



VALIDATION REPORT

Community-Based Renewable Energy Development in the Northern Areas and Chitral (NAC), Pakistan in Pakistan

REPORT NO. 2007-2069

REVISION NO. 03



VALIDATION REPORT

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CERTIFICATION AS

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Project Name: Community-Based Renewable Energy Development in the Northern Areas and Chitral (NAC), Pakistan

Country: Pakistan

Methodology: AMS-I.A

Version: 12

GHG reducing Measure/Technology: Electricity Generation by the User.

ER estimate: 87 477 tCO₂e/year

Size

☐ Large Scale

☒ Small Scale

Validation Phases:

☒ Desk Review

☒ Follow up interviews

☒ Resolution of outstanding issues

Validation Status

☒ Corrective Actions Requested

☒ Clarifications Requested

☒ Full Approval and submission for registration

☐ Rejected

In summary, it is DNV's opinion that the Community-Based Renewable Energy Development in the Northern Areas and Chitral (NAC), Pakistan as described in the PDD, version 6 of 16 October 2009, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology AMS-I.A version 12. DNV thus requests the registration of the project as a CDM project.

Report No.: 2007-2069	Date of this revision: 20 October 2009	Rev. No. 03
Report title: Community-Based Renewable Energy Development in the Northern Areas and Chitral (NAC), Pakistan		
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Key words:

Climate Change Kyoto Protocol
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Mechanism

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Abbreviations

AKRSP	Aga Khan Rural Support Programme
BM	Build Margin
CAR	corrective action request
CDCF	Community Development Carbon Fund
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CWD	Chitral Works Department
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CPI	Community Physical Infrastructure
DNV	Det Norske Veritas
DNA	Designated National Authority
ED	Economic Development
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IBRD	International Bank for Reconstruction and Development
IEE	Initial Environmental Examination
IPCC	Intergovernmental Panel on Climate Change
KIBOR	Karachi Interbank Offer Rate
LIBOR	London Interbank Offer Rate
LoA	Letter of Approval
MHPs	Micro and mini-hydropower projects
MIES	Mountain Infrastructure and Engineering Services
MP	Monitoring Plan
NAC	Northern Areas and Chitral
NAPWD	Northern Areas Public Works Department
NEPRA	National Electric Power Regulatory Authority of Pakistan
NWFP	North Western Frontier Province of Pakistan
ODA	Official Development Assistance
OM	Operating Margin
PCRET	Pakistan Council of Renewable Energy Technologies
PDD	Project Design Document
PPAF	Pakistan Poverty Alleviation Fund
RD	Resource Development
Rs	Pakistani rupee
SHYDO	Sarhad Hydel Development Organization
ToP	Terms of Partnership
UNFCCC	United Nations Framework Convention on Climate Change
WAPDA	Water and Power Development Authority of Pakistan



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1 EXECUTIVE SUMMARY – VALIDATION OPINION

“DNV Certification AS (DNV) has performed a validation of the Community-Based Renewable Energy Development in the Northern Areas and Chitral (NAC), Pakistan project. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

The host Party is Pakistan and the Annex I Party is the Netherlands. Both parties fulfil the participation criteria and have approved the project and authorized the project participants. The DNA from Pakistan has confirmed that the project assists in achieving sustainable development.

The project applies AMS-I.A Electricity generation by the user, version 12.

The proposed project activity will lead to the development of 103 mini and micro hydropower projects (MHP) supplying electricity to isolated mini-grid distribution systems. By producing electricity locally and not utilizing power generated by the internal combustion engines that are currently being used or would be infiltrated in the future, the project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be on the average 87 477 tCO₂e per year over the selected 7 year crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

Adequate training and monitoring procedures have been implemented.

In summary, it is DNV's opinion that the Community-Based Renewable Energy Development in the Northern Areas and Chitral (NAC), Pakistan in Pakistan, as described in the PDD version 6 of 16 October 2009, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly apply the baseline and monitoring methodology AMS-I.A, DNV to request for registration of the project as a CDM project activity.”



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2 INTRODUCTION

The World Bank, Carbon Finance Unit has commissioned DNV to perform a validation of the Community-Based Renewable Energy Development in the Northern Areas and Chitral (NAC), Pakistan project (hereafter called “the project”). This Final validation report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

2.1 Objective

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

2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AMS-I.A version 12, dated 10 August 2007. The validation team has based the validation on the recommendations in the Validation and Verification Manual /4/

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



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3 METHODOLOGY

The validation consisted of the following three phases:

- I a desk review of the project design documents
- II follow-up interviews with project stakeholders
- III the resolution of outstanding issues and the issuance of the final validation report and opinion

The following sections outline each step in more detail.

3.1 Desk Review of the Project Design Documentation

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

- /1/ Project Design Document for Community-Based Renewable Energy Development in the Northern Areas and Chitral (NAC), Pakistan Published for public comments on 27 October 2007, version 2 of 3 July 2008, PDD version 4 of 31 March 2009, and version 6 of 16 October 2009.
- /2/ CDM Executive Board, Simplified baseline and monitoring methodology AMS-I.A, Electricity generation by the user, version 12, valid from 10 August 2007.
- /3/ CDM Executive Board, Simplified baseline and monitoring methodology AMS-I.D, Grid connected renewable electricity generation, version 13, valid from 14 December 2007.
- /4/ CDM Executive Board, Validation and Verification Manual. Version 01 adopted at EB44.
- /5/ Host Party approval letter by DNA of Pakistan dated 30 July 2008.
- /6/ Annex I Party approval letter by DNA of the Netherlands dated 21 July 2008.
- /7/ A letter dated 12 August 2005 from the State of the Netherlands, acting through the Ministry of Housing, Spatial Planning and the Environment (VROM), confirming non deviation of ODA.
- /8/ A list of proposed 103 MHPs containing location of each of the project site, its estimated capacity, and an approximate project cost.
- /9/ <http://www.nepra.org.pk/petitions.htm> - National Electric Power Regulatory Authority of Pakistan.
- /10/ A letter by Chief Executive Officer, Acumen Fund Pakistan dated 3 November 2008.
- /11/ Email communication between management personal of the Acumen Fund and the AKRSP dated 24 August 2009
- /12/ <http://www.norad.no> – The Norwegian Agency for Development Corporation.
- /13/ Getting Finance in South East Asia 2009, Indicators and Analysis of the Commercial Banking Sector, report by the World Bank (ISBN-13: 978-0-8213-7571-6)
- /14/ A letter by the Senior Country Officer of the World Bank, dated 24 August 2009
- /15/ Feasibility Study Reports of MHPs in the NAC region by AKRSP from 2006 to 2009,
- /16/ “Analysis of Investment Cost per Range” by AKRSP, August 2009



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- /17/ Tariff Structure set by NAPWD, as of June 2009 by Northern Areas Public Works Department
- /18/ Tariff Structure set by SHYDO, as of June 2009 by Sarhad Hydel Development Organization
- /19/ Government of Pakistan and AEDB Report on Logical Framework Analysis Workshop on Feed-In Tariff and Simplified Licensing Procedures for Micro and Mini Hydropower Projects, Islamabad, December 18, 2007
- /20/ Analysis of the tariff in NAC region of Pakistan by AKRSP, August 2009
- /21/ <http://pakistanhydro.com/pdf/Final-Report-on-LFA-Feed-in-4-jan-2008.pdf>
- /22/ Analysis of the Load factor by AKRSP, August 2009
- /23/ State Bank of Pakistan
<http://www.sbp.org.pk/ecodata/kibor/2009/Aug/>
- /24/ <http://www.thecsem.org/content/basics-markowitz-portfolio-theory>
- /25/ Construction contract of 3 March 2006 between the community members of Brep hydropower project and the AKRSP.
- /26/ A letter by Site Engineer, AKRSP of 29 June 2006 confirming that the major purchase process for the Brep hydropower project was initiated in May 2006.
- /27/ Copies of Quotations, Invoices and Cheques for the purchase of electrical equipments and cables, pipes, and turbines of March 2006 to August 2006.
- /28/ Project Idea Note (PIN) of January 2006 submitted to the World Bank.
- /29/ Letter of Intent (LOI) of 31 May 2007 signed between the World Bank and the AKRSP.
- /30/ AKRSP board meeting minutes of 26 March 2005 and 18 June 2005.
- /31/ Methodology for Survey to Determine Emission Coefficient of Diesel Generators being used in the Baseline Scenario in Northern Areas and Chitral, by the project consultant of 12 March 2007
- /32/ Questioners distributed by AKRSP to choose diesel generators for emission factor testing of March 2007
- /33/ Diesel generators survey report for emission factor of August 2007: Generators_Survey_Summary.xls
- /34/ Policy for Development of Renewable Energy for Power Generation Employing Small Hydro, Wind, and Solar Technologies, Government of Pakistan, 2006, website link: <http://www.pakistan.gov.pk/ministries/water-power-ministry/media/PakistanREDevelopmentPolicy-Dec092006.pdf>
- /35/ Project Proposals/Initial Engineering Design Reports of the Brep, Onawich, and Mamushthang mini and micro hydropower projects that are part of the proposed CDM project activity developed by the Mountain Infrastructure & Engineering Services (MIES) and the Economic Development (ED) and the Resource Development (RD) sections of the Aga Khan Rural Support Programme (AKRSP) dated November 2005, August 2006, and September 2006 respectively.
- /36/ Initial Environmental Examination (IEE) report of the 48 mini and micro hydropower projects located in Chitral region that are part of the proposed CDM project activity developed by the Community Physical Infrastructure (CPI) section of the Aga Khan



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Rural Support Programme (AKRSP) dated November 2007.

- /37/ Copy of financial model (spreadsheet) CDCF for 103 projects prepared by AKRSP.
- /38/ Terms of Partnerships (ToP) between Brep community and Aga Khan Rural Support Programme (AKRSP) dated 20 May 2005.
- /39/ Terms of Partnerships (ToP) between Onawich community and Aga Khan Rural Support Programme (AKRSP) dated 5 May 2006.
- /40/ Ist dialogue report between Mamushthang community and Aga Khan Rural Support Programme (AKRSP) dated 21 July 2006.
- /41/ Terms of Partnerships (ToP) between Mamushthang community and Aga Khan Rural Support Programme (AKRSP) dated 18 November 2006.
- /42/ 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
- /43/ National Operational Strategy for Clean Development Mechanism by Ministry of Environment, Govt. of Pakistan, January 2006, website link:
http://cdmpakistan.gov.pk/ver1/cdm_doc/Pak%20CDM%20Strategy-%20Approved.pdf
- /44/ Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulations, 2000, Website link: <http://www.environment.gov.pk/act-rules/IEE-EIA-REG.pdf>
- /45/ Initial Environmental Examination (IEE) report of 48 mini and micro hydropower projects located in Chitral region of November 2007 by Community Physical Infrastructure (CPI) Section of Aga Khan Rural Support Programme.
- /46/ http://www.cdmpakistan.gov.pk/cdm_prjapproval10.html

The main changes between the version of the PDD published for the 30 days stakeholder commenting period and the final version submitted for registration are:

- Acumen Fund has been added as a perspective project investor in section A.3.
- Emission estimates have been changed since the emission factor used has been adjusted to more conservative value (as described in section 4.6 of this report) and the crediting period has been pushed further in the future.
- Emission factor derived in section B.4 of the PDD has been changed from 1.84 kgCO₂e/kWh to 1.24 kgCO₂e/kWh based on guidelines provided in methodology AMS-I.A version 12 and AMS-I.D version 13
- A graph showing number of hydropower projects initiated by AKRSP in each year from 1983 to 2005 has been added under “investment barrier” in section B.5 of the PDD. In addition, list of projects under the proposed project activity given in Table B 5.1 has been updated. Projects listed at numbers 4, 20, 21, 23, 24, 27, 28, 29, 32, 40, 41, 44, 45, 46, 47, 54, 55, 56, 57, 61, 65, 71, 73, 77, 79, 80, 81, 85, 89, 90, 99, 100, 101 and 102 were replaced with new projects which also resulted change in project capacities for each of the project replaced as compared to the ones previously listed. Projects listed at numbers 20, 22, 34, 47, 57, 60, 64, 68, 72, 75, 88, and 98 were replaced with new projects without change in project capacities as compared to the ones previously listed. Furthermore, project capacities have been changed for projects listed at numbers 1, 2, 3, 8, 10, 17, 19, 30, 31, 33, 35, 36, 49, 50, 51, 63, 69, 70, 74, 78, 82, 91, 97 and 103 that either reflects actual installed capacities for those already



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implemented or new planned installed capacities for those that will be implemented. Although this overall change results in change in proposed project size (MW) for those that were replaced with new projects or those whose capacities were updated, the overall project capacity for all 103 projects stays at its previous value of 15 MW.

- The IRR analysis spreadsheet has been updated and the equity IRR has been recalculated to 11.6%.
- Under section B.7.2, it has been stated now that the connections will be monitored of any of the micro hydropower projects, included under the CDM activity, to the grid. Any MHP that opts to connect to the national grid, which may be extended to the project area in the future, will be excluded from the project.
- Start date of the project activity in section C.1.1 has been changed from January 2008 to March 2006.
- Starting date of the crediting period has been changed from 1 January 2008 to 15 June 2009 or the date of registration of the proposed project activity.

