>No</td></tr><tr><td>QA/QC procedures appropriate?</td><td>No</td></tr></table> <p>See section B.7.1.1</p>		Monitoring Checklist	Yes / No	Title in line with methodology?	No	Data unit correctly expressed?	No	Appropriate description of parameter?	No	Source clearly referenced?	No	Correct value provided for estimation?	No	Has this value been verified?	No	Measurement method correctly described?	No	Correct reference to standards?	No	Indication of accuracy provided?	No	QA/QC procedures described?	No	QA/QC procedures appropriate?	No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Monitoring Checklist	Yes / No																												
Title in line with methodology?	No																												
Data unit correctly expressed?	No																												
Appropriate description of parameter?	No																												
Source clearly referenced?	No																												
Correct value provided for estimation?	No																												
Has this value been verified?	No																												
Measurement method correctly described?	No																												
Correct reference to standards?	No																												
Indication of accuracy provided?	No																												
QA/QC procedures described?	No																												
QA/QC procedures appropriate?	No																												

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B.7.1.9. <u>Parameter Title: FC_{HFO.Y}</u> HFO consumption by captive power plant	1,2	<table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Correct value provided for estimation?</td><td>Yes</td></tr><tr><td>Has this value been verified?</td><td>Yes</td></tr><tr><td>Measurement method correctly described?</td><td>Yes</td></tr><tr><td>Correct reference to standards?</td><td>Yes</td></tr><tr><td>Indication of accuracy provided?</td><td>Yes</td></tr><tr><td>QA/QC procedures described?</td><td>Yes</td></tr><tr><td>QA/QC procedures appropriate?</td><td>Yes</td></tr></table>	Monitoring Checklist	Yes / No	Title in line with methodology?	Yes	Data unit correctly expressed?	Yes	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes	Correct value provided for estimation?	Yes	Has this value been verified?	Yes	Measurement method correctly described?	Yes	Correct reference to standards?	Yes	Indication of accuracy provided?	Yes	QA/QC procedures described?	Yes	QA/QC procedures appropriate?	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Monitoring Checklist	Yes / No																											
Title in line with methodology?	Yes																											
Data unit correctly expressed?	Yes																											
Appropriate description of parameter?	Yes																											
Source clearly referenced?	Yes																											
Correct value provided for estimation?	Yes																											
Has this value been verified?	Yes																											
Measurement method correctly described?	Yes																											
Correct reference to standards?	Yes																											
Indication of accuracy provided?	Yes																											
QA/QC procedures described?	Yes																											
QA/QC procedures appropriate?	Yes																											
B.7.1.10. <u>Parameter Title: FC_{diesel.y}</u> Diesel consumption by captive power plant	1,2	<table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr></table>	Monitoring Checklist	Yes / No	Title in line with methodology?	Yes	Data unit correctly expressed?	Yes	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>														
Monitoring Checklist	Yes / No																											
Title in line with methodology?	Yes																											
Data unit correctly expressed?	Yes																											
Appropriate description of parameter?	Yes																											
Source clearly referenced?	Yes																											

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		Correct value provided for estimation?	Yes		
		Has this value been verified?	Yes		
		Measurement method correctly described?	Yes		
		Correct reference to standards?	Yes		
		Indication of accuracy provided?	Yes		
		QA/QC procedures described?	Yes		
		QA/QC procedures appropriate?	Yes		
B.7.2. Description of the monitoring plan					
B.7.2.1. Is the operational and management structure clearly described and in compliance with the envisioned situation?	1,2	Yes, Operational and management structure clearly described and it is in compliance with the envisioned situation.		☑	☑
B.7.2.2. Are responsibilities and institutional arrangements for data collection and archiving clearly provided?	1,2	Yes, Shift engineer is responsible at Cherat Nowshera Plant.		☑	☑
B.7.2.3. Does the monitoring plan provide current good monitoring practice?	1,2	Yes.		☑	☑
B.7.2.4. Have QA/QC procedures of the methodology been covered?	1,2	Yes, QA/QC procedures of the methodology been covered		☑	☑
B.7.2.5. If applicable: Does annex 4 provide useful information enabling a better understanding of the envisioned monitoring provi-	1,2	Not Applicable		☑	☑

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sions?				
B.8. Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)				
B.8.1.1. Is there any indication of a date when the baseline was determined?	1,2	Yes, The baseline was determined on 19/03/2009.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.8.1.2. Is this consistent with the time line of the PDD history?	1,2	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.8.1.3. Is the information on the person(s) / entity(ies) responsible for the application of the baseline and monitoring methodology provided consistent with the actual situation?	1,2	Yes, The information on the persons responsible for the application of the baseline and monitoring methodology provided in PDD consistent with the actual situation.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.8.1.4. Is information provided whether this person / entity is also considered a project participant?	1,2	Yes, First Climate (Switzerland) AG and Carbon Services (Private) Limited are project participants.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C. Duration of the project activity / crediting period				
C.1. Duration of the project activity				
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	1	Yes, Starting date of the project activity is November 29, 2007 which is the date of signing contract between Cherat Cement Company Limited and Sinoma Energy Conservation Ltd (IRL 6)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C.2. Choice of the crediting period and related information				
C.2.1. Is the assumed crediting time clearly	1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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defined and reasonable (renewable crediting period of max 7 years with potential for 2 renewals or fixed crediting period of max. 10 years)?		The project has the fixed crediting period of 10 years.		
D. Environmental impacts				
D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts				
D.1.1. Has the analysis of the environmental impacts of the project activity been sufficiently described?	1,18, 45,	According to host country regulations, the project activity required an Initial Environmental examination (IEE). <u>Clarification Request No. 15.</u> Please provide the evidences related to Initial Environmental examination (IEE) to the DOE.	CR 15	<input checked="" type="checkbox"/>
D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, has an EIA been approved?	1,18, 45,	See CR 15	See CR 15	<input checked="" type="checkbox"/>
D.1.3. Will the project create any adverse environmental effects?	1,18, 45,	See CR 15	See CR 15	<input checked="" type="checkbox"/>
D.1.4. Were transboundary environmental impacts identified in the analysis?	1,18, 45,	See CR 15	See CR 15	<input checked="" type="checkbox"/>
D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party				
D.2.1. Have the identified environmental impacts been addressed in the project design sufficiently?	1,18, 45,	See CR 15	See CR 15	<input checked="" type="checkbox"/>
D.2.2. Does the project comply with environ-	1,18,	See CR 15	See	<input checked="" type="checkbox"/>

