FINAL VALIDATION OPINION ON PERMANENT CHANGES IN REGISTERED PDD

DAGACHHU HYDRO POWER CORPORATION LIMITED

DAGACHHU HYDROPOWER PROJECT, BHUTAN
(UNFCCC REF. NO:2746)

REPORT NO.
CDM.12.VER.023.PRC

Date of this issue: 26/08/2013	**KBS Ref. No.:**CDM.12.VER.023.PRC
Organisational Unit:	**Client:** Dagachhu Hydro Power Corporation Limited
Climate Change Division, KBS	
Revised PDD	
Draft Revised PDD:	**Final Revised PDD:**
Version: 08	Version: 09.2
Date: 14/05/2012	Date: 26/08/2013

Summary of validation:

Dagachhu Hydro Power Corporation Limited has contracted KBS Certification Services Pvt. Ltd. to perform the validation of the proposed permanent changes in registered PDD of the CDM project activity;

Project Title:	Dagachhu Hydropower Project, Bhutan
Methodology Applied:	ACM0002, version 07
Sectoral Scopes:	1 Energy industries (Renewable and Non Renewable sources)

The scope of the validation is defined as an independent and objective review of the permanent changes in registered PDD. The information in revised PDD is reviewed against the latest version of CDM Validation and Verification Standard, CDM Project Standard, applied methodology, Kyoto Protocol requirements and UNFCCC rules.

The report is based on the assessment of the revised PDD undertaken through application of standard auditing techniques including but not limited to desk review, follow up actions i.e. on site visit interviews and also the review of the applicable approved methodological and relevant tools, guidance and CDM decisions.

The permanent changes in registered PDD are proposed by;

- ☒ Project Participant
- ☐ DOE
- ☐ CDM EB

Subject: Validation of permanent changes in registered PDD	
Validation Team:	**Document Distribution**
Team Leader, Local Expert: Kaushik Pal Validator, Technical Expert(TA 01.2): Akhilesh Joshi Financial Expert: Megha Lotankar	☒ No Distribution (without permission from the Client)
Technical Review Team: / **Manager Technical & Certification**	
Technical Reviewer and ETR (TA 01.2) : B. Rampradap Date: 26/08/2013 / Name: Ashok Kumar Gautam Date: 27/08/2013	☐ Limited Distribution
Authorized by:	
Name: Kaushal Goyal, Managing Director Date: 27/08/2013	☐ Unrestricted Distribution

Revision Number:	Date:	Number of Pages:
0	19/02/2013	30
1	13/03/2013	34
2	28/03/2013	30
3	26/08/2013	32

Abbreviations

ADB	Asian Development Bank
CAR	Corrective Action Request
CDM	Clean Development Mechanism
EB	Executive Board
CEO	Chief Executive Officer
CER	Certified Emission Reduction
CL	Clarification Request
DHPC	Dagachhu Hydro Power Corporation Limited
DOE	Designated Operational Entity
DNA	Designated National Authority
DNV	Det Norske Veritas
E&M	Electrical & Mechanical
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
GWh	Giga Watt Hours
HCC	Hindustan Construction Company
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
KBS	KBS Certification Services Pvt. Ltd.
MoC	Modalities of Communication
MW	Mega Watts
Nu.	The Ngultrum (BTN) – Bhutan Currency
O&M	Operation & Management
PCP	Project Cycle Procedure
PDD	Project Design Document
PS	Project Standard
PP	Project Participant
PDC	Project Design Change
PRC	Post Registration Changes
RMP	Revised Monitoring Plan
TPTCL	Tata Power Trading Company Limited
TR	Technical Review
VVS	Validation and Verification Standard
UNFCCC	United Nations Framework Convention on Climate Change
WCD	World Commission on Dams

Table of Content

Annexes:

1. Validation Opinion

KBS has been contracted by Dagachhu Hydro Power Corporation Limited to perform validation of the post registration changes, according to the procedure detailed in latest version of CDM VVS (version 03.0), CDM PS (version 02.1) and CDM PCP (version 03.1), in registered PDD of the CDM project 'Dagachhu Hydropower Project, Bhutan', UNFCCC Ref. No. 2746. The purpose of this validation is to have an independent third party assessment of the post registration changes, in particular the 'permanent changes from the project design 'of the PDD.

The following permanent changes are proposed in the registered PDD:

- Change in the installed capacity from 114 MW (as per registered PDD) to 126 MW based on the contract agreement between DHPC and Austrian Hydro Consortium Dagachhu dated 27/07/2009

- Revision of the Section A.2 (Project description) to show the revised installed capacity

- Revision in the name of the host country project participant in section A.3. Department of Energy, Ministry of Economic Affairs is now changed to Dagachhu Hydro Power Corporation Limited (DHPC). Also, Annex-1 contact information has been updated in the revised PDD. This is in line with the latest MoC available on project webpage.

- Revision Section A.4.4 and B.6.4 (Emission reduction sheet) to show the revised estimation of the expected CERs from the project activity

- Revision of the Section B.5 regarding the additionality based on the new assumptions. In accordance with para 274(a) of PS the project participants have modified the key parameters in the original spreadsheet calculation affected by the actual changes to the project activity based on the contract agreement between DHPC and Austrian Hydro Consortium Dagachhu dated 27/07/2009

-Revision in the start date of the crediting period from 01/01/2012(as per registered PDD) to 01/04/2014 based on the revised implementation schedule received from PP.

- Revision in the monitoring organization structure. Role of the Department of Energy, Bhutan is now taken over by DHPC.

- Change in the project lifetime from 40 years to 30 years in line with the Bhutan Sustainable Hydropower Development Policy 2008.This revision improves the accuracy of information provided and consistency in the registered PDD and the monitoring plan. The proposed revisions have impact on estimated emission reductions in the registered PDD.

Furthermore, KBS confirms that:

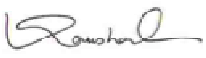
(a) the proposed revision points have been described, and an assessment has been provided to substantiate the reasons for each of the proposed revision points of the registered PDD, using objective evidence;

(b) the proposed revision of the PDD ensures that the level of accuracy and completeness in the monitoring and verification process are not reduced as a result of the revisions

(c) the proposed revision of the project design is in accordance with the approved monitoring methodology (ACM0002, version 07) applicable to the project activity whilst ensuring the conservativeness of the emission reductions calculation.