The following updates were made to the PDD in response to request for corrections following request for review for minor issues on 14 August 2009 and 09 October 2009:

- Start date of the project activity in section C.1.1 has been specified as 3 March 2006.
- Discussions regarding Investment barrier and Technology barrier have been updated in section B.5 of the DD.
- Discussion on project emissions under emission reductions in section B.6 has been updated to include emissions from new diesel generators, being purchased in response to an increase in demand as and when applicable.
- A new parameter (i.e. “Energy production by new diesel gen set purchased in the project boundary”) has been included in the monitoring plan in section B.7.1 of the PDD. It has been stated that the emissions from these generators will be counted towards project emissions and how this parameter will be monitored and how the project emissions will be conservatively calculated. It has also been stated that the purchase of new diesel generators is highly unlikely and remote scenario. Further explanation has been added under “Any Comments” for the parameter on how likely it is that the new generators would be purchased in the area. In addition, it has been clarified that in case new generators are brought into the area their power output will not pass through the same meters that are installed to monitor electricity from the MHPs. The power out put of these diesel generators will independently be monitored and records will be maintained.
- It has been added in section B.7.2 of the updated PDD that diesel generators are not used to start-up the MHPs as the MHPs use small “self-exciting” alternators; thus, there is no leakage to be monitored from this source.

3.2 Follow-up Interviews with Project Stakeholders

For follow-up interviews with project stakeholders, please see Appendix C of this report for details.



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3.3 Resolution of Outstanding Issues

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project (see Table 2 of Appendix A). The protocol shows in a transparent manner the criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

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

The validation protocol consists of three tables. The different columns in these tables are described in the figure below. A completed validation protocol for the Community-Based Renewable Energy Development in the Northern Areas and Chitral (NAC), Pakistan is enclosed in Appendix A of this report.

Findings established during the validation can either be seen as a non-fulfilment of CDM criteria or where a risk to the fulfilment of project objectives is identified. Corrective action requests (CAR) are issued, where:

- i) mistakes have been made with a direct influence on project results;
- ii) CDM and/or methodology specific requirements have not been met; or
- iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

A request for clarification (CL) may be used where additional information is needed to fully clarify an issue.



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<i>Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities</i>				
<i>Requirement</i>	<i>Reference</i>	<i>Conclusion</i>		
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	This is either acceptable based on evidence provided (OK), a Corrective Action Request (CAR) due to risk or non-compliance with stated requirements, or a request for Clarification (CL) where further clarifications are needed.		

<i>Validation Protocol Table 2: Requirement checklist</i>				
<i>Checklist Question</i>	<i>Reference</i>	<i>Means of verification (MoV)</i>	<i>Comment</i>	<i>Draft and/or Final Conclusion</i>
<i>The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the large-scale PDD template, version 03 - in effect as of: 28 July 2006. Each section is then further sub-divided.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</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.</i>	<i>This is either acceptable based on evidence provided (OK), or a corrective action request (CAR) due to non-compliance with the checklist question (See below). A request for clarification (CL) is used when the validation team has identified a need for further clarification.</i>

<i>Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests</i>			
<i>Draft report clarifications and corrective action requests</i>	<i>Ref. to checklist question in table 2</i>	<i>Summary of project owner response</i>	<i>Validation conclusion</i>
<i>If the conclusions from the draft Validation are either a CAR or a CL, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 2 where the CAR or CL is explained.</i>	<i>The responses given by the project participants during the communications with the validation team should be summarised in this section.</i>	<i>This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".</i>

Figure 1: Validation protocol tables



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3.4 Internal Quality Control

The validation report underwent a technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation Team

The proposed project team constitutes the following personnel:

<i>Role/Qualification</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Type of involvement</i>					
				Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	Expert input
CDM validator / technical team leader	Khawaja	Rafi-ud-Din	Norway	×		×	×		
GHG auditor	Folkestad	Tonje	Norway			×			
GHG auditor (Trainee)	Imam	Mustafa	Pakistan		×				
GHG auditor (Trainee)	Srivastava	Gaurav	India	×			×		
Sector expert/ Methodology Expert	Lehmann	Michael	Norway						×
Technical Reviewer (applicant for Final)	Tang	Zhiang	China					×	
Technical Reviewer (Draft and Final)	Chaudhary	Anu	India				×	×	

It should be noted that due to DNV's travel restrictions to Pakistan, which only allows essential travel, Mr. Mustafa Imam was authorised to carry out the site visit interviews on behalf of DNV Climate Change Services. Mr. Imam is a qualified Lead Auditor in Management Systems at DNV- Karachi in Pakistan.

The qualification of each individual validation team member is detailed in Appendix B of this report.



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4 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation of 16 October 2009, version 6.

4.1 Participation Requirements

The project participants representing the host country is: Aga Khan Rural Support Programme (AKRSP) - a Pakistan-based Non-governmental organization representing the participating 103 communities and the International Bank for Reconstruction and Development (IBRD) as Trustee of the CDCF from the State of the Netherlands. The host Party Pakistan and the participating Annex I Party, the State of the Netherlands, both meet the requirements to participate in the CDM. The DNA of Pakistan has issued a Letter of Approval (LoA) /5/ on 30 July 2008, authorizing AKRSP as a project participant and confirming that the project assists in achieving sustainable development. The DNA of the State of the Netherlands has issued a LoA /6/ on 21 July 2008 authorizing IBRD as Trustee for the CDCF as a project participant. DNV received these LOAs from the project Participant. The LOA from the DNA of Pakistan is also listed on the Ministry of Environment, Pakistan website as approved /46/.

The project does not involve public funding, and the validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards Pakistan. The State of the Netherlands through a letter dated 12 August 2005 /7/, acting through the Ministry of Housing, Spatial Planning and the Environment (VROM), has confirmed that any public funding used to participate in the Community Development Carbon Fund does not result in a diversion of official development assistance and is separate from and not counted towards its financial obligations as a Party included in Annex I.

4.2 Project Design

The Community-based Renewable Energy Development in the Northern Areas and Chitral (NAC), Pakistan project proposes 103 mini and micro hydropower projects (MHP) with a total installed capacity of 15.00 MW that would be built at various locations at the federally administrated Northern areas (Baltistan and Gilgit Regions) and Chitral District of Pakistan. The power generation capacity of the proposed MHPs will range from 30 kW to 350 kW as per the PDD version 6 of 16 October 2009. DNV reviewed a complete list of the proposed 103 MHPs containing location of each of the project site, its estimated capacity, and an approximate project cost for each individual MHP /8/. The estimated project capacity and the project costs are based on the initial design reports for the projects that have been initiated and these have been reviewed by DNV. In addition, the project summary reports provided by project proponent show that the cumulative power output of 103 projects will not exceed the 15 MW threshold of the applicability criteria for the approved methodology, AMS-I.A.

DNV has reviewed a list containing geographic coordinates of each of the MHP. DNV also reviewed project proposals of three of the sites (Brep, Onawich, and Mamushthang) that commenced construction in year 2008 and are located within the project boundaries /35/. The



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project proponents have not registered any small scale CDM projects in the last 2 years and the project is not within 1 km radius of any other proposed large scale CDM project. This has also been confirmed from the Northern Areas Tourism, Environment, Sports, & Culture Directorate – Gilgit, NA-EPA of Pakistan during the site visit. Therefore, the project activity is not a debundled component of a larger project activity according to the rules for “determining the occurrence of debundling” as outlined in Appendix C of the Simplified Modalities and procedures for Small-Scale CDM activities.

The proposed technology for these MHPs will include locally manufactured and imported turbines. The imported technology will include manufacturers from China and Europe. The decision about the type of turbines and technology used would be made at the project implementation stage. However AKRSP has stated in the PDD version 6 of 16 October 2009 that it will guide the local communities in technology identification and procurement and will ensure that the quality of product is not compromised. In addition AKRSP would assist in design and construction supervision of the civil works that are associated with the construction of MHPs.

The start date of the project activity is 3 March 2006, which represents the start of physical construction of first mini hydropower project at Brep site. The operational lifetime of the MHPs has been stated to be 21 years which has been found reasonable by DNV.

The starting date of the crediting period has been stated as 15 June 2009 and it is further stated that each hydropower plant will start operating as soon as the installation is complete.

The project description is to the consideration of DNV complete and accurate.

4.3 Baseline Determination

The proposed project applies the simplified baseline methodology category AMS-I.A version 12, dated 10 August 2007 /2/. According to the methodology, “*This category comprises renewable energy generation units that supply individual households or users or groups of households or users with electricity.*” Its applicability has been considered justified based on the following assessment:

- (i) The households and users do not have a grid connection except when a group of households or users are supplied electricity through an isolated mini-grid. None of the 103 projects are currently designed to be connected to the national or regional power grids. Project proponent has stated that the connection of any of the MHP to the grid in future, should the grid be extended to these communities, will be monitored and reported to the DOE and that any sites which opt to connect to the grid will subsequently be excluded from the project.
- (ii) The renewable generating units are new and/or replace existing fossil fuel fired generation. It is assumed that the MHPs will substitute small diesel-based generators that are or would have been installed if the proposed project activity were not to be implemented. This has been confirmed from the project stakeholders during site visit.
- (iii) The total capacity of these renewable energy generators does not exceed 15 MW. DNV reviewed the project summary reports provided by project proponent that show that the cumulative power output of 103 projects is 15 MW.

The baseline scenario identified in the PDD is the fuel consumption by diesel generators already in use or that would have been installed in the absence of the project activity. No



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other alternative baseline scenario except for the project activity has been considered. The assessment of the project activity compared to this baseline scenario is described under additionality in Section 4.4. DNV concludes that, in the absence of grid-connected electricity, it is conservative to assume that in the absence of the proposed project activity, electricity would be generated using diesel fuel. There is no study documenting that the infiltration of diesel generators will take place in the absence of the proposed project activity. However, site visits by DNV representative followed by interviews with various community members located within the project boundary have confirmed that the infiltration of diesel generators will take place in the absence of the proposed project activity.

DNV confirms that the identified baseline has been determined in accordance with the approved baseline methodology AMS-I.A version 12.

The project boundary is clearly defined that includes 103 project sites across three regions in northern Pakistan: Gilgit region (including districts of Gilgit, Ghizer and Astore), Baltistan region (Ganche and Skardu districts), and Chitral district of North West Frontier Province. The project validation team reviewed the list of 103 mini and micro hydropower projects /8/ that would be constructed under the proposed CDM project activity and the selected sources and gases are justified for the project activity.

4.4 Additionality

The additionality of the project is demonstrated by applying a barrier analysis as per the Attachment A to the Appendix B of the Simplified Modalities and Procedures for Small-scale CDM Project Activities. The PDD addresses that the proposed project activity faces investment and technological barriers and will not occur without CDM revenues.

4.4.1 CDM consideration and continued action to secure CDM status

The starting date of the project activity is 3 March 2006, which represents start of construction of first mini hydropower project at Brep site. DNV reviewed a construction contract of 3 March 2006 between the community members of Brep hydropower project and AKRSP /25/ and confirms that the construction of the 200 kW power plant started on 3 March 2006 at the Brep site which was followed by the procurement of electrical equipments and turbines for the same site in May 2006 /26/. In addition, by reviewing copies of quotations, invoices, and cheques for the procurement of electrical equipments and cables, pipes, and turbines of March 2006 to August 2006 /27/ for the projects that started construction around the same time, DNV confirms that the Brep hydropower is the first project site where construction started earliest and all other projects under the proposed CDM activity were initiated afterwards. The same has been further confirmed during site visit by interviewing the project stakeholders.

DNV verified by reviewing the AKRSP board meeting minutes of 26 March 2005 and 18 June 2005 /30/ that the carbon financing was considered for clean energy resources proposal that formed the basis for the proposed project activity. Furthermore, during site visit and follow-up interviews it has been confirmed that the Project Implementation Note /28/ was approved in January 2006 taking CDM into account. Hence CDM was seriously considered prior to starting date of the project activity in compliance with EB41 annex 46.

After the starting date the following actions were done to secure CDM status in parallel with the physical implementation of the project and this was found satisfactory by DNV:



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- Letter of Intent (LOI) for potential purchase of emission reductions was signed in between the World Bank and AKRSP on 31 May 2007 /29/.
- Diesel generators survey for emission factor was conducted in August 2007 /33/.
- Validation started on 27 October 2007.

4.4.2 Investment barrier

The improvement in the project IRR to attractive levels considering CDM benefits is not the critical argument for additionality for this project. The major investment barrier is that there is a financing gap in the project which is being filled by private sector investment and a bank loan and the same has been confirmed by DNV as described below. DNV finds this to be in accordance with para 114(b) of the VVM /4/. In addition, the project proponent has provided the investment analysis to substantiate the investment barrier which has also been reviewed by DNV while concluding towards the investment barrier.

A graph of micro hydropower projects initiated by AKRSP each year was presented to DNV and also included in section B.5 of the PDD version 6 of 16 October 2009, which indicates that there was substantial international funding available for new projects from years 1993 to 2003. It has been demonstrated by the project proponent that currently there is no funding available from the international donors. In addition, it has been demonstrated that the repayment of the loan will be possible only with carbon credits even though the project has revenue generating component through the sales of electricity.