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mental legislation in the host country?	45,		CR 15	
E. Stakeholders' comments				
E.1. Brief description how comments by local stakeholders have been invited and compiled				
E.1.1. Have relevant stakeholders been consulted?	1,15, 16,17	Yes, Local stakeholder consultation meeting was held on November 20 th , 2008 at Cherat Cement Factory.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	1,15, 16,17	It is mentioned in section E.1 of the PDD that stakeholders were informed through specific advertising published by the project owner in the both language (Urdu and English) in newspaper.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	1,15, 16,17	Yes, The stakeholder consultation meeting is required by the Designated National Authority (DNA) of Pakistan for issuance of Host Country Approval	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.1.4. Is the undertaken stakeholder process that was carried out described in a complete and transparent manner?	1,15, 16,17, 18	Yes, TÜV SÜD audit team confirms that the Local stakeholder consultation meeting was done in appropriate way. The stakeholders were invited by newspaper sufficient time before the stakeholder meeting and comments of stakeholder were well documented. (IRL	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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E.2.Summary of the comments received				
E.2.1. Is a summary of the received stakeholder comments provided?	1,15,16,17	Yes, Summary of the received stakeholder comment have been provided in section E.2 of PDD and has been delivered to DOE.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.3.Report on how due account was taken of any comments received				
E.3.1. Has due account been taken of any stakeholder comments received?	1,15,16,17	Summary of the received stakeholder comments shows that no negative comments received.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F. Annexes 1 - 4				
F.1.Annex 1: Contact Information				
F.1.1. Is the information provided consistent with the one given under section A.3?	1	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.1.2. Is the information on all private participants and directly involved Parties presented?	1	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.2.Annex 2: Information regarding public funding				
F.2.1. Is the information provided on the inclusion of public funding (if any) in consistency with the actual situation presented by the project participants?	1,8	Yes, Written evidence has been provided to DOE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.2.2. If necessary: Is an affirmation available that any such funding from Annex-I countries does not result in a diversion of ODA?	1,8	Yes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS	PPD in GSP	Final PDD
F.3. Annex 3: Baseline information				
F.3.1. If additional background information on baseline data is provided: Is this information consistent with data presented by other sections of the PDD?	1,2	<u>Corrective Action Request No.6.</u> The choice of the emission coefficients for HFO and coal need to be referenced as for IPCC 2006 taking account a conservative approach.	CAR6	<input checked="" type="checkbox"/>
F.3.2. If additional background information on baseline data is provided: Is this information consistent with data presented by other sections of the PDD?	1,2	See CAR6	See CAR6	<input checked="" type="checkbox"/>
F.3.3. Is the data provided verifiable? Has sufficient evidence been provided to the validation team?	1,2	See CAR6	See CAR6	<input checked="" type="checkbox"/>
F.3.4. Does the additional information substantiate / support statements given in other sections of the PDD?	1,2	See CAR6	See CAR6	<input checked="" type="checkbox"/>
F.4. Annex 4: Monitoring information				
F.4.1. If additional background information on monitoring is provided: Is this information consistent with data presented in other sections of the PDD?	1,2	Monitoring information has been given in Section B.7.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.4.2. Is the information provided verifiable? Has sufficient evidence been provided to the validation team?	1,2	Monitoring information has been given in Section B.7.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.4.3. Do the additional information and / or documented procedures substantiate /	1,2	Monitoring information has been given in Section B.7.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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CHECKLIST TOPIC / QUESTION	Ref.	COMMENTS	PPD in GSP	Final PDD
support statements given in other sections of the PDD?				

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Table 2 Resolution of Corrective Action and Clarification Requests

Clarifications and corrective action requests by validation team	Ref. to table 1	Summary of project owner response	Validation team conclusion
<u>Corrective Action Request No.1.</u> At least once in the PDD the abbreviation has to be explained, e.g. HFO, TDP. This is applicable for all abbreviations in the PDD.	A.2.1.	All abbreviations now have been explained in the PDD.	Abbreviation in the PDD has been explained in PDD. The issue is settled. <input checked="" type="checkbox"/>
<u>Corrective Action Request No.2.</u> The indicated figure for net electricity (41730 MWh/yr) generated by the project activity needs to be justified in more detail taking into account a statement about a credible load factor of the project activity.	A.4.3.1.	The indicated figure for net electricity generated by the project activity is 41,730 MWh/year and is based on the performance guarantee value of 5.35 MW provided by the equipment supplier and 325 days of operation ($5.35 * 325 * 24 = 41,730$ MWh). The supporting document for the guaranteed value has already been provided to the DOE and net power generation by steam turbine has already been explained in the PDD.	The presented figure for net electricity generated in the project activity is 41,730 MWh/year which is based on the performance guarantee value of 5.35 MW provided by the equipment supplier and 325 days of operation ($5.35 * 325 * 24 = 41,730$ MWh). The issue is settled. <input checked="" type="checkbox"/>
<u>Corrective Action Request No.3.</u> For all default figures provided in the ER excel file calculation sheet appropriate sources have to be indicated in order to trace these figures.	A.4.4.2.	In the ER excel file with comments attached with this response to validation protocol, sources for all default figures have been indicated in order to trace these figures.	The evidenced of default figures provided in PDD has been delivered to DOE. The issue is settled. <input checked="" type="checkbox"/>
<u>Corrective Action Request No.4.</u> Please clarify why the grid has not been included in the project boundary	B.3.1.	The project activity displaces only the electricity generated by the captive power plant. It has already been mentioned in section A.2 of the PDD that at the	The project activity replaces the electricity produced at fossil fuel based captive power plant.