(d) first verification of the project activity has not yet been commenced and as per CDM VVS and CDM PS prior approval of CDM EB is requested on proposed permanent changes.

Authorized Signatory



Signature:
Name: Kaushal Goyal
Date: 27/08/2013

2. Introduction

2.1 Objective

KBS has been contracted by Dagachhu Hydro Power Corporation Limited to perform validation of the post registration changes in registered PDD of the registered CDM project titled 'Dagachhu Hydropower Project, Bhutan' UNFCCC ref. no.2746. The objective of a validation is to have an independent third party assessment of the post registration changes in registered PDD. The assessment includes in particular, but not limited to, the level of accuracy and completeness in the proposed revised PDD, and the conformity with the approved monitoring methodology applicable to the project activity.

KBS reviewed the PDD, using a risk based approach.

2.2 Scope

The scope of the validation is defined as an independent and objective review of the post registration changes in registered PDD. The information in revised PDD is reviewed against CDM VVS, CDM PS, Kyoto Protocol requirements, UNFCCC rules, applied methodology and associated interpretations.

3. Methodology

3.1 Review of Revised PDD and Additional Documentation

The validation is performed primarily as a document review of the available revised PDD version 08, dated 14/05/2012 and the subsequent versions 09.2 dated 26/08/2013 (final version). The assessment is performed by a validation team using a validation protocol attached as Annex 1.

3.2 Site visit and interview

The site visit for this Post Registration Change assessment was undertaken by Kaushik Pal (Team Leader & Local Expert) and Akhilesh Joshi (Verifier & Technical Expert) and details are mentioned below;

Location	Dagana Dzongkhag (district) in Bhutan, on the Dagachhu River.	
Dates	23/11/2012, 24/11/2012 & 25/11/2012	
Key points discussed	**Name of person interviewed**	**Designation, Organization**
Implementation and operation of project activity (project boundary, technology, project equipment, monitoring and metering equipment) as per registered PDD/previous verification.	Mr. Thinley Dorji Mr. Sonam Wangdi Mr. Namgay Dorji	Chief Executive Officer, DHPC Deputy CEO, DHPC AEE (E), DHPC
Physical inspection of the project activity: Site visit and interview of site personnel	Mr. Yeshi Wnagchuk Mr. Sanga Jamtsho Mr. Surender H. Yadav Mr. B. Ravikumar Mr. Tikaram Darjee Mr. Avneesh Kumar Bhatt	Head,HeadWorks Division, DHPC Head,PowerHouseDivision,DHPC Manager (Works), HCC Head(Head Race Tunnel), HCC Head(Head Race Tunnel), DHPC Geologist, HCC
Choice and applicability of baseline methodology(ies)	Mr. Namgay Dorji	AEE (E), DHPC
Additionality of the project activity (Baseline alternatives, Investment analysis, identified barriers, Common Practice analysis)	Mr. Thinley Dorji Mr. Sonam Wangdi Mr. Namgay Dorji	Chief Executive Officer, DHPC Deputy CEO, DHPC AEE (E), DHPC
Parameter fixed Ex-ante and Baseline emissions, Project emissions and Leakage calculation	Mr. Thinley Dorji Mr. Sonam Wangdi Mr. Namgay Dorji	Chief Executive Officer, DHPC Deputy CEO, DHPC AEE (E), DHPC
Monitoring plan (feasibility of monitoring arrangements described in PDD, QA/QC procedures, responsibility of implementation of monitoring plan, data recording & storage procedures)	Mr. Thinley Dorji Mr. Sonam Wangdi Mr. Namgay Dorji	Chief Executive Officer, DHPC Deputy CEO, DHPC AEE (E), DHPC
Review of procedures for ER calculations in accordance with applied methodology and	Mr. Namgay Dorji	AEE (E), DHPC

relevant tools and Environmental impacts and need of EIA		

3.3 Findings

As an outcome of the validation process, the validation team can raise different types of findings

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

Where a non-conformance arises the validator shall raise a **Corrective Action Request (CAR).** A CAR is issued, where:

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

Corrective Action Requests and Clarification Requests are raised in the draft validation protocol and detailed in a separate form (Annex 2). In this form, the project participant is given the opportunity to "resolve" outstanding CARs and respond to CLs.

3.4 Internal Quality Control

Following the completion of the assessment process and a recommendation by the assessment team, the validation opinion prepared by Team Leader is independently reviewed by internal Technical Reviewer (TR). TR reviews if all the KBS procedures have been followed and all conclusions are justified in accordance with applicable standards, procedures, guidance and CDM decisions. The TR either is qualified for the technical area within the CDM sectoral scope applicable to project activity or is supported by qualified independent technical expert at this stage.

The Technical Reviewer will either accept or reject the recommendation made by the assessment team. The findings can be raised at this stage and project participant must address them within agreed timeline.

The opinion recommended by Technical Reviewer will be confirmed by Manager Technical & Certification and finally authorized by the Managing Director on behalf of KBS as final validation opinion.

4. Validation Findings

4.1 Applied Corrections in registered PDD

Type of Revision:

- Change in the installed capacity from 114 MW (as per registered PDD) to 126 MW based on the contract agreement between DHPC and Austrian Hydro Consortium Dagachhu dated 27/07/2009/P14/.
- Revision of the Section A.2 (Project description), Section A.4.3 & Section B.5 to show the revised installed capacity and Plant Load Factor respectively.
- Revision in the name of the host country project participant in section A.3. Department of **Energy, Ministry of Economic Affairs is now changed to Dagachhu Hydro Power Corporation Limited**. Also, Annex-1 (Contact Information) in the revised PDD has been updated. This is in line with the latest MoC available on project webpage.
- Revision Section A.4.4 and B.6.4 (Emission reduction sheet) to show the revised estimation of the expected CERs from the project activity.
- Revision of the Section B.5 regarding the additionality based on the new assumptions. In accordance with para 274(a) of PS the project participants have modified the key parameters in the original spreadsheet calculation affected by the actual changes to the project activity based on the contract agreement between DHPC and Austrian Hydro Consortium Dagachhu dated 27/07/2009 /P14/.
- Revision in the start date of the crediting period from 01/01/2012(as per registered PDD) to 01/04/2014 based on the revised implementation schedule received from PP/P12/.
- Change in the project lifetime from 40 years to 30 years in line with the Bhutan Sustainable Hydropower Development Policy 2008/P24/.