It must be noted again that improvement in the IRR to attractive levels is not the critical argument for additionality for this project. The major investment barrier is that there is a financing gap in the project which is being filled by private sector investment and a bank loan. These investors were attracted to the project because of the carbon revenue stream. DNV has reviewed a letter from Acumen Fund /10/ which states that commercial financing is only attracted to the project on account of carbon revenue. It is clearly mentioned in the letter that the inability of the project to generate carbon revenue may result in Acumen Fund not making an investment in the project. The recent shift in Acumen Fund's portfolio investment criteria for the region, resulting into increasing the financial gap for the proposed project, was further confirmed from an email communication between management personnel of the Acumen Fund and the AKRSP /11/ that was provided to DNV for review. This has been demonstrated that the revenue from electricity sales to rural communities alone is not sufficiently attractive for the investment and there is currently no funding available from the international donors. The unavailability of funding from the international donor was also supported by the Government of Norway's decision not to invest in the project. This was further confirmed from the NORAD website /12/, which has no record of Government of Norway funding towards these projects. In addition, the project proponent has stated that if the funding was available, it would have been used towards the project activity. Furthermore, the following evidences were provided to DNV and reviewed during validation to demonstrate that the project faces investment barrier:

- A report by the Word Bank /13/ was provided to DNV and reviewed in regards to the soundness and performance of the financial sector in the South Asian region, indicating lack of credit availability in Pakistan.
- This was further supported by a letter dated 24 August 2009 /14/ refereeing to the project activity signed by Senior Country Officer of the World Bank outlining lack



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of credit availability and country economic conditions. This letter outlined three sub-components of the financial barriers that include: a) country risks, b) lack of access to financing, and c) sub-national risks combined with barriers to micro-hydro in the Northern Areas and Chitral (NAC) region of Pakistan. It was confirmed in this letter that the lack of financing has been documented in several World Bank reports that include: “Doing Business 2009”, and “Pakistan Bringing Finance to the Poor”. These reports state that the “firms consistently rate access to credit as among the greatest barriers to their operation and growth” and “financial institution willingness to expand access in Pakistan has been stunted by slow technologic advances, weak legal foundations, and unsuitable financial processes and products”. It was further stated that the NAC region being a remote area in rugged Himalaya Mountains where economic efforts are severely hampered by its inaccessibility and extreme poverty. And due to this fact the NAC region faces additional financial barriers apart from the country-specific and sub-national barriers. It was also confirmed through this letter that project faces a financing gap of more than US\$5.7 million and is trying to attract financing by monetizing expected carbon revenues.

DNV considers it reasonable and concludes that the project faces investment barriers.

It should be noted that the project faces a financial barrier and discussion on IRR analysis is optional for the project since for small-scale project activities, investment analysis should be required if “a financially more viable alternative to the project activity would have led to higher emissions”, which is not the case in case of this project. However, the project proponent has provided DNV the investment analysis to substantiate the investment barrier as further discussed below:

The IRR without CERs has been calculated to be 11.6%. Project proponent has used a ten year bonds issued by Government or corporate entities yielding 10-12% annually as a comparison, but used 15% as a benchmark for private investments in the power sector. That is the benchmark generally adopted by the National Electric Power Regulatory Authority of Pakistan /9/.

The financial calculation is based on the internal rate of the return from the equity invested by communities and private investor. This equity constitutes 30% of the total investments. The remaining are grants from Pakistan Poverty Alleviation Fund, Public sources of funding (PCRET) as well as loan. It is deemed reasonable that the private investors and communities are the entities that depend on profit in order to invest in the project. The equity-IRR is calculated and compared to the benchmark of 15%.

The IRR calculations are carried out taking into account project expenses (5% operation and maintenance costs per initial investment cost which is reasonable for hydro project of this size) and loan repayment (with 5 years payback time and 13.7% interest rate) as well as income from electricity sales (50% load factor and tariff dependent on the users, assuming 5% annual escalation in the tariff). The following is discussion on suitability of input values in the IRR analysis including: the investment costs, the tariff, the load factor, and the benchmark.

The Investment Costs:

The investment costs are based on the feasibility study reports /15/ of the MHPs prepared by AKRSP that have already been initiated or completed and the “Analysis of Investment Cost



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per Range” /16/ also prepared by AKRSP based on values from these feasibility study reports. It should be noted that a formal feasibility study report is not required for a micro hydropower project in Pakistan that would provide electricity to a local-grid, which is isolated from any regional and national grids existing in the region. Therefore, the informal feasibility study reports of the MHPs by AKRSP, which has demonstrated sufficient experience by designing over 200 micro and mini hydropower projects in Pakistan, was considered sufficient by DNV. The “Analysis of Investment Cost per Range” document and the related feasibility study reports have been provided to DNV for review. DNV confirms that the cost of the projects planned to start construction in the future has been calculated in a conservative manner and the values have been correctly transferred to the IRR analysis spreadsheet. It should be noted that the actual costs are higher than the estimates since the Pakistani Rupee (Rs) has depreciated from Rs 60 to the current rate of Rs 82.50 per US\$.

The tariff:

The NAC comprises of Northern Areas of Pakistan and Chitral district, NWFP of Pakistan.

The Northern Areas of Pakistan are federally administered areas and National Electric Power Regulatory Authority of Pakistan (NEPRA) rules are not applied in this area. The local public sector department, Northern Areas Public Works Department (NAPWD) is responsible for supply of electricity and has set its own Tariff Structure. The following table lists the tariff structure of Northern Areas Public Works Department (NAPWD) /17/ which is based on the NEPRA tariff:

Table: (Tariff Structure set by NAPWD, as of June 2009)

Units Consumed (kWh)	1 to 50 Units	51 to 150 Units	151 to 300 Units	300 and above
A1: Domestic use	Rs 1.82/kWh	Rs 2.72/kWh	Rs 3.64/kWh	Rs 4.52/kWh
Units Consumed (kWh)	1 to 100 Units	100 and above	-	-
A2: Commercial Use	Rs 4.86/kWh	Rs 6.81/kWh	-	-
Units Consumes (kWh)	Average per Unit (kWh)	-	-	-
A3: Industrial	Rs 3.04/kWh	-	-	-

The situation in district Chitral, NWFP is relatively more severe in terms of supply of electricity by the public sector. This district is the largest in NWFP in terms of area. The district borders Afghanistan and the troubled regions on the border with Afghanistan, as a result of which access to this district, from the rest of the country, is restricted. More than 70% of the population in district Chitral does not have access to electricity provided by Sarhad Hydel Development Organization (SHYDO), which is the public sector organization responsible for supply of electricity. The following table lists the tariff structure of SHYDO /18/:



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Table: (Tariff Structure set by SHYDO, as of June 2009)

Units Consumed (kWh)	1 to 50 Units	51 to 100 Units	101 to 200 Units	201 and above
A1: Rates for Domestic use	Rs 1.77/kWh	Rs 2.47/kWh	Rs 3.37/kWh	Rs 5.66/kWh
Units Consumed (kWh)	-	1 to 100 Units	101 to 360 Units	-
A2: Rates for Commercial Use	-	Rs 7.58/kWh	Rs 7.61/kWh	-

It should be noted that the above tariffs apply to the consumer that are connected to the regional grid in the NAC region. Both the NEPRA (and thus NAPWD) and SHYDO tariffs have been shown to be too high in practice and people often do not pay /19/.

For the proposed project in the NAC region where electricity will be supplied to local-grids separate from the regional or national grid, the electricity tariff has been assumed by AKRSP. For the base year 2008, the tariff has been assumed to be Rs 1.25 (US cents 2.08), Rs 2.50 (4.17 cents) and Rs 4.00 (6.67 cents) per kWh for three proposed categories of consumers: that is lifeline domestic, higher consumption domestic, and commercial; respectively. An annual increase in tariff to commensurate with an expected inflation of 5% was also assumed and was considered reasonable by DNV. It is also assumed that 75% of the energy will initially be sold to customers at the lifeline consumption level, which was considered reasonable by DNV based on the project design.

The project proponent has provided DNV with an analysis of tariff /20/ on how AKRSP has reached to the above tariff. The analysis was based on tariff used by NEPRA and Northern Areas Public Works, and explains why AKRSP has reduced the tariff based on prior experience that poor people in NAC are unable to pay these tariffs. These reasons supporting reduction in tariff including: poverty and non-paying consumers, were further confirmed from the barriers cited in the Government of Pakistan and AEDB Report on Logical Framework Analysis Workshop on feed-in Tariff and Simplified Licensing Procedures for Micro and Mini Hydropower Projects /21/.

Under these circumstances, the tariff used for the project activity for the base year 2008 with an annual escalation of 5% was considered reasonable by DNV.

The Load Factor:

The average plant load factor for the 103 MHPs has been assumed in the calculations to be 50%. Analysis of the load factors of the projects that have been operational for some months now has been provided to DNV and was reviewed /22/. As per this analysis the actual load factor ranges from 18% to 37% for the projects that have been operational. Therefore, DNV considers a load factor of 50% used in the IRR analysis to be conservative.



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Benchmark:

The benchmark rate of 15% adopted for the project was checked against the benchmark rate adopted by the National Electric Power Regulatory Authority of Pakistan /9/ and was found to be consistent with the national standards.

In order to demonstrate that the benchmark of 15% for private investments in the power sector used for this project was considered appropriate by DNV, discussion on the interbank offer rate and Pakistan Treasury bill rate has also been included here. The risk-free Karachi Interbank Offer Rate (KIBOR), which is local equivalent of London Interbank Offer Rate (LIBOR), that is the established market standard rate, was 13.43% as of August 26, 2009 /23/. The Pakistan Treasury bill rate fluctuates around the same level and it has been as high as 16.28% in January 2009 and higher in the past as confirmed from the State Bank of Pakistan website. It should be noted that KIBOR is not available to third-parties. As per the Markowitz portfolio theory /24/, any commercial investor would have to add a further risk premium to this rate to account for the country risk, credit risk, and project risk. Therefore, the benchmark rate of 15% also checked through the National Electric Power Regulatory Authority website /9/ was considered applicable to the project by DNV.

The equity-IRR is calculated over 15 years. The initial investments are done over a time period of 5 years. The operational lifetime of the electromechanical equipment of each hydropower plant is assumed to be 12 years and major repairs and replacement of equipment are expected after that to be able to operate the small power plants. Based on the scale of each individual project and the operating structure managed by small communities, DNV finds it likely that the 12 year period is realistic. The major repairs and replacement of the equipment has not been included in the final investment analysis since the return of these costs is not within the time frame of the financial analysis. In addition all hydro power plants are still assumed to operate at full capacity until year 20 of the financial analysis. This is conservative. It should be noted that the "IRR NPV (2)" spreadsheet in the excel workbooks provided for the IRR analysis has been confirmed during validation and the analysis is performed until year 2010. The 10 year calculations shown in the earlier sheets correspond only to the Emission Reduction Purchase Agreement (ERPA) and should not be confused with IRR calculations.

The equity-IRR was calculated to be 11.6%. The equity-IRR calculation were provided in an Excel spreadsheet and verified by DNV. The input parameters and assumptions are checked. Based on the investment barrier that was further supported by the financial analysis, DNV is of the opinion that the project faces financial barrier and would have not occurred without considering CDM related benefits.

4.4.3 Technological barrier

The PDD argues that building micro and mini hydropower projects at the community level requires technical and managerial skills that are not locally available in the NAC region of Pakistan, and that this represents a technology barrier.

However, DNV notes that the technology as such is widely available. While it is reasonable to assume that the implementation of the project requires high institutional and managerial capacity, AKRSP has already built several hundred MHPs in Pakistan. Therefore, DNV is of the opinion that the technological barrier alone would not prevent the project from happening



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in the absence of CDM-related income. However, the technological barriers support the investment barriers.

4.5 Monitoring

The project applies the approved monitoring methodology, AMS-I.A “Electricity generation by the user” version 12.

The monitoring plan requires real measurements of baseline emissions, by metering the electricity generated by all systems installed under the proposed project activity. The monitoring plan is in accordance with the monitoring methodology. The monitoring plan will give opportunity for real measurements of achieved emission reductions. The meters, approved by the Water and Power Development Authority (WAPDA) of Pakistan, will be installed and used for this purpose. The project proponent has stated that the manufacturer of the electricity meters is an ISO 9000 certified company and the standard calibration methods as recommended by WAPDA would be adapted as required, DNV considers this sufficient.

With regard to leakage, the applied methodology requires the consideration of leakage resulting from the transfer of energy generating equipment to or from the project. Since only new equipment will be installed, there is no possibility of leakage from the transfer of hydropower generating equipment to the project sites. In addition, old gensets will be scrapped by the communities after the completion of the hydropower projects as per the Terms of Partnership (TOP) /38/ /39/ /41/ between communities and the AKRSP, leakage calculations are not necessary. The project proponent has stated in response to clarification request that leakage from any generators which are transferred out of the community to any area which falls outside the project boundary will be monitored for their usage with the participation of beneficiary community and/or owners of these generators. The leakage thus monitored will be deducted from the emission reductions. Furthermore, it has been clarified that diesel generators are not used to start-up the MHPs as the MHPs use small “self-exciting” alternators; and thus, there is no leakage to be monitored from this source.

As per the LOA from DNA of Pakistan dated 30 July 2008 /5/, the host Party does not require any further monitoring of sustainable development indicators and the environmental impacts of the project activity.