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		time of investment decision (October 25, 2007) of the project, there was no grid connection available to Cherat Cement. Cherat Cement connected to grid on 1st March 2010 and will be using it as backup source of power. The baseline thus refers to the situation prevalent at the time of investment decision. Furthermore, please note that export to the grid from captive power plant and WHR recovery system is prevented by a reverse current protection system. This relay system pre-vents the flow of power from captive power plant and WHR plant to the grid. Hence, in view of the reasons mentioned above, grid has been excluded from the project boundary as it does not affect the baseline or the project situation.	The issue is settled. <input checked="" type="checkbox"/>
<u>Corrective Action Request No.5.</u> – Please clarify the quantity and energy content of the waste energy produced for the rated plant capacity/per unit of product produced.	B.7.1.5.	The method selected for calculation of f_{cap} (Case 1 of Method 3) is based on Final Output Energy (electrical MWh) of the project plant; therefore, the determination of intermediate energy (waste heat per unit of product) is not relevant to the selected approach for calculation of f_{cap} . No historical measurements or data is available for waste energy produced by the kiln.	The applied approach to calculate the F_{cap} is (Case 1 of Method 3) which does not require to determination the intermediate energy (waste heat per unit of product). The issue is settled. <input checked="" type="checkbox"/>
<u>Corrective Action Request No.6.</u> The choice of the emission coefficients for HFO and coal need to be referenced as for IPCC 2006 taking account a conservative approach.	F.3.1.	The type of HFO has been specified in Annex 3 of the PDD. According to table 1.1 of Volume 2, Chapter 1 of IPCC 2006, types of HFO being used is Residual Fuel Oil. Emission coefficient of coal is not relevant as it is not involved in emission reduction calculations.	According to applied methodology AMS-III.Q. / Version 04 it is permissible to use IPCC default values of emission factors for fuels. The issue is settled. <input checked="" type="checkbox"/>

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		Local or country-specific values of emission factors of fuels are not available. Therefore, IPCC default values are used for all the fuels including HFO. According to applied methodology AMS-III.Q. / Version 04 it is permissible to use IPCC default values of emission factors for fuels.	
<u>Clarification Request No. 1.</u> Please clarify that whether pre-commissioning of Cherat Waste Heat Recovery Project has been done or not.	A.2.2.	As mentioned in Table B.5.1 of the PDD, and checked by the DOE during on-site validation visit; the commissioning of the project plant has been already done in February 2010.	The commissioning of the project plant has been done as per schedule (IRL 56) The issue is settled. <input checked="" type="checkbox"/>
<u>Clarification Request No. 2.</u> – The LoA of the parties involved have to be provided to the DOE. – Please provide the Modalities of Communication (MoC).	A.3.2.	<ul style="list-style-type: none"> Host Country Approval of the project activity for the Project Participants (Cherat Cement Company Limited and Carbon Services (Private) Limited) from the DNA (Designated National Authority) for CDM in Pakistan has been provided to DOE. Swiss LoA of First Climate (Switzerland) AG is attached with this response to validation protocol. Modalities of Communication form is in process and shall be provided to DOE later. 	<ul style="list-style-type: none"> Both LoA have been provided to DOE (IRL 39, 44). Modalities of Communication (MoC) have been provided to DOE (IRL 12). The issue is settled. <input checked="" type="checkbox"/>
<u>Clarification Request No. 3.</u> Proofs of operation license of cement plant and construction license of the project activity have to be provided to the DOE.	A.4.1.2. IRL 3a IRL 19	No operation license of cement plant is required by Government of Pakistan. The only construction license for the project activity is Environmental Approval from the Environmental Protection Agency of Provincial Government. The Environmental Approval is already provided to DOE.	TÜV SÜD confirms based on its local and sectoral expertise that the project participant needs environmental approvals from Environmental Protection Agency of Provincial Government (Khyber Pakhtunkhwa, formerly North-West Frontier Province

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			(NWFP), Pakistan) which has been delivered to DOE (IRL 18). The issue is settled. <input checked="" type="checkbox"/>
<u>Clarification Request No. 4.</u> The contracts with the supplier of HRSGs and steam turbine including technical data or at least the offer have to be provided to the DOE.	A.4.3.1. IRL 6	The contracts with the supplier of HRSGs and steam turbine have been provided to the DOE.	a) The evidence of contract for HRSGs and steam turbine including technical data between Cherat Cement Company Limited & Sinoma Energy Conservation Limited has been provided to DOE (IRL 6). The issue is settled. <input checked="" type="checkbox"/>
<u>Clarification Request No. 5.</u> Please provide information in the PDD that the project technology likely to be substituted by other or more efficient technologies within the project period or not	A.4.3.7. IRL 59	The project uses state of the art technology from China. The project technology is not likely to be substituted by other or more efficient technologies within the crediting period of the project activity. This statement has been added in PDD version 6.	The project activity involves installation of state of art technology. The discussion about the no substitution of technology has been added in PDD. The issue is settled. <input checked="" type="checkbox"/>
<u>Clarification Request No. 6.</u> Evidences about initial training and maintenance for the implementation and operation of the project activity has to be provided to the DOE.	A.4.3.8. IRL 15	Evidences on training have been provided to DOE.	The issue is settled. <input checked="" type="checkbox"/>
<u>Clarification Request No. 7.</u> A written statement that public funding is excluded for this project needs to be submitted	A.4.5.1. IRL 8	A written statement that public funding is excluded	The Evidence regarding the no public funding involvement in the project activity has been

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to the DOE.		for this project has already been provided to DOE.	delivered to DOE (IRL 8). The issue is settled. <input checked="" type="checkbox"/>
<u>Clarification Request No. 8.</u> Please provide the Energy Bills and Financial Statements audited by competent authorities.	B.2.3. IRL 60	Annual financial report for year 2006/07 of Cherat Cement Company Limited, audited by a competent third party, has been provided to DOE which demonstrates that all the energy required for the process has been procured commercially.	TÜV SÜD confirms after cross-checking the annual financial report of Cherat Cement Company Limited that all required energy at Cherat Cement plant is produced by Captive power plant /Grid and no waste heat recovery system was installed at the plant site (IRL 60). The issue is settled. <input checked="" type="checkbox"/>
<u>Clarification Request No. 9.</u> How can it be proved that electricity from WHR project will not be exported to the grid? Please add more information about this issue in PDD.	B.2.6. IRL 26	Export to the grid from captive power plant and WHR recovery system is prevented by a reverse current protection system. This relay system prevents the flow of power from captive power plant and WHR power plant to the grid. The relay system was shown and explained to DOE during on-site validation visit.	The project activity will displace the captive power plant and reverse current protection system will not allow the export of centrality from WHR system to grid. The issue is settled. <input checked="" type="checkbox"/>
<u>Clarification Request No. 10.</u> Please clarify the following questions. - Who decides the KIBOR - Please clarify who decides the basis points.	B.5.17. IRL 43 IRL45 IRL 51 IRL 52	<ul style="list-style-type: none"> - State Bank of Pakistan decides the daily KIBOR. - The lending bank decides the spread to be added to the KIBOR. The average spread over the KIBOR or the risk component used in the calculation of benchmark is linked to 	The KIBOR (Karachi Interbank Offered Rate) is determined by the third party (State Bank of Pakistan) which is the lending bank which ultimately decides about the average spread to be