Findings: Please refer the closures of CARs and CLs in Annex-1 Table-1 of this validation report.

Opinion:

Assessment team confirms that all the relevant sections of the PDD are revised/ updated by the PP and revised PDD correctly reflects the actual project design change.

4.2 Changes to the start date of the crediting period

The start date of the crediting period is not prior to the date of registration as the project registered on 26/02/2010. According to the registered PDD the start date of crediting period is 01/01/2012. However, during the course of post registration change validation it was identified that the project is not yet commissioned and PP is proposing the future start date of crediting period due to the delay in the construction work on site/P19/. Assessment team has observed from site visit and document review that the most of the construction activities delayed due to poor topographical area of the project activity. This delay in completion of the critical activities, further postponed the completion of related other activities. This leads to overall delay in the implementation of the project activity.

Findings:

However, CAR 01 was raised as the PP has not submitted proper evidence to substantiate the proposed new start date of crediting period in the month of April 2014. The CAR was subsequently closed as the PP has provided the proper evidence for proposed date of commissioning. Please refer CAR 01.

Opinion:

PP has provided the latest project implementation schedule/P12/, which is verified by the assessment team during on site visit. The proposed new start date of the crediting period is 01/04/2014, which is deemed appropriate considering revised project implementation schedule/P12/.

4.3 Permanent changes from the registered monitoring plan or monitoring methodology

The only change in the monitoring plan is that now DHPC has taken over the role of Department of Energy, Bhutan related to monitoring of the project activity.

Findings: Please refer CL-02

Opinion:

Assessment team can confirm through review of revised MoC and site visit that Department of Energy, Bhutan has officially withdrawn its participation from the project activity. The revised monitoring organization structure is in line with the latest MoC of the project activity.

4.4 Changes to the project design of a registered project activity

4.4.1 Changes from the registered PDD

<table>
<tr><th>Affected Changes</th><th>DOE Analysis</th></tr>
<tr><td>Changes in effective output capacity due to increased installed capacity</td><td>As per registered PDD the capacity of project was 114 MW, however due to the change in the design the project capacity is now being installed is 126 MW/P14/. Hence the annual generation will change from 500 GWh to 515 GWh/P14/. Therefore, capacity increase is 10.54% and generation increase is 3%.
The following information obtained from registered PDD and revised PDD:
<table><tr><td>Parameter</td><td>Registered PDD</td><td>Revised PDD</td></tr><tr><td>Capacity</td><td>114 MW</td><td>126 MW</td></tr><tr><td>PLF</td><td>52%</td><td>46.66%</td></tr><tr><td>Generation</td><td>500GWh</td><td>515GWh</td></tr></table>The revised PDD has changed the annual average PLF value from 52% to 46.66% considering the generation figure of 515 GWh and installed capacity of 126 MW.</td></tr>
<tr><td>Changes in effective output capacity due to increased number of units / installation of units with lower capacity / installed units with less advanced technology than that described in the PDD</td><td>There is no increase of the number of unit. As per registered PDD, the registered project consists of 2 units, each capacity of 57 MW; however effective output from each unit has been increased from 57 MW to 63 MW.</td></tr>
<tr><td>Addition of components or extension of technology</td><td>There is no addition of components or extension of technology in this project activity.</td></tr>
<tr><td>Removal or addition of site / increase in the project boundary</td><td>Neither removal nor addition of site nor increase in the project boundary taking place in this project activity.</td></tr>
<tr><td>Actual operational parameters which are within the control of the project participants differing from the expected parameters</td><td>No operational parameter is going to change due to the implementation of the project activity. As per the applied methodology all the parameters will be monitored in accordance with the registered PDD. Only the capacity of the project activity is going to change.</td></tr>
<tr><td>Any consequential changes to the baseline</td><td>Through the document review of the revised PDD</td></tr>
</table>

methodology – including changing or adding another baseline methodology or	(section.B.2) /P01/ the verification team confirms that the Baseline scenario, applicability criteria and determined benchmark will remain same irrespective of increase in capacity of the project activity. Also it confirms that the revised PDD appropriately captures the same in line with the registered PDD /B04/. Furthermore, the PP appropriately reconfirmed the applicability of the methodology of the project activity. It is demonstrated that at the time of registration there was no change of technology. The project involves only the increment of the capacity of each generator. Hence applicability and application of approved baseline methodology under which the project activity has been registered is still satisfied for the project activity after the increase of capacity.
Any consequential changes by applying a baseline scenario that is more appropriate as a result of the proposed or actual modification to the project activity.	Please refer to the above mentioned assessment.

Herewith, the verification team summarizes the post registration changes between registered PDD and actual project activity:

Post registration change in the project implementation **Description of the proposed or actual changes as compared to the description in the registered PDD**	
Description in Registered PDD	**Correction to the registered PDD based on the actual project activity with DOE assessment and reason of acceptance**
When was the changes occurred (after registration /prior to registration)	Prior to the registration of the project activity. Please refer CL 01.
Reason for these changes taking place	There has been considerable delay in project implementation, which is mainly due to the poor geology of the project location. Due to this reason the civil work completion has been delayed substantially around 2 years then the expected dates for the following reasons which was confirmed with the project personnel during the on site visit by : ➢ Complete washout of the coffer dam due to flood. ➢ Problem faced during the construction of underground tunnels due to poor rock class. ➢ Large cavity formed during drilling of the surge tank. ➢ Loose rock found during excavation of power house tunnels
How does the changes impact on the overall operation/ability of the project activity to deliver emission reduction as stated in the registered PDD	Due to the increase in the installed capacity from 114 MW to 126 MW, there is change in the value of estimated emission reduction compared to the as stated in the registered PDD. Please refer CL-03.

4.4.2 Assessment of impacts of the changes on Additionality of the project activity

The project activity additionality was originally demonstrated by applying an investment analysis. The proposed changes in the PDD do affect this analysis, since it represents changes in investment costs/schedule, Installed capacity of the power plant and annual generation/output. The project IRR has decreased from 8.79% to 5.81%, which is still below the benchmark of 9.4% as demonstrated in the registered PDD. The assessment of the new IRR calculation is presented below:

Input parameters

The assessment team of KBS has validated all revised input values to the investment analysis based on appropriate evidence, as described below. Only revised input parameters have been elaborated below.