Details of the data to be collected, the frequency of data recording, certainty level and format and the project management responsibilities have been described in the PDD. In addition, detailed procedures for training of monitoring personal, review of reported results/data and corrective actions have been described in the PDD version 6 of 16 October 2009.

4.5.1 Parameters determined ex-ante

Since the parameter c_i (i.e. estimate of average annual individual consumption (in kWh per year) observed in closest grid electricity systems among rural grid connected consumers belonging to the same group of “i” renewable energy technologies) was not available, option 1 of AMS-I.A was not used. In addition, option 3 is not applicable since the project does not propose any existing technology replacement. Hence, option 2 was used by the project participants. The distribution loss “ l ” was considered to be 20% on a low voltage rural distribution grid, as per the methodology.

The baseline emissions are calculated as a product of the electricity generated in kWh and the emission coefficient of 1.24 tCO₂e/MWh.



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The emission factor of 1.24 tCO₂e/MWh was determined *ex-ante* based on values from Table I.D.1 of AMS-I.D and results from diesel generators survey conducted by AKRSP for emission factor that was conducted in May/June of 2007 /33/. It has been explained below how the diesel generator survey has been carried out by the project proponent and validated by DOE. It has been further explained how the method to calculate the emission factor based on weighted average concept and a sample size of 50 diesel generator sets is considered conservative by DNV.

The methodology and the results of the diesel generator survey have been detailed in Annex 3 of the PDD. The diesel generators surveyed were divided into 5 categories that included a) < 15 kW; b) >=15 <35 kW; c) >=35 <135 kW; d) >=135 <200 kW; e) >= 200 kW and 23, 13, 9, 2 and 3 engines, respectively have been surveyed in each of these categories. This was considered consistent by DNV with the categories in Table I.D.1 of AMS-I.D. The number of engines surveyed in each of these categories was also representative of distribution of engines in each of the categories within the project boundary. DNV has reviewed the survey methodology developed by the project consultant of 12 March 2007 /31/ to determine emission coefficient of diesel generators being used in the baseline scenario and the questioners /32/ that were distributed to choose 50 well filled questioners that were later tested for emission factor determination. The number of well filled questioners received in each of the category is confirmed as follows:

Category	Number of Questionnaires received
< 15 kW	23
>=15 <35 kW	13
>=35 <135 kW	9
>=135 <200 kW	2
>= 200 kW	3
Total	50

As per the survey methodology /31/ the fuel efficiency of the diesel generators in terms of the number of kWh produced per litre of diesel was measured. This was done by filling up the diesel tank for each of the diesel generator that was tested and running the generator at normal load for a few hours. The amount of diesel used was computed by measuring the amount of diesel needed to re-fill the diesel tank. The amount of electricity generated was noted by taking the kWh meter readings before and after the above stated procedure. A default conversion factor of 3.2 kg CO₂/kg of diesel was used from IPCC to calculate a value of 1.83kg CO₂eq/kWh. The information on the survey data and the test results were put together in the form of a spreadsheet and the generators survey report for emission factor of August 2007 /33/ was provided to DNV for review during validation.

Based on the above approach, the survey estimated the emission factor to be 1.83 tCO₂e/MWh detail of which are provided in the following table:



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Category	Measured fuel efficiency (kWh/litre)	Litres of diesel/ kWh	kg of diesel/kWh	kg CO ₂ eq/ kWh
< 15 kW	1.19	0.84	0.70	2.25
>=15 <35 kW	1.47	0.68	0.57	1.82
>=35 <135 kW	1.73	0.58	0.48	1.55
>=135 <200 kW	2.78	0.36	0.30	0.96
>= 200 kW	3.03	0.33	0.28	0.89
Weighted average of gensets <35 kW	1.47	0.68	0.57	1.83

However, this is not in line with the methodology to use area specific emission factor. A corrective action was requested by DNV during validation resulting in a conservative use of weighted average value of 1.24kg CO₂eq/kWh from Table I.D.1 under category I.D using results from survey as further explained below. Since the results from the survey showed that the area specific emission factor is much higher than the default value of 0.8 tCO₂/MWh, the results from the survey were used to justify the choice of a higher emission factor from Table I.D.1 of AMS-I.D than the default value of 0.8 tCO₂/MWh (as per para 10 of AMS-I.A, version 12). In addition, the results from the survey were used towards estimating the relative shares of diesel generators in the categories a) below 15 kW; b) between 15 and 35 kW; c) between 35 and 135 kW; d) between 135 and 200 kW; e) above 200 kW, so that the values from Table I.D.1 of AMS-I.D could be correctly applied.

Since the number of engines surveyed in each of these categories was based on the distribution of the engines in each of the categories within the project boundary, the method to calculate the emission factor based on weighted average concept from Table I.D.1 of AMS-I.D and a sample size of 50 diesel generator sets is considered conservative by DNV. Further, DNV is of the opinion that doing more surveys would have revealed similar results because of the homogeneous nature of these remote communities in the Northern Areas and Chitral (NAC), Pakistan.

Thus, the relative shares in each of the five categories were used together with Table I.D.1 in AMS-I.D to calculate the emission factor of 1.24 tCO₂e/MWh. DNV has verified the survey as explained above and the calculations provided in section B.4 of the PDD and were found to be correct and conservative.

4.5.2 Parameters monitored ex-post

The methodology requires monitoring of the following:

- An annual check of all systems or a sample thereof to ensure that they are still operating (other evidence of continuing operation, such as on-going rental/lease payments could be a substitute). OR,
- Metering the electricity generated by all systems of a sample thereof.



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The main data needed to be monitored *ex-post* is the electricity generated by the users, which will be monitored daily through metering equipments installed at the proposed 103 project substations.

These meter readings will be submitted monthly by the power house operator of each MHP to the regional AKRSP office, where they will be entered into an electronic system and reported to the AKRSP head office and added up to compute annual energy production for each plant and combined to compute annual energy production for the aggregate of all the power plants. All the data will be stored in an electronic data log at the AKRSP office. The data will be regularly updated and will be available for verification by the DOE. Monthly readings at each plant will be monitored by AKRSP and site visits will be arranged for investigation in case of unusually high or low readings. The energy meters will be certified by a reputable agency every two years or as needed if readings are unusual at any site.

The monitoring methodology being used for the project requires recording the actual kWh produced by the MHPs, it will thus not be necessary to monitor the kWh produced by back up diesel generator sets. The kWh produced as backup power, generated by diesel generator sets remaining in the communities, either during the hours when the MHP is not operational or not producing sufficient power to meet all community needs, is considered as the component of the baseline emissions continuing in the project scenario.

It has been stated that the purchase of new diesel generators is highly unlikely and remote scenario. However, in the case of emissions being generated in the project area from new diesel generators being purchased in response to an increase in demand, the monitoring of electricity generated by the new diesel generators has been included in the PDD and the corresponding emissions are counted as project emissions. Thus, new diesel generators will be monitored for the total amount of kWh produced and the corresponding emissions will be reduced from the total emission reductions. It has been clarified under the monitoring plan in section B.7.1 of the PDD that in case new generators are brought into the area their power output will not pass through the same meters that are installed to monitor electricity from the MHPs. The power output of these diesel generators will independently be monitored and records will be maintained. In addition, it has been clarified in section B.7.2 of the updated PDD that diesel generators are not used to start-up the MHPs as the MHPs use small “self-exciting” alternators and no fuel is consumed during start-ups.

As per para 18 of the applied methodology, AMS-1-A, version 12: "if fossil fuel is used the electricity generation metered should be adjusted to deduct electricity generation from fossil fuels using the specific fuel consumption and the quantity of fossil fuel consumed." DNV confirms that under the actual situation of the project, this requirement of the methodology is met.

In complying with the requirements of the “indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories”, it has been clarified in the monitoring plan in the PDD, Version 6 of 16 October 2009 that relevant data records will be kept for 2 years following the end of the crediting period or the last issuance of the CERs for the project activity, whichever occurs later.



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4.5.3 Management system and quality assurance

AKRSP is taking responsibility for ensuring the overall implementation of the proposed project activity in coordination with local community based organizations and donors. The management structure of the project has been described in Figure A-3.1 of the PDD.

Plants constructed under the project will be managed and operated by a community-based management system backed by the Aga Khan Rural Support Programme (AKRSP), the Mountain Infrastructure and Engineering Services (MIES, a private company established in the area through AKRSP support), the Northern Areas Public Works Department (NAPWD), and Chitral Works Department (CWD) for technical support.

The project will use and expand existing community-based institutional mechanisms and capacities developed by AKRSP, including community-owned private-company-based management systems for construction of MHPs, carrying out operations, maintenance of the power units, and sale of power produced after completion of the project. DNV considers the proposed management system and quality assurance mechanism adequate and appropriate.

4.6 Estimate of GHG Emissions

The annual emission reduction ER_y by the project activity during the crediting period is the difference between baseline emissions (BE_y) and the project emissions (PE_y) and emissions due to leakage (L_y):

Baseline emissions: Baseline emissions (BE_y in tCO_2) are the product of the baseline emissions factor (EF_y in tCO_2e/MWh) times the electricity generated by the users in MWh. The baseline emissions are estimated to reach an annual average of 87 477 tCO_2e .

The baseline emission factor (EF_y) of 1.24 tCO_2e/MWh has been computed using factors from Table I.D.1 under the *Mini-grid with temporary service (4-6 hr/day) (i.e 50% load factor)* after taking weighted average of the values in the size ranges: a) below 15 kW; b) between 15 and 35 kW; c) between 35 and 135 kW; d) between 135 and 200 kW; e) above 200 kW based on total number of generators surveyed and the number of generators in each size range within the project boundary. The results are summarized in Table B.4.2 - *Emission Factor based on Table I.D.1* of the updated PDD version 6 of 16 October 2009. The baseline emission estimate can be replicated using the data and parameter values provided in the PDD and supporting files submitted for registration. The data sources mentioned have been verified by DNV

Project emissions: The proposed project emissions are regarded as zero. This is acceptable under the approved simplified methodology, AMS-IA. Emissions from the diesel generators that might be used for back-ups have not been taken into consideration while calculating project emissions. Since the back-up generators will only be operating during the time of no production or not sufficient production by MHPs and the emission reduction credits would be claimed based on the cumulative kWh of the each hydro project, it is considered conservative by DNV not to include emissions from any back-up generators in emission reduction calculations.

However, in the case of emissions being generated in the project area from new diesel generators being purchased in response to an increase in demand, the project has included monitoring electricity generated by the new diesel generators in the PDD. Thus, new diesel generators will be monitored for the total amount of kWh produced and the corresponding



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emissions will be reduced from the total emission reductions using the emission factor of 1.24 tCO₂e/MWh. This was deemed reasonable by DNV.

As was explained in section 4.5.2 above, it should be noted again that in case new generators are brought into the area their power output will not pass through the same meters that are installed to monitor electricity from the MHPs. The power output of these diesel generators will independently be monitored and records will be maintained. It should also be noted that the diesel generators are not used to start-up the MHPs as the MHPs use small “self-exciting” alternators and no fuel is consumed during start-ups.

Leakage: No leakage has been considered for the proposed project activity. As per the chosen methodology, leakage should be considered if any energy generating equipment is transferred to or from the project site.

It has been clarified during validation that no used equipment will be transferred to the proposed project activities, since all 103 projects will install new equipment that includes: generator and turbine, alternator, governor, penstock, transformer etc.

It has also been confirmed that old gensets will be scrapped by the communities after the completion of the hydropower projects as per the Terms of Partnership (TOP) between communities and the AKRSP. DNV has reviewed some of these Terms of Partnership documents between AKRSP and the communities in which these MHPs will be installed/38/ /39/ /41/. Therefore, leakage calculations are not necessary.

No other project emission or leakage sources contributing more than 1% and not mentioned by the methodology have been found.

The proposed project activity will lead to the reduction of 612 342 tCO₂e in the renewable 7-year crediting period from 2009 to 2015. It should be noted that the actual GHG emission reduction would be measured based on aggregation of the annual meter readings at each operating MHP after project is implemented.

4.7 Environmental Impacts

Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulation, 2000 states that hydropower projects of less than 50 MW capacities require Initial Environmental Examination (IEE) while those with more than 50 MW capacities require environmental impact assessment (EIA) /44/. IEEs were submitted by the project proponent covering all 103 projects to the provincial environmental authorities in Northern Areas of Pakistan for projects located in Gilgit and Baltistan regions, and in NWFP for projects located in Chitral region. These have been approved by the authorities following issuance of No Objection Certificate (NOC) for the implementation of the projects.

DNV has also reviewed an Initial Environmental Examination (IEE) report of the 48 mini and micro hydropower projects located in Chitral region /45/ that are part of the proposed CDM project activity. This report was developed by the Community Physical Infrastructure (CPI) section of the Aga Khan Rural Support Programme (AKRSP) in November 2007. The potential environmental impacts have been sufficiently identified. No significant environmental impacts are expected from the project activity.

In addition, LOA from DNA of the host country (Ministry of Environment Pakistan) has been issued on 30 July 2008. The host country does not require any further monitoring of sustainable development indicators and the environmental impacts of the project activity.



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It has been clarified during validation that the local communities will partially use the electricity for heating and cooking purposes which will have positive environmental impact from reduced deforestation. However, since the project proponent deems it as an additional benefit of the project activity and does not claim any emission reductions for the reduced deforestation, the argument was accepted by DNV.