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<ul style="list-style-type: none"> - Why 350 basis points are considered - At what time project participants considered 350 basis points and what is base of consideration of 350 basis points. - Please provide the unprotected and correctly formulae applied IRR calculation spreadsheet to DOE. 	IRL 53	<p>specific risks or characteristics of the project activity (which a lending bank will always take into account while extending a loan offer to a borrower).</p> <ul style="list-style-type: none"> - The average spread (350 basis points) used in the benchmark calculation is based on the loan offer that the PP got from a local bank (a copy of the loan offer letter has already been provided to the DOE). - 350 basis points were considered at the time of feasibility preparation for the project activity. The basis for consideration of 350 points is already explained above. - The unprotected IRR calculation file is attached with this response to validation protocol. 	<p>charged above KIBOR. The average spread (350 basis points) used in the benchmark calculation is based on the loan offer that the PP got from a local bank As bank offer for basis point is also from the third party so it is clear that the approached used for the calculation of benchmark (KIBOR + basis point) is appropriate.</p> <p>The unprotected IRR calculation IRR file has been provided.</p> <p>See IRL 43, 45, 51, 52 and 53 of annex 2.</p> <p>The issue is settled.</p> <p><input checked="" type="checkbox"/></p>
<p><u>Clarification Request No. 11.</u></p> <ul style="list-style-type: none"> - The benchmark value in FSR is 13.50% while it GSP-PDD the benchmark value is 13.52%; Please clarify the difference. - The project IRR in FSR is 7.60% while the project IRR in first GSP- PDD is 8.24% while the project IRR in repeated GSP is 7.86%. Please describe these three different applied values. - Please describe why the fuel costs values for electricity generation are different in GSP-PDD and in repeated 	B.5.17. IRL 5 IRL 14 IRL 59	<p>The difference in the values of input parameters, IRR values, etc. occurred due to following reasons:</p> <p>The initial investment analysis as provided in the GSP PDD was based on the information provided in financial questionnaire which was sent to the PP by the CDM Project Developer. The values provided in this questionnaire were different from those mentioned in the FSR of the proposed CDM project activity which was not shared with the PDD developer at the time of PDD development. That is why a difference in the values of dependent variables, such as IRR was observed. For example value of major overhaul considered during the 5th year was provided</p>	<p>The difference in IRR values and benchmark values appeared in different version of PDD was due to the different input values applied for calculation of IRR of project and benchmark has been explained and TÜV SÜD has checked the FSR, input values in PDD and IRR and confirms that the input values in PDD, IRR are consistent with FSR now. The reasons have been explained in chapter 3.6 of validation report.</p>

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GSP-PDD.		<p>in the questionnaire as 70,883,323 PKR while in the FSR it was 80,098,155 PKR.</p> <p>Moreover, the investment analysis also took into account fuel cost values which were based on the historical data period, procedures, calculation methods, etc. as specified in the methodology. This approach also caused minor difference in the values, especially in re-GSP PDD. For example annual quantity of HFO consumption considered in the investment analysis provided in the re-GSP PDD was 25,393 t/yr while in the FSR it was considered 21,798.52 t/yr.</p> <p>Although the approach adopted by the project developer for investment analysis was quite conservative and robust, it was beyond the scope of the guidance on the assessment of investment analysis as provided in EB 62 Annex 5)</p> <p>This has now been rectified and input values used in all investment analyses are now consistent and are in compliance with the guidance provided in EB 62 Annex 5.</p> <ul style="list-style-type: none"> – One component of the benchmark is based on monthly average of KIBOR rates of September 2007. The difference in the benchmark is due to numbers being rounded off. The PP rounded off the value to single decimal digits (i.e. 10.02 % rounded off to 10% + 	<p>The issue is settled.</p> <p><input checked="" type="checkbox"/></p>
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		<p>credit spread of 3.5% = 13.5%) whereas the CDM project developer rounded off the value to 2 decimal digits (i.e. 10.02% + credit spread of 3.5% = 13.52%); this value in PDD version 6 has now been made consistent with the FSR.</p> <ul style="list-style-type: none"> – The difference in the IRR value was due to difference in the input values of investment analysis which PP used in the FSR and CDM project developer used in the PDD. – Fuel cost values were different because the CDM project developer had taken 3 years of power plant data for financial calculations which was not in compliance with Annex 13 to EB 61. All the values in PDD version 6 have now been made consistent with the FSR to comply with Annex 13 to EB 61. 	
<p>Clarification Request No. 12. Please provide all the relevant evidence related to benchmark, Investment Cost, operational & Maintenance cost.</p>	<p>B.5.17. IRL 5 IRL 43 IRL45 IRL 51 IRL 52 IRL 53</p>	<p>Evidences related to benchmark (source of KIBOR & bank loan offer letter), investment cost (contract with the equipment supplier and bank loan offer letter), and operation & maintenance cost (letter from consultants) have been provided to DOE.</p>	<p>Evidences related to benchmark, investment cost and bank loan offer letter and operation & maintenance cost has been provided to DOE (IRL 5, 43, 45, 51, 52, 53) The issue is settled. <input checked="" type="checkbox"/></p>
<p>Clarification Request No. 13. Please clarify in detail how the efficiency of the power plant ($\eta_{\text{Plant}, j}$) has been calculated.</p>	<p>B.6.2.1.</p>	<p>The efficiency of the captive plant has been determined according to option (i) mentioned at page 6 of AMS-III.Q. / Version 04. As a conservative approach, the highest optimal operation (designed) efficiency among the two types of gensets is selected as con-</p>	<p>TÜV SÜD Confirms that the efficiency of the captive plant has been defined as per methodology. The issue is settled.</p>