Investment costs:

The total investment cost has increased from Nu. 8,160 million to Nu. 11,600 million. The major reason for increase is due to delay in civil works. The delay incurred due to the poor geology of the project location. The reason for delay of more than 2 years in the civil work is because of the complete washout of the coffer dam due to flood, difficulty faced during the construction of underground tunnels due to poor rock class, large cavity formed during drilling of the surge tank, loose rocks found during excavation of power house tunnels/P19/. Assessment team confirms through site visit and document review that the major part of the civil construction activities delayed due to poor topographical area of the project activity.

KBS validation team could confirm this value by comparing the difference in values between the Original estimates submitted by ADB (Asian Development Bank) dated February 2009 /P11/ (for the 114 MW project) and Revised estimates which are prepared based on Actual Annual Audited Financial Reports /P22/ and Final Budget Estimation Sheet /P23/ which was duly approved by DHPC Board on 08/09/2012 /P21/ (for the 126 MW); Based on documents, Validation team concludes that the revised investment cost considered is appropriate.

O&M costs:

Due to change in the electricity output, there has been increase in O&M cost. The O&M cost has increased from Nu. 142 millions to Nu. 202 millions. The O&M costs include both Fixed O&M and Variable O&M. Variable O&M costs are the transmission costs which are based on annual generation. Due to increase in annual generation from 500 to 515 GWh, the variable O&M costs have also increased. Further, the fixed O&M costs are defined as 1% of the total investment costs. As the investment costs have increased significantly due to which the fixed O&M costs have also increased. Thus, KBS Validation team considers the increase in O&M cost to be conservative, since there will be an additional generation in place.

Electricity generation:

Due to change in the electricity output, there has been increase in electricity generation from 500 GWh to 515 GWh. The validation team has checked the technical specifications of E & M equipment /P14/ based on which the Board members decided to increase the installed capacity to 126 MW with an increase in average annual generation up to 515 GWh/P16/.

The revised PDD mentions the change in the installed capacity as 126MW and the electricity generation estimation as 515GWh, due to which the PLF is revised to 46.66%. During the 11th board meeting dated 23/11/2010, PP had estimated the annual average PLF of 46.66% and the generation figures of 515 GWh based on the information from Bernard Engineers. PP has submitted the basis for month wise annual estimation of electricity generation /P25/ for validation. Based on the review, the validation team noted that the project can work on water discharge of 50m^3/s instead 45m^3/s and it is capable to utilize its full discharge

capacity during the peak season. Also, the validation team found that the increase in the electricity generation is due to the annual variable water discharge.

However, the revised PDD submitted for Post Registration Changes (PRC) has not correctly mention the PLF with respect to the increase in installed capacity. Therefore, CAR-02 was raised by the validation team. In response to the finding, PP has submitted the basis for the calculation of PLF. The validation team has reviewed the basis of the calculation and confirms that the change in the PLF is appropriate.

Further, the validation team has cross checked the expected generation of 515 GWh per year with WCD Compliance Report /P20/ prepared by a third party. Considering the documentary evidence validation team considers data to be appropriate.

Calculation and conclusion

The IRR calculations for 30 years were provided in a spreadsheet /P08/. The calculations were verified and found to be correct by KBS. The assumptions used in the calculations were deemed to be correct by KBS. The project-IRR without CDM revenues is 5.81%, which confirms that the project in the absence of CDM benefits and compared to the benchmark of 9.4% is still not financially attractive. Following the original PDD, a sensitivity analysis was carried on, considering a variation of ±5%. The resulted IRR are still below the benchmark of 9.4%. Hence, the validation team concludes that project still remains additional with the increase in installed capacity.

	UPDATED Project IRR	
	Without CDM	**With CDM**
Investment -5%	3.39	3.03
Investment +5%	3.72	3.37
O&M costs -5%	3.53	3.17
O&M costs +5%	3.58	3.22
Generation +5%	3.39	3.04
Generation -5%	3.73	3.38

Validation Team carried out its own independent assessment, which reveals that the project would become non additional if,

- Generation increased by 55.1%
- Project cost reduced by 35.8%
- O &M cost reduced by 131.6%
- Electricity Tariff increased by 51.2%

PP has submitted that such a reduction in project cost or O&M costs or increase in generation or electricity price is highly unrealistic and unlikely to happen and reasoned out as follows:

Project cost: As stated above, the cost is based on final EPC agreement and Civil agreement, hence significantly reducing the cost uncertainty. Hence, a decrease of these investment cost by 35.8% in order to meet the benchmark IRR without CDM revenues is not realistic.

Generation: Based on the estimated annual energy generation hydrological data 1990-2004 and as stated in updated PDD, the average figure of 515 GWh would have to increase to above 799 GWh in order to meet the benchmark IRR of 9.4%. Validation team based on EPC agreement/P14/ and WCD Compliance report /P20/ found that increase in generation by 55.1% is very unrealistic.

O&M Costs: The validation team is in agreement with the reasoning given by the PP and hence concludes that such a reduction in O&M cost by 131.6% is very unrealistic.

Electricity Tariff Rate: The Electricity tariff rate of INR 2.35 remains unchanged as PPA between DHPC and TPTCL has already been signed on dated 25/06/2008. Hence, any variation in electricity tariff rate is not envisaged.

Having regard to the assessment of conformity of additionality demonstration and benchmark selection, plausibility and appropriateness of parameters used and correctness of financial calculations, the validation team concludes that the project scenario is not economically feasible without benefits from CER.

4.4.3 Impact of changes on Scale of project activity

- This is a large scale project activity and due to the aforementioned change in project design no impact has been observed on the scale of the project activity.

4.4.4 Impact of changes on Applicability and application of baseline methodology

- Due to the aforementioned change in project design no impact has been observed on the applicability and application of baseline methodology of the project activity.

4.4.5 Impact of changes on compliance of monitoring plan with applied monitoring methodology

- Due to the aforementioned change in project design no impact has been observed on the monitoring plan of the project activity.

4.5 Findings of Validation and/or Previous Verification Reports

Discussion:

There are no pending issues from validation of the project activity. Same has been checked from validation report of the project activity.