4.8 Comments by Local Stakeholders

For each MHP to be implemented, the project followed a three-step dialogue process with the local communities and stakeholders. Comments were invited from community members and stakeholders at each step of the dialogue process.

The received comments, their response and agreed upon actions are compiled by AKRSP after each of the dialogue steps. DNV reviewed the first dialogue report between Mamushthang community and AKRSP dated 21 July 2006. It showed that the proposed project has received strong support from the local community and the comments received have been taken into consideration to achieve environmental and social benefits.

Signing a Term of Partnership (ToP) with local community is part of the three-step dialogue process adopted by AKRSP. DNV also reviewed terms of partnerships (ToPs) that were signed between local communities and AKRSP for the following project sites:

- a. Brep community and AKRSP dated 20 May 2005
- b. Onawich community and AKRSP dated 5 May 2006
- c. Mamushthang community and AKRSP dated 18 November 2006

In DNV's opinion, these ToPs describe responsibilities of each party towards project execution for successful completion of the MHPs in the NAC region through community-owned private company based management system. The host country codes do not have any specific requirements or regulations regarding stakeholder consultations. DNV considers that the local stakeholder consultation process is adequate.

4.9 Comments by Parties, Stakeholders and NGOs

The PDD of October 2007 was made publicly available on DNV's climate change website (http://www.dnv.com/focus/climate_change/projects/projectdetails.asp?ProjectId=1550) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 27 October 2007 to 25 November 2007.

No comments were received.

APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory Requirements for Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion
About Parties		
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	OK.
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	CAR-2 OK
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	CAR-2 OK
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	CAR-3 OK
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	OK
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	OK

Requirement	Reference	Conclusion
About additionality		
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	CL-7 OK
About forecast emission reductions and environmental impacts		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	CAR-5 CL-3 CL-10 CL-18 OK
About small-scale project activities (if applicable)		
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakech Accords and shall not be a debundled component of a larger project activity.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	CL-4 OK
13. The proposed project activity shall conform to one of the project categories defined for small scale CDM project activities and use the simplified baseline and monitoring methodology for that project category.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK
14. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	CL-18 OK
About stakeholder involvement		
15. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	CL-19 OK

Requirement	Reference	Conclusion
16. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
Other		
17. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
18. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
19. The baseline methodology shall exclude earning CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
20. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	CAR-4 OK
21. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. General Description of Project Activity <i>The project design is assessed.</i>					
A.1. Project Boundaries <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project’s spatial boundaries (geographical) clearly defined?	/1/	DR I	Yes, the project boundary is clearly defined that includes 103 project sites across three regions in northern Pakistan: Gilgit region (including districts of Gilgit, Ghizer and Astore), Baltistan region (Ganche and Skardu districts), and Chitral district of North West Frontier Province. The project validation team reviewed the list of 103 mini and micro hydropower projects that would be constructed under the proposed CDM project activity that was included in the PDD. In addition a list of GPS coordinates for each site was reviewed as a means of validation.	OK	OK
A.1.2. Are the project’s system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/	DR	Yes. The project comprises installation of 103 mini and micro hydropower projects with a total capacity of 15 MW installed in the northern regions of Pakistan for meeting community energy needs and at the same time substituting the use of diesel fuel used in compression ignited internal	OK	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			engines, thereby contributing to reduction of GHG emissions.		
A.2. Participation Requirements <i>Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project Participant.</i>					
A.2.1. Which Parties and project participants are participating in the project?	/1/	DR I	<p>The project participants representing the host country are: Aga Khan Rural Support Programme (AKRSP) - a Pakistan-based Non-governmental organization, participating 103 communities, Pakistan Poverty Alleviation Fund (PPAF), Northern Areas Govt of Pakistan, and Pakistan Centre for Renewable Energy Technologies (PCRET); and IBRD as a trustee of the Community Development Carbon Fund (CDCF). The Norwegian Embassy in Pakistan is an Annex I Party project participant.</p> <p>Annex 1 of the PDD needs to be revised to include contact information of all project participants listed in Section A.3 of the same document.</p> <p>It needs to be clarified whether AKRSP will act on behalf of the 103 participating communities as a project participant.</p>	CAR-1 CL-1	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.2.2. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?	/1/	DR	The LoA from the DNA of Pakistan has not been provided.	CAR-2	OK
A.2.3. Do all participating Parties fulfil the participation requirements as follows: - Ratification of the Kyoto Protocol - Voluntary participation - Designated a National Authority	/1/ /43/	DR	Yes. Pakistan ratified the Kyoto Protocol on 16 December 2004. The DNA of Pakistan is Ministry of Environment, which is voluntarily participating in the proposed project activity.	OK	OK
A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/1/	DR I	No funding agreement has been signed with any Annex I country. Norway could become a project participant if a funding agreement is signed with Govt. of Norway. In this case it needs to be documented and verified that the funding from Govt of Norway is not a diversion of official development assistance.	CAR-3	OK
A.3. Technology to be employed <i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					
A.3.1. Does the project design engineering reflect	/1/	DR	Yes. The project design reflects good	CAR-4	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
current good practices?			engineering practice.		
A.3.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/	DR	The project will not use state of the art technology for these mini and micro hydropower projects. However, AKRSP has stated that during project implementation it will collaborate with PCRET and other agencies to introduce technologies such as electronic load controllers which are proven internationally but are not yet easily available in Pakistan.	OK	OK
A.3.3. Does the project make provisions for meeting training and maintenance needs?			The provisions for meeting training and maintenance needs have to be clarified.	CL-2	OK
A.4. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	/1/	DR I	Not yet. The LoA from the DNA of Pakistan has not been issued.	CAR-2	OK
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The project will reduce local air pollution that in the absence of the proposed project activity would have arisen from burning of diesel and other fossil fuels. The PDD also claims that the project will result in a reduction of deforestation and degradation of the natural habitats of rare plant and	CL-3	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			animal species presently threatened by excessive cutting of wood and shrubs. However, in DNV's opinion the latter claim is not consistent with the assumption that the project will substitute diesel generators. It is unlikely that electricity generated by the MHPs will be used for cooking and heating, and hence DNV does not see how the project will reduce degradation of local forest habitats.		
A.5. Small scale project activity <i>It is assessed whether the project qualifies as small-scale CDM project activity</i>					
A.5.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1/ /2/	DR	Being a renewable energy project activity, with an output capacity of less than 15 MW (which still needs to be confirmed), the project may qualify as a small-scale CDM project activity according to the category (i) defined in paragraph 6, subparagraph (c) of decision 17/CP.7 of the modalities and procedures for the CDM, and as defined by category I.A of Appendix B of the simplified modalities and procedures for small-scale CDM project activities. However, documentation needs to be provided showing that the overall power generation capacity of the proposed project activity stay below the applicability	CL 4	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			threshold of 15 MW.		
A.5.2. Is the small scale project activity not a debundled component of a larger project activity?	/1/ /4/	DR	The project is not a debundled component of a larger project activity according to the Appendix C of the simplified modalities and procedures for small-scale CDM project activities. This has been confirmed from the Northern Areas Tourism, Environment, Sports, & Culture Directorate – Gilgit, NA-EPA of Pakistan during site visit.	OK	OK
B. Project Baseline <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
B.1. Baseline Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.1.1. Does the project apply an approved methodology and the correct version thereof?	/1/	DR	Yes. The project applies the simplified baseline and monitoring methodology AMS I.A <i>Electricity generation for the user</i> version 12 of 10 August 2007.	OK	OK
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	/1/	DR	It needs to be clarified and documented whether the existing grids within project boundary are connected to the national or regional grid.	CL-5	OK
B.2. Baseline Scenario Determination					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.</i>					
B.2.1. What is the baseline scenario?	/1/	DR	The baseline scenario identified in the PDD is the fuel consumption by diesel generators already in use or that would have been installed in the absence of the project activity.	OK	OK
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/	DR	No other alternative scenarios have been considered and the baseline scenario listed in B.2.1 above is the only scenario considered under the proposed project activity.	OK	OK
B.2.3. Has the baseline scenario been determined according to the methodology?	/1/	DR	Yes. The baseline scenario has been determined according to the methodology.	OK	OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	In the absence of grid-connected electricity it is conservative to assume that without the proposed project activity, electricity would be generated using diesel fuel.	OK	OK
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	Yes. All relevant national and sectoral policies, regulations and department rules and disciplines have been considered.	OK	OK
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and	/1/	DR	There is no study documenting that the infiltration of diesel generators will take	OK	OK

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sources clearly referenced?		I	place in the absence of the proposed project activity. However, site visits by DNV representative followed by interviews with various community members located within the project boundary have confirmed that the infiltration of diesel generators will take place in the absence of the proposed project activity.		
B.2.7. Have the major risks to the baseline been identified?	/1/	DR	There are no significant risks to the baseline.	OK	OK
B.3. Additionality Determination <i>The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.</i>					
B.3.1. Is the project additionality assessed according to the methodology?	/1/	DR	<p>Additionality of the Project is demonstrated based on the requirement of Attachment A to Appendix B of <i>the Simplified Modalities and Procedures for Small-scale CDM Project Activities, the barrier analysis.</i></p> <p>The PDD argues that the proposed project activity faces investment and technological barriers and hence is not financially attractive and will not occur without CDM revenues. However, it has been indicated in the PDD that the AKRSP has experience developing and implementing similar hydro power projects in the past. Clarifications</p>	CL-6	OK