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		stant efficiency of the existing captive plant. The determination of efficiency has been explained in §B.6.1 of PDD version 06.	☑
Clarification Request No. 14. <ul style="list-style-type: none"> - The calculation of the project load factor of 70% has to be justified and evidenced. - Please clarify the use of the waste heat to meet the internal energy demand of the clinker production lines - Please clarify the total energy demand of the industrial facility - Please clarify the specific energy consumption of the clinker production. 	B.6.2.6.	<ul style="list-style-type: none"> - The load factor of the project plant is $5.35/7=76\%$ and it has been calculated considering 5.35 MW performance guarantee and 7 MW maximum capacity of the WHR plant. The technical specifications of WHR equipment has been provided to DOE. Evidence of daily power generation by project plant was provided to DOE during on-site validation visit. - Cherat cement plant has only one clinker production line. - Cherat Cement Limited doesn't have any internal demand of waste heat. The waste heat generated at the cement plant in the clinker production process is vented to the atmosphere with only a small portion recycled to heat the incoming raw materials. - Fuel consumption at kilns and electricity demand corresponding to clinker production are mentioned in Annex 3 of the PDD. Relevant proofs of the data have been provided to DOE. - Historical specific fuel energy consumption for the clinker production is 3.62 GJ per ton of clinker for year 2006/07. It has been mentioned in Annex 3 of the PDD version 06 and calculation is provided in updated Emission 	<ul style="list-style-type: none"> - The plant load factor is in reasonable range. The comparison of PLF has been provided in validation report. - - The information regarding the internal waste heat demand has been described in PDD. - The information regarding Fuel consumption at kilns and electricity demand corresponding to clinker production has been provided in PDD and found correct. - The provided figure of historical specific fuel energy consumption for the clinker production is 3.62 GJ per ton of clinker which is in a reasonable range. <p>The issue is settled.</p> <p>☑</p>

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		Reduction Calculation Excel Sheet.	
<u>Clarification Request No. 15.</u> Please provide the evidences related to Initial Environmental examination (IEE) to the DOE.	D.1.1.	A copy of Initial Environmental Examination (IEE) Report has been provided to DOE.	The issue is settled. <input checked="" type="checkbox"/>

Table 3 Unresolved Corrective Action and Clarification Requests (in case of denials)

Clarifications and / or corrective action requests by validation team	Id. of CAR/CR	Explanation of Conclusion for Denial
-	-	-


Validation of the CDM Project:

Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited,
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South Asia


Annex 2: Information Reference List

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Ref. No.	Issuance and/or submission date (dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)														
1	29/07/2009 19/05/2011	PDD “Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan”, Version 01 (with AM0024) PDD “Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan”, Version 05 (with AMS.III.Q version 5)	First Climate and Carbon Services (private) Limited	PDD in GSP														
2	15/04/2011	Methodology for Waste energy recovery (gas/heat/pressure) projects – AMS.III. Q Version 4	UNFCCC	-														
3	01/10/2009	Participant list of on-site interviews	TÜV SÜD	-														
3a		<p>The project discussion part and interviews conducted on October 1st, 2009 in headquarter of Cherat Cement Company Limited in Karachi but due to security situation it was not possible for TÜV SÜD team to perform the onsite. The security situation was better later and onsite was performed in May 2010 by auditing team of TÜV SÜD.</p> <p>Validation team on-site:</p> <table><tr><td>Robert Mitterwallner</td><td>TÜV SÜD, GHG Auditor</td></tr><tr><td>Auer Paula</td><td>TÜV SÜD, GHG Auditor</td></tr><tr><td>Khalid Mahmood</td><td>TÜV SÜD, GHG Auditor & Host Country Expert</td></tr><tr><td>Georgios Agrafiotis</td><td>TÜV SÜD, GHG Auditor</td></tr></table> <p>Interviewed persons at Cherat Cement Company Limited, Pakistan:</p> <table><tr><td>Qazi Sabir</td><td>Sr. Project Manager, Carbon Services (private) Limited Pakistan</td></tr><tr><td>Faisal Munir</td><td>Project Engineer, Carbon Services (Private) Limited Pakistan</td></tr><tr><td>Fawad Nagaria</td><td>Manager Accountant (Cherat Cement Company Limited)</td></tr></table>	Robert Mitterwallner	TÜV SÜD, GHG Auditor	Auer Paula	TÜV SÜD, GHG Auditor	Khalid Mahmood	TÜV SÜD, GHG Auditor & Host Country Expert	Georgios Agrafiotis	TÜV SÜD, GHG Auditor	Qazi Sabir	Sr. Project Manager, Carbon Services (private) Limited Pakistan	Faisal Munir	Project Engineer, Carbon Services (Private) Limited Pakistan	Fawad Nagaria	Manager Accountant (Cherat Cement Company Limited)	-	-
Robert Mitterwallner	TÜV SÜD, GHG Auditor																	
Auer Paula	TÜV SÜD, GHG Auditor																	
Khalid Mahmood	TÜV SÜD, GHG Auditor & Host Country Expert																	
Georgios Agrafiotis	TÜV SÜD, GHG Auditor																	
Qazi Sabir	Sr. Project Manager, Carbon Services (private) Limited Pakistan																	
Faisal Munir	Project Engineer, Carbon Services (Private) Limited Pakistan																	
Fawad Nagaria	Manager Accountant (Cherat Cement Company Limited)																	

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Ref. No.	Issuance and/or submission date (dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
		Abid Munir Group Company Sectary (Cherat Cement Company Limited) Deedar Gul General Manager Production (Cherat Cement Limited) Yasir Masood Chief Financial Officer (Cherat Cement Limited)		
4	NA	Cherat Cement Limited homepage http://www.gfg.com.pk/cheratcement/cc.html	Cherat Cement Company Limited	
5	19/10/2007	Feasibility study Report of Cherat Cement Company Limited Waste Heat Recovery Plant	Cherat Cement Company Limited	
6	29/11/2007	Contract for supply of major equipment of the project activity between Cherat Cement Company Limited & Sinoma Energy Conservation Limited	Cherat Cement Company Limited	Document confirming the starting date of the project
7	10/12/2007	Letter of credit (L/C) for purchase of major equipment of the project activity.	United Bank Limited	
8	28/10/2008	Letter of No Public Funding Involvement issued by Cherat Cement Company Limited	Cherat Cement Company Limited	-
9	18/12/2006	A letter was sent from Pakistan Sugar Mill Association (PSMA) to the Chief Executives of all sugar mills including Mirpurkhas Sugar Mill which is also a subsidiary of GFG group along with Cherat Cement Company Limited	Cherat Cement Company Limited	CDM Awareness evidence
10	26/11/2007	Arrangement of syndicated term finance facility for Cherat Cement Company Limited (CCCL) amounting to PKR 1,000 million (Loan Document)	United Bank Limited and Bank Al Habib Limited	
11	2005	<i>The State bank of Pakistan (Financial Year 2004) - Quarterly Report</i> <i>Initially, introduced in September 2001, KIBOR was only used as a reference rate for interbank money market (for clean lending). However, to promote the culture of floating rate lending and make the mechanism transparent both for lender as well as borrower, KIBOR was also introduced as a reference rate for corporate lending in February 2004.</i>	State bank of Pakistan	Benchmark
12	29/09/2011	Modalities of Communication	First Climate (Switzerland)	