5. References

Reference	Document	Date of Document (DD/MM/YYYY) in case irrelevant put "--"
/P01/	Revised PDD version 7.3	22/02/2010
/P02/	Revised PDD [final version], version 9.2	26/08/2013
/P03/	Emission Reduction Calculation Excel Sheet corresponding to /P01/	25/10/2012
/P04/	Emission Reduction Calculation Excel Sheet corresponding to /P02/	16/01/2013
/P05/	Grid Emission Factor Calculation Excel Sheet corresponding to/P01/ (=/P03/)	25/10/2012
/P06/	Grid Emission Factor Calculation Excel Sheet corresponding to/P02/ (=/P04/)	16/01/2013
/P07/	Project IRR calculation Excel Sheet corresponding to/P01/	25/10/2012
/P08/	Project IRR calculation Excel Sheet corresponding to/P02/	12/03/2013
/P09/	Latest Annual Power Data Book for Bhutan(Year 2011)	--
/P10/	Feasibility Study Final Report - July 2006	--
/P11/	ADB Due Diligence Study Report –February 2009	--
/P12/	Proof of implementation plan of the proposed project activity (Gantt Chart)	23/05/2012
/P13/	Environmental Impact assessment / aspect analysis report-July 2006	--
/P14/	Signed E&M contract (with the technical specifications) which includes a technical option to increase the installed capacity from 114 MW to 126 MW due to design optimization.	27/07/2009
/P15/	Hydrology Study report conducted by independent consultant(Part of Final Feasibility Study =/P10/) - July 2006	--
/P16/	Extract of DHPC 10th and 11th Board meetings report as mentioned under Table 2 of the Section B.5. of /P01/	29/06/2010 23/11/2010
/P17/	Power Purchase Agreement signed between DHPC, Bhutan and TPTCL	25/06/2008
/P18/	Single Line Diagram of Project Activity	22/02/2011
/P19/	Internal Report of DHPC on Delay in Commissioning of Project	05/12/2011

/P20/	WCD Compliance Assessment Report issued by DNV	07/12/2011
/P21/	Minutes of the 1st Extra Ordinary General Meeting (DHPC Board)	08/09/2012
/P22/	Annual Audited Financial Statements of DHPC from 2007-2012	--
/P23/	Final Budget Estimation Spreadsheet	07/08/2012
/P24/	Bhutan Sustainable Hydropower Development Policy 2008	26/06/2008
/P25/	Expected Month Wise Electricity Generation for one year issued by DHPC	26/08/2013

Background investigation and other referred documents/websites:

Reference	Document
/B01/	Approved CDM consolidated baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 07).
/B02/	Kyoto Protocol (1997).
/B03/	Decision 3/CMP.1, Decision 4/CMP.1 and Decision 1/CMP.2, § 28.
/B04/	Registered Project Design Document for CDM project: "Dagachhu Hydropower Project, Bhutan" registered on 26/02/2010, UNFCCC project reference no 2746 (Version 7.3)
/B05/	Validation report for CDM project: " Dagachhu Hydropower Project, Bhutan" UNFCCC project reference no 2746.
/B06/	UNFCCC CDM Validation and Verification Standard (Version: 03.0), CDM Project Standard (Version: 02.1), CDM Project Cycle Procedure (Version: 03.1)
/B07/	UNFCCC project page of project reference number (2746): https://cdm.unfccc.int/Projects/DB/DNV-CUK1247228633.76/view
/B08/	Websites referred: a. http://cdm.unfccc.int/index.html b. http://www.itouchmap.com/latlong.html

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Annex 1: Validation Protocol

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.1. General Requirements				
A.1.1. Is KBS accredited in the validation function for the sectoral scope applicable to the project activity?	VVS para 247	DR	KBS is accredited in validation function for sectoral scope 01.	OK
A.1.2. Is the change identified prior to commencement or during verification of the activity?	VVS para 250	DR	Yes, the change is identified prior to commencement of verification and proposed by PP. Prior approval from CDM EB will be requested.	OK
A.1.3. Is there an indication of a revision number and the date of the revision in revised PDD?	Revised PDD	DR	Yes, final revised PDD is submitted as version 09.	OK
A.2. Corrections				
A.2.1 Are the corrections made in project information or parameters fixed at validation in registered PDD?	VVS para 257, PS para 212	DR	No changes envisaged in the project information or parameter fixed ex ante.	OK
A.2.2 Do the identified changes in project design require prior approval by the board?	VVS para 248, 249 PS para 206	DR	Yes, prior approval of CDM EB is required as changes are requested before commencement of verification.	OK
A.2.3 Is the corrected information is an accurate reflection of actual project information?	VVS para 258a	DR/I	Assessment team can confirm that the revised PDD presents an accurate reflection of actual project information.	OK
A.2.4 Are all corrected parameters comply with applied methodology and/or selected monitoring plan?	VVS para 258b	DR/I	The corrected parameters comply with applied methodology.	OK
A.3. Changes to the start date of the crediting period				

*MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.3.1 Is the start date of crediting period prior to date of registration?	PS para 214	DR	No. Start date of crediting period is after the date of registration of the project activity.	OK
A.3.2 Is the change to the start date of crediting period requested for more than years 2 years or for more than 4 years for projects in LDCs?	PS para 215	DR	No. The change in the start date of crediting period requested is 2 years and 3 months ahead of the existing crediting period start date. Since the project is in LDC country (Bhutan), this is within the 4 years period.	OK
A.3.3 Is prior approval of CDM board required for the change in start date of crediting period?	PS para 216, 217	DR	Required. Please refer CAR#01 below	~~CAR#01~~ OK
A.3.4 In case proposed change of the start date of the crediting period of registered project constitutes a difference of more than one year but less than 2 years and more than 2 years and less than 4 for project activity in LDCs, has the PP demonstrated that no changed have occurred to the project activity that would result in a less conservative baseline?	PS para 217a	DR/I	Since, the proposed change of the start date of the crediting period of registered project constitutes a difference of more than 2 years 3 months, the PP has demonstrated that no changed have occurred to the project activity that would result in a less conservative baseline. The change in the start date was envisaged mainly due to delay in completion of the Civil Works for the project activity. CAR 01 has been raised.	~~CAR 01~~ OK
A.3.5 If above point is applicable, has the PP demonstrated that substantive progress has been made to start the project?	PS para 217a	DR/I	Assessment team has verified through Onsite visit and Document review that PP is continuously working towards early completion of the project activity implementation.	OK
A.3.6 Is the assessment resulting in less conservative baseline?	VVS para 260	DR/I	Not applicable as the baseline determined in the registered PDD has selected ex-post option for the calculation of emission factor.	OK
A.4 Permanent changes from the registered monitoring plan or monitoring methodology				

*MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.4.1 Are permanent changes in monitoring plan proposed prior to the commencement of verification or the proposed change in monitoring plan is a result of CDM EB decision and/or FAR raised in verification report of previous monitoring period?	PS para 219	DR	No changes proposed in Registered Monitoring plan and monitoring methodology.	OK
A.4.2 Do the proposed changes require prior approval of CDM EB?	VVS para 265	DR	No changes proposed in Registered Monitoring plan and monitoring methodology.	OK
A.4.3 Is the revised monitoring plan complete and does the revised monitoring plan follow the registered PDD template?	Registered PDD	DR	No changes proposed in Registered Monitoring plan and monitoring methodology.	OK
A.4.4 Has the revised PDD including monitoring plan submitted in track change mode for each of the revision point (issue)?	Revised PDD	DR	No changes proposed in Registered Monitoring plan and monitoring methodology.	OK
A.4.5 Is there an objective evidence for each of the proposed revision point (issue)?		DR	No changes proposed in Registered Monitoring plan and monitoring methodology.	OK
A.4.6 Does the revised monitoring plan lead/associate to any kind of change in the project registered design?	Registered PDD &VVS para 269	DR	No changes proposed in Registered Monitoring plan and monitoring methodology.	OK
Data and Parameters Monitored				

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.4.7 Does the revised monitoring plan in the PDD comply with the applied approved methodology?	VVS para 263	DR/I	No changes proposed in data and parameters monitored.	OK
A.4.8 Are the changes in the monitoring plan inline to the applied methodological tools?	Methodology	DR	No changes proposed in data and parameters monitored.	OK
A.4.9 If a later version of approved methodology and/or tool is applied, are the proposed changes in monitoring plan resulting in conservative estimation of emission reductions including monitoring and verification process?	VVS para 264	DR	No changes proposed in data and parameters monitored.	OK
A.4.10 Is the revised monitoring plan resulting in improved level of accuracy of the monitoring compare to registered monitoring plan?	VVS para 263	DR	No changes proposed in data and parameters monitored.	OK
A.4.11 Is there any change proposed in the specifications, location calibration frequency or accuracy of the monitoring equipment?	Appendix I PS	DR	No changes proposed in data and parameters monitored.	OK
A.4.12 Are the changes affecting the ER calculation (directly/indirectly)?	Revised MP	DR	No changes proposed in data and parameters monitored.	OK
A.4.13 If the permanent changes are likely to lead to a reduction in the accuracy of the calculation of emission reductions, has the PP applied conservative assumptions or discount factors to ensure that emission reductions are not over-estimated as a result of permanent change?	VVS para 266	DR	No changes proposed in data and parameters monitored.	OK
A.4.14 Are all formulae used to determine emission reductions clearly indicated and in compliance with the monitoring methodology.	Revised PDD	DR	No changes proposed in data and parameters monitored.	OK
Quality Control (QC) and Quality Assurance (QA) Procedures				

*MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.4.15 Is the selection of data undergoing quality control and quality assurance procedures complete?	VVS Para. 131	DR	No change is proposed related to quality control and quality assurance procedures	OK
A.4.16 Are quality control procedures and quality assurance procedures sufficiently described to ensure the delivery of high quality data to ensure that emission reductions resulting from the proposed project can be report ex-post and verified accurately?	VVS Para 131, 132	DR	No change is proposed related to quality control and quality assurance procedures	OK
Operational and Management Structure				
A.4.17 Is the authority and responsibility of project management clearly described?	Revised PDD	DR	Not applicable.	OK
A.4.18 Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	Revised PDD	DR &I	The role of Department of Energy, Bhutan in the monitoring of the project activity is now taken care by DHPC. As Department of Energy, Bhutan has officially withdrawn his participation from the project activity. CL-02 has been raised	~~CL-02~~ OK
Monitoring Plan (Annex 4)				

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.4.19 Is the information on monitoring in Annex 4 consistent with previous chapters of PDD?	Revised PDD	DR	The role of Department of Energy, Bhutan in the monitoring of the project activity is now taken care by DHPC. As Department of Energy, Bhutan has officially withdrawn his participation from the project activity. CL-02 has been raised.	~~CL-02~~ OK
A.4.20 Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	Revised PDD	DR	No changes are proposed in Annex 4 of PDD	OK
A.4.21 Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	Revised PDD	DR	No changes are proposed in Annex 4 of PDD	OK
A.5. Changes to the project design of a registered project activity				

*MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.5.1 Are permanent changes in project design proposed prior to the commencement of verification or the proposed change in monitoring plan is a result of CDM EB decision and/or FAR raised in verification report of previous monitoring period?	Revised PDD	DR	Proposed changes occurred due to generation capacity increase. The changes proposed are not due to CDM EB Decision and/or FAR.	OK
A.5.2 Is the project design change 'proposed' or 'actual'?	VVS para 269	DR	The Project Design change is "Proposed"	OK
A.5.3 Is the nature of change identified?	PS para 218	DR	Yes. The nature of change is increase in the installed capacity of the project activity from 114 MW (as per registered PDD) to 126 MW (as per signed contract with E&M Supplier).	OK
A.5.4 Do the identified changes in project design require prior approval by the board?	VVS para 270	DR	Yes, prior approval of CDM EB is required as verification of the project has not been commenced.	OK
A.5.5 In case of actual changes in project design, has validation the team conducted the site visit?	VVS para 271	DR	Site visit was conducted on 23-25/11/2012 by the assessment team.	OK
A.5.6 Does the revised PDD contain a clear description of the changes in project design? Does the project description in revised PDD accurately reflects the implementation, operation and monitoring of the modified project activity	VVS para 271	DR/I	Assessment team confirms that the revised PDD contains the correct description of the changes in project design. Also, the revised PDD correctly reflects the implementation, operation and monitoring of the modified project activity	OK
A.5.7 Assess the following: • when the change has occurred; • reasons for these changes taking place; • whether the changes would have known prior to registration of the project activity;	VVS para 279 (b)	DR/I	The proposed design change was known to PP from 27/07/2009 (date of signing contract with equipment provider), which is prior to date of registration of the project activity. Assessment team has checked from Project registration page on UN Website that RFR for the project was submitted on 20/07/2009 to UNFCCC. The date of RFR is before the date of contract signing with electro-mechanical equipment supplier. The change in project design was suggested by the E&M Supplier at the time of the final offer for equipment supply. The PP has discussed the change in the offered installed capacity with the equipment	~~CL-01~~ OK

*MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
			supplier over a period of time. Based on the confirmation letter on the increased capacity received from the supplier, DHPC Board in its 11th Board meeting held on 23/11/2010 approved the increase in the installed capacity of the project activity. CL-01 has been raised and closed successfully.	
A.5.8 How the changes would impact the overall operation/ability of the project activity to deliver emission reductions as stated in the PDD?	VVS para 279 (b)	DR/I	The changes would result in increase in emission reductions compared to the stated in registered PDD. This is due to the fact that project installed capacity has been increased and corresponding net electricity generation figure also increased by 3%. CL-03 has been raised.	~~CL-03~~ OK
Additionality of the project activity				

<table>
<tr><th>Checklist Question</th><th>Reference</th><th>MoV*</th><th>Comments</th><th>Conclusion/ CARs/CLs</th></tr>
<tr><td>A.5.9 In case the actual/proposed change in project design affecting investment analysis has the PP modified the affected key parameters in original spreadsheet?</td><td>VVS para 274a, Registered ODD</td><td>DR</td><td>In the registered PDD the information given as follows:

<table><tr><td>Parameter</td><td>Registered PDD</td><td>Revised PDD</td></tr><tr><td>Capacity</td><td>114</td><td>126</td></tr><tr><td>PLF</td><td>52%</td><td>52%</td></tr><tr><td>Generation</td><td>500GWh</td><td>515GWh</td></tr></table>Moreover, in Validation report and ADB due diligence report PLF indicated is 50%.

Therefore, PP is requested to substantiate the basis of PLF value along with proper documentary evidences.</td><td>~~CAR-02~~
OK</td></tr>
<tr><td>A.5.10 In case of barrier analysis, has it been assessed that identified barriers in registered PDD are valid under new circumstances?</td><td>VVS para 274b, Registered PDD</td><td>DR</td><td>Not applicable</td><td>OK</td></tr>
<tr><td>A.5.11 Is the actual/proposed change in project design Adversely Affecting investment analysis/barrier analysis in the registered PDD?</td><td>VVS para 273</td><td>DR</td><td>Validation team conformed that the changes made in the project design is not adversely affecting the conclusions of the validation report of the registered PDD.</td><td>OK</td></tr>
<tr><td>Scale of the project activity</td><td></td><td></td><td></td><td></td></tr>
</table>

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.5.12 Is the proposed/actual change in project design affecting the scale of project activity?	VVS para 273b	DR	Not Applicable, since project is a Large scale CDM project.	OK
A.5.13 In case the project activity has crossed the small scale limit, has the PP updated PDD in accordance with modalities and procedures for large scale CDM projects?		DR	Not Applicable	OK
Applicability and application of approved baseline methodology under which the project activity has been registered				
A.5.14 Is the proposed/actual change affecting the applicability of methodology to the project activity?	VVS para 273, 275	DR	Not applicable	OK
A.5.15 Is the applied methodology in registered PDD applicable to the project under new circumstances? If NO, has the PP applied a later version of methodology or a new methodology?	VVS para 275	DR	Not applicable	OK
A.5.16 Has it been confirmed that later version of methodology/new methodology including applicable tools are complied fully by the project activity under new circumstances?	VVS para 275, 276	DR	Not applicable	OK
A.5.17 Does the proposed/actual change affect project boundary and emission reduction calculation? Has the relevant section of the PDD updated by PP?	Revised PDD	DR	Not applicable	OK
A.5.18 Does the applied methodology and tools impact the conservativeness of monitoring and verification process and the related emission reduction calculations?	VVS para 276	DR	Not applicable	OK
A.5.19 Compliance of monitoring plan with applied methodology and level of accuracy of the monitoring compared with the requirements contained in registered monitoring plan	VVS para 279, 280	DR	Not applicable	OK

*MoV = Means of Verification, DR= Document Review, I= Interview

Annex 2: Findings

Table 1: Resolution of Corrective Action and Clarification Requests

CL/CAR No	Summary of findings	Reference	Summary of project owner response	Revised section(s)/ Annexe(s) of the PDD	Validation team conclusion
CL-01	The project activity got registered on 26/02/2010. The proposed design change was known to PP from 27/07/2009 (date of signing contract with equipment provider), which is prior to date of registration of the project activity. PP to clarify, why it has not considered the proposed changes at the time of validation of the project activity.	Section A.5.7 of protocol	The final request for the registration was send to UNFCCC on 20/07/2009 (RFR to UNFCCC enclosed) almost a week before signing the contract agreement. The PP has discussed the change in the offered installed capacity with the equipment supplier over a period of time. Based on the confirmation letter on the increased capacity received from the supplier, DHPC Board in its 11th Board meeting held on 23/11/2010 approved the increase in the installed capacity of the project activity.	RFR to UNFCCC, 11th Board Meeting Report	Assessment team has checked from Project registration page on UN Website that RFR for the project was submitted on 20/07/2009 to UNFCCC. The date of RFR is before the date of contract signing with electro-mechanical equipment supplier. The clarification provided by the PP is accepted and hence, this CL is closed.
CL-02	PP to clarify the role of DHPC in Monitoring of Project activity.	Section A.4.18 of Protocol	The role of Department of Energy, Bhutan in the monitoring of the project activity is now taken care by DHPC.	Revised PDD	Assessment team can confirm through review of revised MoC and Site visit that Department of Energy, Bhutan has officialy withdrawn its participation from the project activity and now DHPC has taken over the role of Department of Energy, Bhutan related to monitoring of the project activity. Hence, this CL is closed.