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			are therefore requested whether all these earlier projects applied CDM, if not, how were they funded and why cannot the current project be funded through the same means.		
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/1/ /35/	DR	The investment analysis is not clear and reproducible. Not all assumptions have been stated in a clear manner, and it has not been stated against which benchmark or alternative investment the IRR has been compared. Further clarification is needed.	CL 7	OK
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR	Documentation needs to be provided for each of the input data in the investment analysis.	CL 7	OK
B.3.4. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity?	/1/	DR	An exact starting date needs to be defined, and it needs to be clarified whether the starting date refers to the start of implementation, construction, or real action. It needs to be documented that CDM was taken into account prior to the starting date.	CL 8	OK
B.4. Calculation of GHG Emission Reductions – Project emissions <i>It is assessed whether the project emissions are stated according to the methodology and whether the</i>					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.4.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	In accordance with AMS I-A version 12, project emissions are regarded as zero as the project is based on hydropower. However, emissions from the diesel generators that would be used for back-up need to be taken into consideration while calculating project emissions.	CL-9	OK
B.4.2. Have conservative assumptions been used when calculating the project emissions?	/1/	DR	N/A	OK	OK
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/1/	DR	N/A	OK	OK
B.5. Calculation of GHG Emission Reductions – Baseline emissions <i>It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	The calculations of baseline emissions have been done based on the estimated total electricity generation, and a CO ₂ emission factor for the diesel generators displaced. The estimated total electricity generation is	CAR-5 CL-10	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>a function of the installed capacity and the operating hours for each of the 103 micro and mini hydro plants. Feasibility studies detailing installed capacity and operating hours have not been presented for all sites, and therefore DNV is not able to assess if the total estimated generation is realistic. Further documentation is needed on this point.</p> <p>The emission factor for diesel generators used for calculation of baseline emissions was derived from a local survey, listed in Annex 3 of the PDD. However, in DNV's opinion, the methodology does not cover the possibility of applying a locally derived emission factor, but rather gives the options of applying a) a default value of 0.8 kg CO₂ per kWh, or b) a value derived from Table I.D.1 in the Approved Methodology AMS I.D.</p> <p>The emission factor has to be revised.</p>		
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	See B.5.1.	CAR-5	OK
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	See Section B.5.1	CL-10	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.6. Calculation of GHG Emission Reductions – Leakage <i>It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /2/	DR	<p>In accordance with the AMS I.A version 12 para 14, if the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity, leakage is to be considered.</p> <p>However, leakage has not been addressed in the calculations of emission reductions in section B.6 of the PDD.</p> <p>The PDD does not specify whether any of the electricity generating equipment at the MHPs will or may be transferred from other sites. However, according to the PDD old diesel generators will be either scrapped or kept as back up generators in the village. The same will be checked through an inventory (reference is made to section B.11 below).</p> <p>The following needs to be provided: Documentation of whether any energy generating equipment for the MHPs will be</p>	CL-11	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			transferred from other sites. Clarification on how possible leakage from the transfer of diesel generators to other sites, will be treated. Documentation on how leakage will be calculated and deducted from the baseline emissions.		
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR	Please refer to section B.6.1 above	CL-11	OK
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	Please refer to section B.6.1 above.	CL-11	OK
B.7. Emission Reductions <i>The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.</i>					
B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	/1/	DR	Yes. The emission reductions are real, measurable, and give long-term benefits related to the mitigation of climate change comparing to baseline scenario. However, the amount of emission reductions is a function of the electricity production and the emission factor applied, and hence the estimate of the total emission reductions from the project activity is pending on the final validation of each of	CAR-5 CL-10	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			these two points.		
B.8. Monitoring Methodology <i>It is assessed whether the project applies an appropriate monitoring methodology.</i>					
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	Yes. According to the methodology AMS-I.A, monitoring shall consist of metering the electricity generated by the renewable technology. Hence, the monitoring plan is according to the AMS-I.A.	OK	OK
B.8.2. Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/	DR I	It is not clear if the relevant data records will be kept for 2 years following the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	CL-12	OK
B.9. Monitoring of Project Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
B.9.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR	Project emissions are regarded as zero for the project (please refer to section B.4.1), hence this question is not applicable.	OK	OK
B.9.2. Are the choices of project GHG indicators reasonable and conservative?	/1/	DR	N/A	OK	OK
B.9.3. Is the measurement method clearly stated for each	/1/	DR	N/A	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
GHG value to be monitored and deemed appropriate?					
B.9.4. Is the measurement equipment described and deemed appropriate?	/1/	DR	N/A	OK	OK
B.9.5. Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR	N/A	OK	OK
B.9.6. Is the measurement <i>interval</i> identified and deemed appropriate?	/1/	DR	N/A	OK	OK
B.9.7. Is the <i>registration, monitoring, measurement and reporting</i> procedure defined?	/1/	DR	N/A	OK	OK
B.9.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR	N/A	OK	OK
B.9.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR	N/A	OK	OK
B.10. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.</i>					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.10.1.Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/	DR	Yes. According to the methodology, the only data to be monitored is the electricity generated by the project. The project will record the generation of each individual MHP (please refer to para 15 (b) of AMS I.A, All data will be logged daily in each of the project sites, and reported monthly to the AKRSP office, where the data will be stored and aggregated in an electronic data log. The data will be regularly updated and will be made available for verification by the DOE.	OK	OK
B.10.2.Are the choices of baseline GHG indicators reasonable and conservative?		DR	Yes. The choice of electricity generation as an indicator for baseline emissions is reasonable and conservative.	OK	OK
B.10.3.Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?	/1/	DR	Yes. The electricity generation will be read from 3 phase kWh (energy) meters on each of the 103 power houses.	OK	OK
B.10.4.Is the measurement <i>equipment</i> described and deemed appropriate?	/1/	DR	Three phase energy meters will be used. Detailed specification of the energy meters, if finalized, should be provided.	CL-13	OK
B.10.5.Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR	Measurement accuracy of the monitoring equipment including process for calibration needs to be addressed in the project documentation.	CL-14	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.10.6. Is the measurement <i>interval</i> for baseline data identified and deemed appropriate?	/1/	DR	Yes. Energy generation will be read daily at each site.	OK	OK
B.10.7. Is the registration, <i>monitoring</i> , <i>measurement</i> and <i>reporting</i> procedure defined?	/1/	DR	Yes. The procedure for registration, monitoring, measurement and reporting has been described. Please refer to section B.10.1 above.	OK	OK
B.10.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR	The procedures for maintenance of the monitoring equipment and installations should be provided.	OK	OK
B.10.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR	Yes. All data will be stored in an electronic data log at the AKRSP offices. The data will be regularly updated and will be made available for verification by the DOE.	OK	OK
B.11. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
B.11.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	According to para 14 of AMS I.A, leakage from the transfer of energy generating equipment to or from the project needs to be considered. According to the PDD, leakage will be monitored by preparing an inventory of all diesel generator sets being used in each community where a mini or micro	CL-15	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			hydropower project (MHP) is being installed and monitoring that they are either scrapped or remain in the community as back up generators after the MHP starts operation. However, it needs to be clarified whether there will be possible leakage from hydropower generating equipment from other sites, and if so, how this will be monitored.		
B.11.2. Are the choices of project leakage indicators reasonable and conservative?	/1/	DR	Please refer to section B.11.1 above.	CL-15	OK
B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?	/1/	DR	Please refer to section B.11.1 above.	CL-15	OK
B.12. Monitoring of Sustainable Development Indicators/ Environmental Impacts <i>It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
B.12.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR	At present the requirements from DNA are not clear regarding environmental impacts as well as sustainable development. Clarification needs to be provided on this issue.	CL-16	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.12.2.Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	Please refer to section B.12.1 above.	CL-16	OK
B.12.3.Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR	Please refer to section B.12.1 above.	CL-16	OK
B.13. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
B.13.1.Is the authority and responsibility of overall project management clearly described?	/1/	DR	AKRSP is taking the authority and responsibility of the project management given that the proposed project activity is approved as a CDM project activity.	OK	OK
B.13.2.Are procedures identified for training of monitoring personnel?	/1/	DR	The PDD, Annex 4, states that AKRSP will provide technical support including in the training of electricity operators and users. However, further information on the specific procedures for the training needs are to be provided.	CL-17	OK
B.13.3.Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	According to the actual status of the hydropower project, no emergency situation which can cause unintended	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			emissions is expected from the project.		
B.13.4. Are procedures identified for review of reported results/data?			Yes. Routines for quality assurance and internal verification of data are outlined in Annex 4 of the PDD. The data will be reviewed both by the head office and the three involved regional offices of AKRSP.	OK	OK
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?			Yes. In case of unusual energy meter readings, energy meters will be certified by a reputable agency, and AKRSP will carry out extraordinary visits in case of unusually high or low energy meter readings.	OK	OK
C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	/1/	DR I	The project's exact starting date needs to be defined and evidenced, and it needs to be specified whether the date refers to the implementation, construction or real action.	CAR-6	OK
C.1.2. Is the start of the crediting period clearly defined and reasonable?	/1/	DR	The starting date of the crediting period has been defined as 01 January 2008. The crediting period cannot start before the date of registration of the CDM project activity. Hence, the starting date of the crediting period needs to be revised.	CAR-6	OK
D. Environmental Impacts <i>Documentation on the analysis of the environmental impacts will</i>					

* MoV = Means of Verification, DR= Document Review, I= Interview
CDM Validation 2007-2069, rev. 03

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
D.1. For Small-scale projects					
D.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	/1/	DR I	Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulation, 2000 states that hydropower projects of less than 50 MW capacities require Initial Environmental Examination (IEE) while those with more than 50 MW capacities require environmental impact assessment (EIA). /44/ However, no lower threshold for IEE requirement has been clearly defined, and the different provincial EPAs have different understandings of the requirements. According to the project proponents, the provincial EPAs have submitted a request for clarification with the federal EPA on the issue. The process is on-going and AKRSP is following up with authorities to expedite clarification. The outcome of the clarification on environmental impact requirements needs to be provided for DNV to verify.	CL-18	OK
D.1.2. Does the project comply with environmental legislation in the host country?	/1/	DR	Please refer to section D.1.1	CL-18	OK
D.1.3. Will the project create any adverse environmental	/1/	DR	DNV has reviewed the Initial	CL-18	OK

* MoV = Means of Verification, DR= Document Review, I= Interview
CDM Validation 2007-2069, rev. 03

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
effects?			Environmental Examination for the 48 MHPs in Chitral region, and regards that the potential environmental impacts have been sufficiently identified. No significant environmental impacts are expected from the project activity. Please refer also to section D.1.1		
D.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/	DR	Please refer to section D.1.1 The PDD lists some positive environmental impacts of the MHPs related to the claimed reduction in fuel wood, kerosene oil, and dry cell batteries. The relationship between hydropower production and reduced deforestation needs to be explained, as DNV assumes that the forest cover is under pressure for firewood, which will not be substituted by hydropower. Pending clarification of the requirement for IEEs, the PDD needs to address any environmental impacts described in these reports for the remaining 57 sites for which IEEs have not already been developed.	CL-3 CL-18	OK
E. Stakeholder Comments <i>The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.</i>					

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CDM Validation 2007-2069, rev. 03

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E.1.1. Have relevant stakeholders been consulted?	/1/	DR	<p>Yes. The stakeholders are consulted in a 3-part dialogue process. The first step consists of information on the intention of the hydropower projects, and results in an initial agreement with the communities. The second dialogue concludes with a feasibility study and the Terms of Partnership between AKRSP and the community. The third and last dialogue results in signing the ToP, and the first instalment of the project cost transferred to the community.</p> <p>The first dialogue has been carried out in around 100 communities. However, it was clarified during the site visits that the consultations had not been formalised and recorded.</p> <p>Further information is required about the exact number of sites where dialogues have been conducted, and the outcome of these.</p>	OK	OK
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	Yes. Project proponents have used appropriate media to invite comments.	OK	OK
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	/1/	DR	No such information is identified in PDD.	CL-19	OK

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CDM Validation 2007-2069, rev. 03

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
in accordance with such regulations/laws?					
E.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	Yes. A summary of the stakeholder comments has been received and provided in the PDD. The comments were in general positive, but the PDD also lists some questions and concerns raised during the consultations.	OK	OK
E.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	Comments and questions from the beneficiary community are responded during public meetings. All outstanding issues are resolved before Terms of Partnership are signed between AKRSP and the participating community. The example of clarifications and conflict resolution provided referred to in the PDD as Annex 4 is requested.	CL-19	OK

Table 2b: Additional requirements checklist for VVM version 1 (EB 44)

A.1. Letter of approval				
A.1.1 Is the LoA received directly from the DNA or through the project participant.			DNV received these LOAs from the project Participant. The LOA from the DNA of Pakistan is also listed on the Ministry of Environment, Pakistan website as approved /46/.	OK
A.2. Project design				
A.2.1 Does the PDD describe the CDM project activity with all relevant elements in a transparent and accurate way?			Yes. The PDD describes the CDM project activity with all relevant elements in a transparent and accurate way.	OK
A.2.2 Has the CDM project activity at the start of the validation been constructed or does the CDM project activity use existing facilities or equipment?			The CDM project activity was initiated before the start of validation considering CDM and is being implemented at new project sites.	OK
A.2.3 Is the project a large scale project, a small scale project with average annual emission reductions above 15 000 tonnes or a bundled small scale project? Has on-site visit been carried out?			The project activity is a bundled small scale project activity (15 MW of Total Installed Capacity) with annual emission reductions of over 15 000 tones CO ₂ e per year (87 477 tones CO ₂ e per year). On-site visit has been carried out for the project activity.	OK
A.2.4 Does the project activity involved alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?			The proposed project does not involve alteration of existing installations.	OK
A.3. Project emissions not addressed by the methodology				
A.3.1 Does the methodology describe all project emission source for the project activity that contributes all 1% of the emission reductions? Sources that the methodology considers not to take			No other project emission or leakage sources contributing more than 1% and not mentioned by the methodology have been	OK

into account are not relevant (e.g. cement and iron consumption for building hydropower plants).			found.		
A.4. Documentation of baseline emissions					
1. A.4.1 Documentation of the baseline determination: <ul style="list-style-type: none"> a. All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. b. All documentation is relevant as well as correctly quoted and interpreted. c. Assumptions and data can be deemed reasonable d. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. e. The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity 			<ul style="list-style-type: none"> a. Yes. All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. b. Yes. All documentation is relevant as well as correctly quoted and interpreted. c. Yes. Assumptions and data can be deemed reasonable. d. Yes. Relevant national and/or sectoral policies and circumstances are considered and listed in the updated PDD. e. Yes. The methodology has been correctly applied to identify what would have occurred in the absence of the proposed CDM project activity. 		OK
A.5. Documentation of the calculations					
2. A.5.1 Algorithms and/or formulae used to determine emission reductions <ul style="list-style-type: none"> • All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced • All documentation is correctly quoted and interpreted. • All values used can be deemed reasonable in the context of the project activity • The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the 			<ul style="list-style-type: none"> - Yes. All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced Yes. All documentation is correctly quoted and interpreted. - Yes. All values used can be deemed reasonable in the context of the project activity - Yes. The methodology has been correctly 		OK