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Ref. No.	Issuance and/or submission date (dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
			AG, Cherat Cement Company Limited	
13	NA	Monthly Electric Consumption Report (June 2005) Monthly Electric Consumption Report (June 2006) Monthly Electric Consumption Report (June 2007) Monthly Electric Consumption Report (June 2008)	Cherat Cement Company Limited	
14	29/07/2009	Investment Analysis Sheet (IRR Calculation spreadsheet)	First climate and , Carbon Services (private) Limited Pakistan	-
15		Cherat Waste Heat Recovery project Training sheet	Cherat Cement Company Limited	-
16	19/11/2008	Local Stakeholder meeting Consultation invitation in Daily The Frontier Star, Peshawar, Pakistan,	Cherat Cement Company Limited	-
17	19/11/2008	Local Stakeholder meeting Consultation invitation in Daily SURKHAB, Daily Newspaper, Peshawar,	Cherat Cement Company Limited	-
18	20/11/2008	List of Participants of Public stakeholder process, issued and submitted by Cherat Cement Company Limited	Cherat Cement Company Limited	-
19	05/03/2009	Environmental Approval decision on Initial Environment Examination (IEE) Reports, issued by Environment Protection Department, Government of the NWFP, Peshawar, Pakistan	Environmental Protection Agency, Government of Khyber Pakhtunkhwa, formerly North-West Frontier Province (NWFP)	-
20	NA	Power Generation Data (captive Power plant and fuel consumption baseline data) of Cherat WHR Project (2004-September 2007)	Cherat Cement Company Limited	
21	02/05/2007	Waste heat recovery system information provided by PITCO (Consultancy firm) about the WHR system cost, Waste Heat Generation, O&M Costs and Overhaul costs etc.	PITCO	

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Ref. No.	Issuance and/or submission date (dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
22	13/09/2007	Waste heat recovery system information provided by EAST-WEST Commercial Enterprise about the WHR system cost, Waste Heat Generation, O&M Costs and Overhaul costs, technical lifetime of equipment etc.	EAST-WEST Commercial Enterprise	
23	27/09/2008	Analytical test report of Heavy Speed Diesel (HSD) Sample Test by PERAC Research & Development Foundation		
24		Analytical test report of the Coal (for NCV) Test by In-House Laboratory at Cherat Cement Factory	Cherat Cement Company Limited	
25	04/01/2005	Analytical test report of Heavy Fuel Oil (HFO) Sample Test by PERAC Research & Development Foundation		
26	NA	Single line diagram of Cherat WHR Plant	Cherat Cement Company Limited	
27	10/06/1997	Technical Review of installed Caterpillar Generators at Cherat WHR project	Caterpillar	
28	19/10/1994	Test protocol of Wartsila Engines at Cherat cement Plant		
29	30/06/2007	Daily Operation Log Book of Cement production, Energy consumption & Fuel consumption	Cherat Cement Company Limited	
30	01/10/2009	Pakistan electric power company (private) limited (PEPCO) supply & demand position: 2008-2012 http://www.ppib.gov.pk/SupplyDemand.htm	Pakistan electric power company	-
31	01/10/2009	International Currency converter , Exchange rate US \$ --> PKR http://www.iccfx.com/history.php	International Currency converter	
32	2007	Annual Energy Outlook 2007 (AEO 2007) prepared by the Energy Information Administration http://www.eia.doe.gov/	U.S Energy Information Administration	
33	01/07/2009	Pakistani Cement Industry (Operational Units Data) issued by All Pakistan Cement Manufactures Association (APCMA)	All Pakistan Cement Manufactures Association	
34		UDI World Electric Power Plants Data Base (WEPP). Global inventory of electric power generating units. Platts, McGraw Hill Group.	Platts (www.platts.com)	

Annex 2	28-01-2013	Validation of the Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan Information Reference List	Page 5 of 10	 South Asia
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Ref. No.	Issuance and/or submission date (dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
		<ul style="list-style-type: none"> Design information for more than 145,000 units at more than 60,000 plant sites in 225+ countries; Coverage of installed and projected steam and gas turbines, combined-cycle plants, IC engines, hydro units, wind turbines, and renewable energy units; Details on plant operators, geographic location, capacity (MW), age, technology, fuels, and boiler, turbine, and generator manufacturers, emissions control equipment, and more. 		
35	20/01/2009	Emission Reduction (ER) Calculation Sheet	Cherat Cement Company Limited	-
36	29/02/2008	CDM Service Agreement between Cherat Cement Company Limited and Factor Consulting + Management AG (now First Climate (Switzerland) AG)	First Climate	Continued action evidence
37	04/04/2008	CDM Service Agreement Contract between Cherat Cement Company Limited & First Climate(Switzerland) AG	First Climate	Continued action evidence
38	25/10/2007	<p>Extract of Minutes of the Board Directors meeting of Cherat Cement Company Limited</p> <p><i>“Updating the Board of Directors on The developments in the Waste Heat Recovery(WHR) project, Mr Azam Faruque informed that based on data gathered and preliminary cost estimates provided by Supplier, it can be concluded that the WHR project will be viable for the company to undertake.</i></p> <p><i>He added that the accompanying feasibility study contains two scenarios; one with carbon credits included and other without carbon credits. He then explained the UN Charter on carbon credits ad its salient features. He stated that it is evident from the feasibility study that without the inclusion of Carbon Credits the WHR project will not be financially viable investment.</i></p> <p><i>The project (Cherat WHR Project) was approved by the Board of directors and resolution was passed.</i></p>	Cherat Cement Company Limited	Board Decision
39	10/06/2009	LoA Pakistan	DNA Pakistan	-