Table 1: Resolution of Corrective Action and Clarification Requests					
CL/CAR No	**Summary of findings**	**Reference**	**Summary of project owner response**	**Revised section(s)/ Annexe(s) of the PDD**	**Validation team conclusion**
CL-03	Emission reduction excel sheet considered the net electricity generated for the purpose of CER estimation. While PPA signed with Tata power indicates that DHPC has to supply 12% of the net electricity generated to Royal Government of Bhutan free of cost for the first 12 years from the commercial operation date of the project activity. PP has not deducted the royalty power from the net electricity generated during the CER estimation calculation.	Section A.5.8 of Protocol	The relevant power grid consists of Bhutan and the Eastern grid of India and we have calculated the grid emission factor using both Bhutanese and Eastern Indian generation data. All generated electricity will be consumed within this transnational power grid. It does not matter if it is consumed already in Bhutan or in Eastern India; the grid emission factor is representative for both.	Revised CER Calculation Spreadsheet	Assessment team has checked the Emission factor calculation and confirms that PP has included all the power plants within Bhutan National grid and the Eastern grid of India for grid emission factor calculation. Since, the project activity will replace electricity generated by local as well as Indian regional grid connected fossil fuel based power plants; there is no need to deduct the royalty power provided to the Bhutanese Government. Hence, this CL is closed.
CAR -01	As per registered PDD the crediting period start date was mentioned as 01/01/2012. PP has to substantiate the reason for extending the crediting period start date according to the Para 214 (a) of CDM Project standard Version 01.0. PP to demonstrate that no changes have occurred to the project activity that would result in a less conservative baseline and that substantive progress has been made by the project participants to start the	Section A.3.4. of protocol	The changes in the crediting period are mainly due to delay in the civil works. The construction works which mostly are underground works are hampered by poorer geology than what has been anticipated during the feasibility study. Some of the major challenges face by the Project developer are as follows: ➢ Complete washout of the coffer dam due to flash flood ➢ Problem faced during the construction	Internal Report of DHPC on Delay in Commissioning of Project	Assessment team has checked the revised project implementation schedule and actual project status during on site visit. The extension of crediting period start date is mainly because of the delay of more than 2 year in civil work completion. PP has explained the same through Internal

Table 1: Resolution of Corrective Action and Clarification Requests

CL/CAR No	Summary of findings	Reference	Summary of project owner response	Revised section(s)/ Annexe(s) of the PDD	Validation team conclusion
	project activity.		of underground tunnels due to poor rock class ➢ Formation of large cavity during excavation of the vertical Pressure Shaft with Raise Boring Machine ➢ Longer time taken in the excavation of the Power House and Transformer cavern due to encountering of poor geology		Report of DHPC on Delay in Commissioning of Project/P19/. Hence this CAR is closed.
CAR-02	The following information obtained from registered PDD and revised PDD: Parameter / Registered PDD / Revised PDD Capacity / 114 MW / 126 MW PLF / 52% / 52% Generation / 500GWh / 515GWh Moreover, in Validation report and ADB due diligence report PLF indicated is 50%. Therefore, PP is requested to substantiate the basis of PLF value along with proper documentary evidences in accordance with VVS para 274a.	Section A.5.9 of Protocol	E&M Supplier have offered the machines capable of handling 50m3/s instead of 45m3/s as mentioned in the bidding document. Subsequently based on the increased in discharge from 45 to 50m3/s, Bernard Engineers has confirmed us with a calculation showing the generation taking into consideration the increase in the discharge. The calculation is attached for your review.	B.5	The revised PDD has changed the PLF value from 52% to 46.66% considering the generation figure of 515 GWh and installed capacity of 126 MW. The calculation provided by the PP shows the discharge of 50m^3/s in the peak rainy season i.e. August and September. From the calculation it is evident that PLF varies from 15.31% to 100.09%. Thus, Annual Average PLF stands to be 46.66% which is below the PLF mentioned in the Registered PDD (Pg no. 27) and Validation Report (Pg no.9).

Table 1: Resolution of Corrective Action and Clarification Requests					
CL/CAR No	**Summary of findings**	**Reference**	**Summary of project owner response**	**Revised section(s)/ Annexe(s) of the PDD**	**Validation team conclusion**
					Based on the above assessment the validation team conforms that with PLF of 46.66% (which in turn refers the Generation of 515 GWh) there is no impact on Additionality. Hence, CAR is closed.

Annex 3: Certificate of Competence

Personnel Name:		**Kaushik Pal**	
Qualified to work as:			
Team Leader	☒	Technical Expert	☒
Validator/Verifier	☒	Financial Expert	☐
Technical Reviewer	☒	Local Expert (India)	☒
Area(s) of Technical Expertise			
Sectoral Scope		**Technical Area**	
Energy Industries (renewable/non-renewable)		TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar	
Approved by (Manager C & T)		Mayank Kumar Jain	
Approval date:		25/06/2012	

Personnel Name:		**Akhilesh Joshi**	
Qualified to work as:			
Team Leader	☐	Technical Expert	☒
Validator/Verifier	☒	Financial Expert	☐
Technical Reviewer	☐	Local Expert (India)	☒
Area(s) of Technical Expertise			
Sectoral Scope		**Technical Area**	
Energy industries (renewable/non-renewable sources)		TA 1.2: Energy generation from renewable energy sources	
Approved by (Manager C & T)		Mayank Kumar Jain	
Approval date:		09/08/2012	

Personnel Name:		**Megha Lotankar**	
Qualified to work as:			
Team Leader	☐	Technical Expert	☐
Validator/Verifier (Trainee)	☒	Financial Expert	☒
Technical Reviewer	☐	Local Expert (India)	☒
Area(s) of Technical Expertise			
Sectoral Scope		**Technical Area**	
Not applicable		Not applicable	
Approved by (Manager C & T)		Mayank Kumar Jain	
Approval date:		25/06/2012	

Personnel Name:		B. Rampradap	
Qualified to work as:			
Team Leader	☒	Technical Expert	☒
Validator/Verifier	☒	Financial Expert	☐
Technical Reviewer	☒	Local Expert (India)	☒
Area(s) of Technical Expertise			
Sectoral Scope		**Technical Area**	
Energy industries (renewable/non-renewable sources) Waste handling and disposal		TA 1.2: Energy generation from renewable energy sources TA 13.1: Waste handling and disposal	
Approved by (Manager C & T)		Mayank Jain	
Approval date:		23/07/2012	

Personnel Name:		Ashok Kumar Gautam	
Qualified to work as:			
Team Leader	☒	Technical Expert	☒
Validator/Verifier	☒	Financial Expert	☐
Technical Reviewer	☒	Local Expert (India)	☒
Area(s) of Technical Expertise			
Sectoral Scope		**Technical Area**	
Energy industries (renewable/non-renewable sources)		TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar	
Waste handling and disposal		TA 13.1: Waste handling and disposal	
Approved by (Manager C & T)		Mayank Kumar Jain	
Approval date:		12/12/2011	

History of the document

Version	Date	Nature of revision	Reviewed by (Date)	Approved by (Date)
1.0	20/06/2012	Initial adoption	Manager CDM Quality, 20/06/2012	MD, 20/06/2012