data provided in the PDD and supporting files to be submitted for registration.			applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration.		
A.6. Implementation of the monitoring plan					
A.6.1 How were the plans for implementation of the monitoring plan, data management, QA/QC procedures assessed? To what extent can the emission reductions achieved by the project be monitored ex-post and verified later by a DOE?			A detailed discussion has been provided above under sections 4.5.		OK
A.7. CDM consideration prior to starting date					
A.7.1 The prior consideration of CDM for the project activity complies with EB41 annex 46			Yes. A detailed discussion has been provided above under section 4.4.1.		OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CAR 1</p> <p>Annex 1 of the PDD needs to be revised to include contact information of all project participants listed in Section A.3.</p>	A.2.1	<p>Participant's information is listed in Version 3 of PDD (Annex 1). Please note that there are only two project participants: AKRSP and the IBRD as Trustee of the CDCF purchasing ERs.</p>	<p>OK. Project participant's information has been included in the Annex I of the PDD.</p> <p>Therefore, this CAR is closed.</p>
<p>CAR 2</p> <p>The letters of approval (LoA) from the designated national authorities (DNA) of the Host Country Pakistan, the Annex I Party Norway have to be provided. It needs to be stated which Party will authorize IBRD/the Community Development Carbon Fund as a project participant.</p>	A.2.2 A.4.1	<p>The Letter of Approval from DNA of Pakistan has been issued on 30th of July 2008. The Norwegian government is not a project participant and is no longer funding this project.</p> <p>The Annex I LoA by the CDCF from the DNA of Netherlands was submitted in August 2008.</p>	<p>The Letter of Approval from DNA of Pakistan has been issued on 30th of July 2008.</p> <p>Letter of Approval from DNA of Netherlands was submitted in August 2008.</p> <p>Therefore, this CAR is closed.</p>
<p>CAR 3</p> <p>The project participants are required to provide confirmation that the project can not be seen as a diversion of official development assistance (ODA) funding towards Pakistan, as specified in Section A.4.4 and Annex 2 of the PDD.</p>	A.2.4	<p>AKRSP and the CDCF are the only project participants. Norway is not a project participant. Potential funding that was being considered from Norway did not come through and thus, Norway will not provide any funds for the project. Thus, no confirmation of ODA</p>	<p>The PDD has been updated stating that the govt. of Norway is not a project participant and no confirmation of ODA diversion is required.</p> <p>In addition, it has been explicitly stated that the other listed sources of funds are</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>diversion is required.</p> <p>The other funding sources listed (PPAF, Northern Areas Government, PCRET) are local non-Annex I sources of financing and/or training only, and are not project participants. IBRD, is a project participant and a letter from Netherlands clarifying that the project can not be seen as a diversion of ODA was submitted in August 2008.</p>	<p>local sources and no confirmation of ODA diversion is required for these local sources as well.</p> <p>In addition, a letter from Netherlands clarifying that the project can not be seen as a diversion of ODA was submitted in August 2005 /7/.</p> <p>Therefore, this CAR is closed.</p>
<p>CAR 4</p> <p>Under section A.1 of the PDD, the version number and date of completion of the document needs to be included along with title of the small-scale project activity.</p>	A.3.1	Is reflected in PDD Version 3 (Section A.1).	<p>The version number and the date of completion of the updated PDD have been confirmed.</p> <p>The updated version 6 of the PDD was completed on 16 October 2009.</p> <p>Therefore, this CAR is closed.</p>
<p>CAR 5</p> <p>The emission factor for diesel generators used in the calculation of baseline emissions needs to be revised to be in line with the baseline methodology and/or EB guidance.</p>	B.5.1 B.5.2 B.7.1	<p>The emission factor of 1.4 has been used from Table I.D.1 of the Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories I.D/ Version 13. The diesel generators which would be replaced by the micro-</p>	<p>The use of emission factor from Table I.D.1 is as per the chosen methodology AMS –I.A, version 12. It is argued that the result of surveys as listed in version 1 of the PDD that was published demonstrate that the use of 1.4 kgCO₂e/kWh emission factor is</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>hydropower projects to be installed are mostly in the < 15 kW range and have characteristics most similar to the 50% load factor category: <i>Mini-grid with temporary service (4-6 hr/day)</i>.</p> <p>PDD Version 2 states that the emission factor of 1.4 and not survey emissions factor is being used to calculate baseline emissions (Section B 4, page 15). The survey is referenced to demonstrate that the emission factor of 1.4 is conservative, especially given the operation conditions, lack of maintenance, and quality of diesel generators used.</p>	<p>conservative as compared to the value that was calculated as per the survey.</p> <p>However, DNV finds that it is not conservative to use a higher value of 1.4 kgCO₂e/kWh under the 50% load factor category from Table I.D.1. Since the result of Survey also suggest that the expected number of diesel engines in the range of < 15 kW that will be replaced by the proposed project activity are less than 50% of the total replaced.</p> <p>This CAR is not closed and further clarification is requested from the project proponent as CAR 5 continues below.</p>
<p>CAR 5 (Continued)</p> <p>It is not conservative to use a higher value of 1.4 kgCO₂e/kWh under the 50% load factor category from Table I.D.1, since the result of the survey also suggest that the expected number of diesel engines in the range of < 15</p>	<p>B.5.1 B.5.2 B.7.1</p>	<p>The emission factor of 1.24kg CO₂eq/kWh has been used. It has been computed using factors from Table I.D.1 under the 50% column (<i>Mini-grid with temporary service (4-6 hr/day)</i>) after applying a weighted average in the</p>	<p>The weighted average emission factor of 1.24 kgCO₂e/kWh is deemed conservative and acceptable by DNV as further explained in Section 4.5.1 of the validation report above.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>kW that will be replaced by the proposed project activity are less than 50% of the total replaced.</p> <p>Although it has been stated in the PDD that the most of the larger engines are in urban areas and the installations are owned by Govt. Departments, it is still not clear how it is conservative to use a higher value of 1.4 kgCO₂e/kWh when not all of the larger engines are in the urban areas and not owned by the Govt. departments (please refer to the Generator Survey Summary that was submitted to DNV in August 2007).</p>		<p>size ranges: <15 kW, >=15 <35 kW, >=35<135 kW, >=135<200 kW, and >200 kW - among the sample of generators surveyed in the NAC region in May/June 2007. Refer to <i>Table B.4.2 - Emission Factor based on Table I.D.1</i> in the updated PDD version 6 of 16 October 2009.</p> <p>This same survey found that the rural areas of NAC, where the micro/mini-hydropower projects are slated to be installed, were served by smaller size generators in the < 15 kW category. The larger size gensets in the >=35 <135kW, >=135 < 200kW, and >200 kW are in urban centres. The emission factor of 1.24 kg CO₂eq/kWh is conservative in taking the weighted average by size categories of surveyed generators whereas the generators to be displaced by the project are almost all in the < 15 kW. Secondly the survey showed that actual emission factors of diesel generators working in the field are higher than what is listed in Table I.D.1.</p>	<p>Therefore, this CAR is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CAR 6</p> <p>The starting date of the crediting period has been defined as 1 January 2008. The crediting period cannot start before the date of registration of the CDM project activity. Hence, the starting date of the crediting period needs to be revised.</p>	<p>C.1.1 C.1.2</p>	<p>The starting date of the crediting period will be 15 June 2009 or the date of registration whichever comes later.</p>	<p>OK.</p> <p>Therefore, this CAR is closed.</p>
<p>CL 1</p> <p>It needs to be clarified whether AKRSP will act on behalf of the 103 participating communities as a project participant.</p>	<p>A.2.1</p>	<p>Yes, AKRSP will act on behalf of the 103 participating communities as project participant. This has been clarified in PDD Version 3.</p>	<p>OK. This has been clarified in the PDD that AKRSP will act on behalf of 103 participating communities as a project participant.</p> <p>Therefore, this CL is closed.</p>