Annex 2	28-01-2013	Validation of the Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan Information Reference List	Page 6 of 10	
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Ref. No.	Issuance and/or submission date (dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
40	11/11/2008	Letter of intent-Civil work Waste Heat Recovery Project	Cherat Cement Company Limited	
41	2007	Calculation of Weighted Average Cost of Capital (WACC) for Year 2007	Cherat Cement Company Limited	
42	NA	Profile of the internal Audit department of Ghulam Faruqe Group	Cherat Cement Company Limited	
43	24/05/2007	News articles about the KIBOR and Basis point in Pakistan states that <i>"The cost of short-term financing for export is the lowest in Pakistan amongst its competitors both in nominal as well as real terms. The State Bank provides finance to banks at the rate of 7.5 per cent (6.5 per cent concessionary finance rate+ 1 per cent spread) subsidizing to the extent of 2.34 per cent as against the commercial lending rate of 12.57-13.57 percent"</i>	Dawn News article Dawn Newspaper Pakistan	
44	25/11/2011	LoA Switzerland	Federal Office for the Environment FOEN Climate division	
45	09/05/2007	Bank Loan offer for Financing of Waste Heat Recovery Plant	United Bank Limited	-
46	13/05/2010	Daily Clinker Production Report 13-May-2010	Cherat Cement Company Limited	
47	02/05/2010	Daily Power Generation Report 02-May-2010	Cherat Cement Company Limited	
48	08/08/2010	Daily Power Generation Report 08-May-2010	Cherat Cement Company Limited	
49	10 /07/2009	CDM Validation Contract	Cherat Cement Company Limited & TÜV SÜD Industry Service	
50	13/10/2009	Email confirmation from DNA Pakistan that Waste Heat Recovery Based Power Generation is not a Common Practice in cement Industry of Pakistan	DNA, Pakistan	

Annex 2	28-01-2013	Validation of the Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan Information Reference List	Page 7 of 10	 South Asia
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Ref. No.	Issuance and/or submission date (dd/mm/yyyy)	Title/Type of Document		Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
51	2007	Tax rate document "Rates and Taxes for Companies"		Government of Pakistan	Tax Rate
52	2007	KIBOR rate of State Bank of Pakistan: http://sbp.org.pk/ecodata/kibor/2007/		State bank of Pakistan	benchmark
53	21/01/2004	SBP, PBA ask Banks To use KIBOR as The Benchmark Rate For Corporate Lending		State Bank of Pakistan	
54	2007	CCCL-WACC Calculation for Financial Year 2007		Cherat Cement Company Limited	WACC of Cherat Cement Company Limited in 2007
55	22/03/2010	Natural Gas curtailment, gas shortage articles and press releases in Pakistan			
		39a	Energy Shortage forcing textile units to shift abroad		
		39b	Winter gas shortage hurts consumers, business		
		39c	Five work days/week for industrial units, CNG stations announced		
		39d	Curtailment of gas supply to the fertilizer plants, Chemical Plants in 2008		
56	01/02/2010	WHR Project Commissioning Schedule of Cherat Cement Limited		Cherat Cement Company Limited	Project Commissioning
57	08/07/2011	PDD of CDM project "Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan" Version 6		First Climate and Carbon Services (private) Limited	
58	18/02/2009	Initial Environmental Examination (IEE) Report		Cherat Cement Company Limited	
59	09/08/2011	PDD of CDM project "Waste Heat Recovery and Utilization for power Generation at Cherat Cement Company Limited, Nowshera, Pakistan" Version 7		First Climate and Carbon Services (private) Limited	
60	2006/ 2007	Annual Financial Report		Cherat Cement Company Limited	

Annex 2	28-01-2013	Validation of the Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan Information Reference List	Page 8 of 10	 South Asia
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Ref. No.	Issuance and/or submission date (dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
61	08/10/2011	Total investment costs (Invoices of Freight, Duties, Taxes & Others, invoices values- F.O.B, Civil works, Mechanical works & Material cost, Electrical & Instrumentation, Pre-Production overheads, Financing costs,	Cherat Cement Company Limited	
62	15/08/2011	Cherat Cement Company Limited annual audit report 2011	ERNSYT & Young Ford Rhodes Sidat Hyder Chartered Accountant	
63	08/10/2011	Actual Operational & Maintenance costs of Cherat Cement Company Limited	Cherat Cement Company Limited	
64	08/10/2011	PDD of CDM project "Waste Heat Recovery and Utilization for power Generation at Cherat Cement Company Limited, Nowshera, Pakistan" Version 8	First Climate and Carbon Services (private) Limited	
65	08/10/2011	Actual Operational & Maintenance costs of Cherat Cement Company Limited	Cherat Cement Company Limited	
67	23/12/2011	PDD of CDM project "Waste Heat Recovery and Utilization for power Generation at Cherat Cement Company Limited, Nowshera, Pakistan" Version 9	First Climate and Carbon Services (private) Limited	
68	01/10/2009	Operating and Maintenance cost inflation rate Base On Financial Figures of 2006 & 2007 Of Power Generation Department	Cherat Cement Company Limited	
69	04/11/2008	Financial information was requested by Omar Malik (Carbon Services Private Limited) and information provided by Citi Bank Pakistan about the benchmark, Karachi Inter Bank offer rates (KIBOR).	Citi Bank, Pakistan	
70	05/01/2012	PDD of CDM project "Waste Heat Recovery and Utilization for power Generation at Cherat Cement Company Limited, Nowshera, Pakistan" Version 10	First Climate and Carbon Services (private) Limited	
71	08/05/2008	Basic Design Clarification Document for the 7 MW Waste Heat Recovery Project of CCCL	Sinoma Energy Conservation Limited	
72	01/01/2008	Pakistan Energy Year Book 2007	Hydro Carbon Institute of Pakistan	
73	01/02/2010	Cherat Company Information Letter	Cherat Cement Company Limited	

Annex 2	28-01-2013	Validation of the Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan Information Reference List	Page 9 of 10	 South Asia
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Ref. No.	Issuance and/or submission date (dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
74	NA	CCCL Average Fuel Cost for Financial Year 2006-2007	Cherat Cement Company Limited	
75	05/03/2009	Future Price Evolution Spreadsheet	First Climate and Carbon Services (private) Limited	
76	14/09/2010	Detailed Calculation for Performance Guarantee of 7MW Waste Heat Recovery Project at Cherat Cement Plant	Sinoma Energy Conservation Limited	The documents explain that the WHR project can generate 5.95MW and can deliver the net production of 5.35MW.
77	24/04/2012	Certificate of operational & maintenance cost of 7MW Waste Heat Recovery Plant for the Year ended June 30, 2011	Minoo N. Bamjee & Company Chartered Accountants Karachi.	
78	NA	Trend analysis of Consumer Price Index		
79	02/07/2003	Cherat Cement Company Limited's maintenance contract with the equipment supplier (Wartsila)	Wartsila	
80	NA	Annual Report of State Bank of Pakistan 2006-2007	State Bank of Pakistan	
81	2007	Petroleum Exploration and Production Policy 2007	Ministry of Petroleum & Natural Resources	
82	2007	Energy Prices Future Evolution Calculation	Cherat Cement Company Limited	
83	December, 2006	Pakistan Energy Yearbook 2006	Hydrocarbon Development Institute of Pakistan	
84	February 2006	Annual Energy Outlook 2006 www.eia.doe.gov/oiaf/aeo/	Energy Information Administration, USA	
85	30/08/2012	Third party confirmation of escalation of Operational and maintenance costs of Waste heat recovery project and baseline fuel cost	Minoo N. Bamjee & Company	Third party confirmation that the

Annex 2	28-01-2013	Validation of the Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan Information Reference List	Page 10 of 10	 South Asia
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Ref. No.	Issuance and/or submission date (dd/mm/yyyy)	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
			Chartered Accountants Karachi, Pakistan	applied approach of escalation of O&M costs per year and price of fuel cost considered in baseline are realistic
86	25/10/2012	PDD of CDM project "Waste Heat Recovery and Utilization for power Generation at Cherat Cement Company Limited, Nowshera, Pakistan" Version 11	First Climate and Carbon Services (private) Limited	
87	16/12/2008	Remaining technical lifetime letter for Caterpillar Generator Sets	Graves Pakistan (Private) Limited	
88	29/12/2008	Remaining technical lifetime letter for Wartsila Generator Sets	Wärtsilä Finland Oy	
89	15/01/2013	PDD of CDM project "Waste Heat Recovery and Utilization for power Generation at Cherat Cement Company Limited, Nowshera, Pakistan" Version 12	First Climate and Carbon Services (private) Limited	

Validation of the CDM Project:
Waste Heat Recovery and Utilization for Power Generation at Cherat Cement Company Limited, Nowshera, Pakistan



South Asia



Industrie Service

Annex 3: Appointment Certificates

CERTIFICATE OF APPOINTMENT

Mr. Mahmood, Khalid fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	VER	Other
Date	23.03.12				

Qualification as						
Status	Trainee	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date		23.03.12	23.03.12	23.03.12		1.2, 13.1, 13.2, 15.2

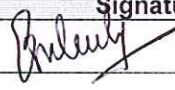
Other qualification						
Country Expertise						
Region	1	2	3	4	5	Other
Date	23.03.12					
Further countries						
Financial Expertise						
Date						

Qualification in technical areas	
Technical Area	Date
1.2_Energy generation from renewable energy source	23.03.12
13.1_Waste handling and disposal	23.03.12
13.2_15.2_Animal waste management	23.03.12

This appointment is valid until 28.02.2013 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0028/001.

Date	Signature
21.11.2012: Extension of Validity	



South Asia

CERTIFICATE OF APPOINTMENT

Mr. Mitterwallner, Robert fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	VER	Other
Date	23.03.12				

Qualification as						
Status	Trainee	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date		23.03.12	23.03.12	23.03.12	23.03.12	1.2, 4.1, 4.3, 13.1

Other qualification						
Country Expertise						
Region	1	2	3	4	5	Other
Date	23.03.12		23.03.12			
Further countries						
Financial Expertise						
Date						

Qualification in technical areas	
Technical Area	Date
1.2_Energy generation from renewable energy source	23.03.12
4.1_Cement sector	23.03.12
4.3_Iron and steel sector	23.03.12
13.1_Waste handling and disposal	23.03.12

This appointment is valid until 28.02.2013 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0030/001.

Date	Signature
21.11.2012: Extension of Validity	



South Asia

CERTIFICATE OF APPOINTMENT

Mr. Agrafiotis, Georgios fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	VER	Other
Date	22.03.12				

Qualification as						
Status	Trainee	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date		22.03.12	22.03.12			1.2, 13.1

Other qualification						
Country Expertise						
Region	1	2	3	4	5	Other
Date	22.03.12		22.03.12			
Further countries						
Financial Expertise						
Date	22.03.12					

Qualification in technical areas	
Technical Area	Date
13.1_Waste handling and disposal	22.03.12
1.2_Energy generation from renewable energy source	22.03.12

This appointment is valid until 28.02.2013 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0002/001.

Date	Signature
21.11.2012: Extension of Validity	



South Asia

CERTIFICATE OF APPOINTMENT

Mr. Grugni, Luciano fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	VER	Other
Date	23.03.12				

Qualification as						
Status	Trainee	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date		23.03.12	23.03.12			1.1, 1.2, 2.2, 4.10, 13.1

Other qualification						
Country Expertise						
Region	1	2	3	4	5	Other
Date	23.03.12					
Further countries						
Financial Expertise						
Date						

Qualification in technical areas	
Technical Area	Date
1.1_4.10_Thermal energy generation...	23.03.12
1.2_Energy generation from renewable energy source	23.03.12
2.2_Heat distribution	23.03.12
13.1_Waste handling and disposal	23.03.12

This appointment is valid until 28.02.2013 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0014/001.

Date	Signature
21.11.2012: Extension of Validity	



South Asia

CERTIFICATE OF APPOINTMENT

Mr. Kleiser Thomas fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	VER	Other
Date	25.03.12				

Qualification as						
Status	Trainee	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date		25.03.12	25.03.12	25.03.12	25.03.12	1.1, 1.2, 4.1, 4.10

Other qualification						
Country Expertise						
Region	1	2	3	4	5	Other
Date	25.03.12					
Further countries						
Financial Expertise						
Date	25.03.12					

Qualification in technical areas	
Technical Area	Date
1.1_4.10_Thermal energy generation....	25.03.12
1.2_Energy generation from renewable energy source	25.03.12
4.1_Cement sector	25.03.12

This appointment is valid until 28.02.2013 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0022/001.

Date	Signature
21.11.2012: Extension of Validity	



South Asia

CERTIFICATE OF APPOINTMENT

Mr. Agarwal, Nikunj fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	VER	Other
Date	22.03.12				

Qualification as						
Status	Trainee	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date		22.03.12	22.03.12	22.03.12	22.03.12	1.1,1.2, 3.1, 4.10, 13.1,13.2, 15.2

Other qualification						
Country Expertise						
Region	1	2	3	4	5	Other
Date	22.03.12					
Further countries						
Financial Expertise						
Date	22.03.2012					

Qualification in technical areas	
Technical Area	Date
1.2_Energy generation from renewable energy source	22.03.12
13.1_Waste handling and disposal	22.03.12
3.1_Energy demand	22.03.12
13.2_15.2_Animal waste management	22.03.12
1.1_4.10_Thermal energy generation..	23.11.12

This appointment is valid until 28.02.2013 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0001/001.

Date	Signature
23.11.2012	