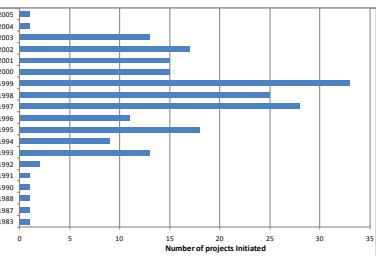
Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 2</p> <p>Clarification is needed on whether the project makes provisions for meeting training and maintenance needs.</p>	A.3.3	<p>For each MHP project provisions are made to train two operators during installation and commissioning of the project. A project is underway with the help of Pakistan Council for Renewable Energy Technologies (PCRET) Pakistan to support further training needs of the project personnel.</p> <p>As per methodology of AKRSP, a maintenance fund amounting to 5% of the construction cost will be ensured for sustainable maintenance of the completed projects. This fund will be required to be collected by the beneficiary communities before commissioning of each project. Whenever this fund is utilised, the maintenance committees will collect additional money from community members to replenish this fund for future maintenance needs. Furthermore, the tariff collected from users will also be deposited in the maintenance account to use for operation and maintenance of the projects.</p>	<p>It has been clarified (and section A.3 of the PDD updated) that the project makes provisions for meeting training and maintenance needs.</p> <p>Therefore, this CL is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 3</p> <p>The project participants are requested to clarify how the project will cause positive environmental impacts from reduced deforestation</p>	<p>A.4.2</p> <p>D.1.4</p>	<p>Majority of these projects are of above 100 kW generation capacities. The beneficiary communities will use this electricity primarily for lighting, but they will also use it for heating and cooking purposes. The partial use of electricity for heating and cooking purposes will have direct and positive environmental impacts from reduced deforestation, where these mountain communities have to rely on their farm forests or natural forests for fuel and fire wood. Although it is expected to accrue as a co-benefit from the project activity, emission reduction benefits through reduced deforestation have not been claimed for the project.</p> <p>This is clarified in PDD Version 3 (Sections A.2, D.1).</p>	<p>It has been clarified here and updated in the PDD, Version 6 of 16 October 2009 that the local communities will partially use the electricity for heating and cooking purposes which will have positive environmental impact from reduced deforestation.</p> <p>In addition, since the project proponent deems it as an additional benefit and does not claim any emission reductions for the reduced deforestation, the argument is accepted by DNV.</p> <p>Therefore, this CL is closed.</p>
<p>CL 4</p> <p>Documentation such as feasibility report(s), needs to be presented to confirm that the overall power generation capacity of the proposed project activity will stay at or below the applicability threshold of 15 MW.</p>	<p>A.5.1</p>	<p>Based on initial engineering design data collected from the project sites, project summaries have been prepared for all projects. The project summary reports show that cumulative power output of</p>	<p>Since no official Feasibility Study Reports (FSRs) are required for these small hydro projects and the information with regards to the installed capacities is taken from the initial</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		103 projects does not exceed the 15 MW threshold.	<p>engineering design data /35/ for each of the project developed by the project proponent, the information is considered acceptable by DNV.</p> <p>The project summary reports show the cumulative power output of 103 projects will not exceed the 15 MW threshold of the applicability criteria.</p> <p>Therefore, this CL is closed.</p>
<p>CL 5</p> <p>The project participants are requested to clarify and document whether the existing grids observed within project boundary are connected to the national or regional grid.</p>	B.1.2	<p>None of the 103 projects are currently designed to be connected to the national or regional power grids. Connection of any of the MHP to the grid in future, should the grid be extended to these communities, will be monitored and reported to the DOE. Any sites which opt to connect to the grid will subsequently be excluded from the project.</p> <p>The PDD includes an explicit monitoring activity to cover future connection of MHPs to the grid:</p>	<p>It has been explicitly stated in section B.7.2 in the updated PDD under the monitoring plan that the connectivity to the grid will be monitored of any of the hydropower projects under the CDM activity. And that any of the MHP that opts to connect to the national grid, which may be extended to the project area in the future, will be excluded from the project.</p> <p>Therefore, this CL is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>“Connections will be monitored of any of the micro hydropower projects, included under the CDM activity, to the grid. Any MHP that opts to connect to the national grid, which may be extended to the project area in the future, will be excluded from the project.”</p>	
<p>CL 6</p> <p>The PDD argues that the proposed project activity faces investment and technological barriers and hence is not financially attractive and will not occur without CDM revenues. However, it has been indicated in the PDD that the AKRSP has experience developing and implementing similar hydro power projects in the past. Clarifications are therefore requested whether all these earlier projects applied CDM, if not, how were they funded and why the current project can not be funded through the same means.</p>	B. 3.1	<p>AKRSP has executed more than 200 Micro Hydel Projects mainly in Chitral region since its inception in 1983. Most of these projects are in the range of 5 kW to 30 kW. These projects were constructed during 1980's and 1990's with international grant funding. In the current decade, especially after 2005, there is no funding available from the international donors for AKRSP's infrastructure programme. Inability to get Norwegian funding for this project is the latest evidence of this. The change in funding availability is mainly due to a change in donor priorities and a new focus on the tribal areas bordering Afghanistan as a result of recent</p>	<p>DNV needs to look at the evidence that the most of the hydro power projects constructed by AKRSP were constructed before 1990 and the investment came from international grant funding. In addition, it needs to be demonstrated that currently there is no funding available from the international donors.</p> <p>In addition, evidence is needed to support that the repayment of the loan will be possible only with carbon credits sine the project has revenue generating component through the sales of electricity.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>international political developments.</p> <p>AKRSP has sought support from national partners for its micro hydel program. These national partners (Pakistan Poverty Alleviation Fund-PPAF and Pakistan Council for Renewable Energy Technologies-PCRET) have agreed to provide assistance for the construction of the micro-hydel plants in Northern Areas and Chitral. Secondly, even with support from local partners, AKRSP has had to rely on private sector investment (for 12% of total investment) and a bank loan (for 18% of total investment) to cover the financing gap and meet the cash flows required for this project. The repayment of the loan will be possible only with carbon credits/revenues from this project. PPAF and PCRET have also asked to receive a share of carbon revenues generated by the project.</p> <p>These arguments have been added to PDD Version 2 (Section B.5, page 17) and Version 6 of 16 October 2009.</p>	<p>This CL is not closed and further clarification is needed when the CL 6 continues below.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 6 (Continued)</p> <p>Project proponent is required to provide evidence to show that the hydro power projects that were constructed by AKRSP were constructed during 1990's and that the investment for those projects came from international grant funding. In addition, it needs to be demonstrated that currently there is no funding available from the international donors.</p> <p>In addition, evidence is needed to support that the repayment of the loan will be possible only with carbon credits since the project has a revenue generating component through the sale of electricity as well.</p>	B. 3.1	<p>The graph below depicts the number of new MHP projects started each year from the commencement of AKRSP micro-hydropower activities in 1983. While there was significant funding from international donors for new projects between 1992 and 2003, this declined precipitously in 2004.</p>  <p>Carbon financing, access to local grant funds, and commercial investment from investors and banks became imperative for new projects.</p> <p>Letter from Acumen Fund shows that commercial financing would only be attracted to the project on account of carbon revenue. Revenue from electricity sales to rural communities alone is not sufficiently attractive for this investment.</p>	<p>The graph provided by the project proponent shows a sharp decline in funding from the international donors beginning 2003. It also show that the most of the hydro power projects that were constructed by AKRSP were constructed from 1993 to 2003.</p> <p>In addition, it is evident from letter from Acumen fund that a commercial financing would only be attracted to the project on account of carbon revenue.</p> <p>Since the revenue from electricity sales to rural communities alone is not sufficiently attractive for this investment and there is currently no funding available from the international donors, it is reasonable to assume that the project faces investment barriers.</p> <p>Therefore, this CL is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 7</p> <p>For the additionality discussion, the following items need to be clarified and documented:</p> <p>The benchmark rate or alternative investment against which the project IRR has been compared.</p> <ul style="list-style-type: none"> - The overall approach that has been used in the development of the financial model and the corresponding investment analysis. - The rationale for choosing a ten year period for the investment analysis as opposed to the full lifetime of the project. - The contribution of local communities towards the development of the MHPs, and how that is included in the investment analysis. 	<p>C.1.1</p> <p>B.3.2</p> <p>B.3.3</p>	<p>It must first be pointed out that improvement in the IRR to attractive levels is not the critical argument for additionality for this project. The major investment barrier is that there is a financing gap in the project which is being filled by private sector investment and a bank loan. These investors could not be attracted to the project without the carbon revenue stream. Letter from Acumen Fund, a social venture capital fund, which is considering both equity and debt investment into the project shows that commercial financing would only be attracted to the project on account of carbon revenue.</p> <p>Ten year bonds issued by Government or corporate entities yielding 10-12% annually are taken as comparative rate of return. For a project to be attractive to the private sector, an acceptable IRR would be around 15%. This is the IRR generally accepted by the National Electric Power Regulatory Authority. http://www.nepra.org.pk/petitions.htm</p> <p>Total costs of ownership including</p>	<p>- It has been demonstrated in the PDD that there is a financial gap in the project that will be filled by the private sector investment and the bank loans. DNV has reviewed a letter from Acumen Fund /10/ which states that commercial financing is attracted to the project on account of carbon revenue. It is also clearly mentioned in the letter that the inability of the project to generate carbon revenue may result in Acumen Fund not making an investment in the project.</p> <p>- The overall approach that has been used in the development of the financial model and the investment analysis has been described in the updated PDD and financial model updated.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>initial capital investments as well as subsequent operating expenses have been taken into account for calculating projected income statements. Project financing will first be out of grants from donor agencies and contributions from communities received during the year and any deficit arising will be financed through a running finance facility. Please note that as per traditional international finance conventions and definitions, grants do not count as part of IRR as they are not revenue generated. Carbon income accrued will be utilised to pay the mark up as well as the principal of operating finances to reduce the financial costs. This income will also be utilised for meeting project/operations management expenses.</p> <p>The analysis is carried out with the following assumptions.</p> <ul style="list-style-type: none"> a) Equity investment for the project is provided as community investment plus private sector investment. Private sector investors expect to receive 	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>carbon revenue at par with their portion of the total project investment.</p> <p>b) Public sector grants are available to the project as investment from PPAF plus PCRET.</p> <p>c) The project will take a commercial loan to close the financing gap which it will repay by the year 2015 with carbon revenue.</p> <p>d) IRR calculations are carried out taking into account project expenses, loan repayment, and revenue streams from beginning of project construction in 2006 till the year 2020. Although the life of the power plants are assumed to be 20 years, it is expected that some of the power plants constructed in the earlier years, 2008-09, will need major repairs and replacement of equipment by 2020. It is assumed that electro-mechanical equipment will have a life of 12 years. It is likely that much of the revenue generated by the</p>	<p>- Since the power plants constructed in the earlier years from 2008 to 2009 will need major repairs and replacement of equipment by 2020 and the electro-mechanical equipment will have a life of 12 years, it is deemed reasonable by DNV that the project proponent has used a 14 year period for investment analysis.</p> <p>- The community contribution of up to 20% of the capital cost has been included as an equity investment in the financial analysis.</p> <p>Therefore, this CL is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>projects beyond 2020 will go to replacement of their electro-mechanical equipment. Analysis into the future is also made uncertain by the considerable uncertainty in future carbon prices.</p> <p>e) The price per ton of CO₂ abated till 2014 is expected to be \$10 and is even more uncertain after that.</p> <p>Analysis is carried out to 2020. It is assumed that the life of electro-mechanical equipment will be 12 years. After 2020, much of the revenues from the power plants will go to replacement of equipment. Thus the revenue after 2020 years is expected to contribute insignificantly to any improvement in the IRR. Investment analysis is thus only carried out till this date.</p> <p>Communities will contribute up to 20% of the capital cost (construction) (18% of the full costs including design and supervision costs) of the project in the form of labour, local materials and cash.</p>	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>In the financial analysis community contribution has been considered as equity investment into the project.</p> <p>This is clarified in PDD Version 2 (Section B.5, page 21)</p>	
<p>CL 8</p> <p>The start date of the project activity listed in section C.1.1 of the PDD is January 01, 2008, while the investment analysis starts from year 2006. During site visit and follow-up interviews it has been clarified that the Project Implementation Note was approved in January 2006 taking CDM into account. Documentation is needed showing timeline on project development activities, including CDM consideration and the final decision to go ahead with the project, and any related corrections need to be made to the PDD</p>	B.3.4	<ul style="list-style-type: none"> • The Project Idea Note (PIN) submitted and accepted by Carbon Finance Unit, World Bank in January 2006 • Construction of projects started on 3 March 2006 • LOI signed in between World Bank and AKRSP in May 2007 • 1st Version of PDD developed November 2007 • Diesel generators survey for emission factor and revised PDD August 2007 • Validation November 2007 • Draft Validation Report May 2008 <p>Please also see AKRSP Board Documents of March 26th 2005 and June 18th 2005, in which carbon finance/CDCF was a driver for the clean</p>	<p>Evidence of CDM consideration has been provided and reviewed by DNV. This is evident in the board meeting minutes of March 26 2005 and June 18 2005 that the carbon finance was a driving force for clean energy resources proposal that forms the basis for the proposed project activity.</p> <p>The start date of the project activity in the updated PDD, Version 6 of 16 October 2009 has been changed from January 2008 to 3 March 2006.</p> <p>Therefore, this CL is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>energy resources proposal.</p> <p>The starting date for the project activity is 3 March, 2006. This is the start date of physical construction of the first mini hydel project – ‘Brep’.</p> <p>The starting date of the crediting period will be the date of registration the CDM project activity.</p>	
<p>CL 9</p> <p>Emissions from the diesel generators that would be used for back-ups have not been taken into consideration while calculating project emissions. This needs to be clarified.</p>	B.4.1	<p>In the proposed methodology for the project activity emission reductions are calculated based on the cumulative kWh meter readings at each mini hydel power house. They are not computed by subtracting full project emissions from baseline emissions. The energy (kWh) that is cumulatively generated by the mini- and micro-hydropower plants and transmitted to the respective communities is considered to displace an equivalent number of kWh which would have been generated by diesel generators in the baseline situation if the project activity had not been implemented. Any kWh produced as backup power generated by diesel</p>	<p>Since the back-up generators will only be operating during the time of no production or not sufficient production by MHP and the credits are claimed based on the cumulative kWh of the each hydro project, it is considered conservative by DNV not to include emissions from back-up generators in emission reduction calculations.</p> <p>Therefore, this CL is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>generators remaining in the communities, either during the hours when the hydel is not operational or not producing sufficient power to meet all community needs, will be considered as the component of the baseline emissions which would also exist in the project scenario and would thus cancel out.</p> <p>This is clarified in PDD Version 2 (Section B.7.2 page 27).</p>	
<p>CL 10</p> <p>Further documentation such as feasibility studies is required to support the estimated total electricity production by the 103 micro and mini hydropower plants to be installed by the project.</p>	<p>B.5.1 B.5.3 B.7.1</p>	<p>Refer to response provided to clarification CL 4.</p>	<p>The project summary reports show that the cumulative power output of 103 projects will not exceed the 15 MW threshold of the applicability criteria.</p> <p>Therefore, this CL is closed.</p>
<p>CL 11</p> <p>It needs to be clarified how the possible leakage will be treated in the calculation of emission reductions. The following needs to be provided:</p> <p>Documentation of whether any energy generating equipment for the MHPs will be</p>	<p>B.6.1</p>	<p>No used electricity generating MHP equipment will be transferred into the communities, as all 103 projects will be new and new manufacturing/purchases for turbine, alternator, governor, penstock, transformer etc. will be made.</p>	<p>Since no energy generating equipment will be transferred from other sites, leakage calculations are not necessary.</p> <p>Old gensets will be scrapped by the communities after the completion of the</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>transferred from other sites.</p> <p>Clarification on how possible leakage from the transfer of diesel generators to other sites, will be treated.</p> <p>Documentation on how leakage will be calculated and deducted from the baseline emissions.</p>		<p>Communities will be encouraged to either destroy old diesel generators or to use them for backup in their own communities. The leakage from any generators which are transferred out of the community to any area which falls outside the project boundary will be monitored for their usage with the participation of beneficiary community and/or owners of these generators.</p> <p>This has been clarified in the PDD Version 2 (Section B.4, page 16).</p>	<p>hydropower projects as per the Terms of Partnership (TOP) between communities and the AKRSP, leakage calculations are not necessary.</p> <p>Therefore, this CL is closed.</p>
<p>CL 12</p> <p>It is not clear if the relevant data records will be kept for 2 years following the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?</p>	B.8.2	<p>The relevant data records will be kept with AKRSP for 2 years following the end of the crediting period or the last issuance of CERs for this projects activity, whichever occurs later. This has been clarified in the Monitoring Plan in PDD Version 2.</p>	<p>Ok. This has been clarified in the monitoring plan in the updated PDD, Version 6 of 16 October 2009 that relevant data records will be kept for 2 years following the end of the crediting period or the last issuance of the CERs for the project activity, whichever occurs later.</p> <p>Therefore, this CL is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 13</p> <p>Detailed specification of monitoring equipment and frequency of monitoring, if finalized, needs to be provided. In addition, measurement accuracy of equipment including process for calibration needs to be addressed.</p>	B.10.4	<p>For all projects high quality three phase energy (kWh) meters manufactured by Syed Bhaies (Pvt) Ltd, Pakistan will be used in the power house to record the total power supplied to the beneficiary communities. The accuracy of the energy meters is crucial to the integrity of the monitoring process. Syed Bhaies is ISO-9000:1994 Certified by DNV International in 1999 and ISO-9000:2000 by RWTUV in 2002. Syed Bhaies energy meters are also approved by Water and Power Development Authority (WAPDA) Pakistan for its projects. The meters will be calibrated before installation and regularly calibrated after every two years. The standard calibration methodology used by WAPDA will be used for calibration of these meters.</p> <p>This has been clarified in PDD Version 2 (Annex 4, page 37).</p>	<p>Since the WAPDA approved meters will be installed that are manufactured by an ISO 9000 certified company and the standard calibration methods as recommended by WAPDA would be adapted, DNV considers this sufficient.</p> <p>Therefore, this CL is closed.</p>
<p>CL 14</p> <p>The measurement accuracy of monitoring equipment including process for calibration</p>	B.10.5	<p>It is addressed in the monitoring plan of PDD Version 2 (Annex 4, page 37).</p>	<p>OK, as per DNV conclusion to CL 13.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
need to be addressed in the monitoring plan.		Please also see response to CL 13.	Therefore, this CL is closed.
<p>CL 15</p> <p>It needs to be clarified whether there will be possible leakage from the transfer of hydropower generating equipment to or from the project sites. If yes please specify how this will be monitored.</p>	<p>B.11.1 B.11.2 B.11.3</p>	<p>Please refer to response to CL 11 where it is stated that only new equipment will be installed.</p>	<p>Since only new equipment will be installed, there is no possibility of leakage from the transfer of hydropower generating equipment to the project sites.</p> <p>Therefore, this CL is closed.</p>
<p>CL 16</p> <p>It needs to be clarified if the host country requires monitoring of sustainable development indicators and analysis of the environmental impacts of the project activity.</p>	<p>B.12.1 B.12.2 B.12.3</p>	<p>The provision of LOA will be with all the conditions of host country requirements of monitoring of sustainable development indicators and after analysis of the environmental impacts of the projects activity. The host country does not require any further monitoring beyond the LOA process.</p> <p>In addition, LOA from DNA (Ministry of Environment Pakistan) has been issued on 30th of July 2008.</p>	<p>As per the LOA from DNA of Pakistan dated 30 July 2008, the host country does not require any further monitoring of sustainable development indicators and the environmental impacts of the project activity.</p> <p>Therefore, this CL is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 17</p> <p>Detailed procedures for training of monitoring personnel, review of reported results/data, and corrective actions, are needed.</p>	<p>B.13.2</p>	<p>Training of monitoring personnel for review of reported data and corrective actions will be as follows;</p> <ol style="list-style-type: none"> 1. Operators and Maintenance Committee: will be trained during installation of projects. They will be trained to carry out minor repairs of the project and record keeping of the kWh log book with operating hours of the project on a daily basis. 2. AKRSP's Regional and Islamabad Office staff: regional office staff is already trained in basic record keeping and log book maintenance of such projects. This staff will provide training to the project operators. Project operators will submit the log book to regional offices on monthly basis, where the data from log book will be transferred into a database (Excel Sheet) and then passed on to the Islamabad Office. The data from three regional offices will be consolidated centrally. 	<p>Detailed procedures for training of monitoring personal, review of reported results/data and corrective actions have been described in the PDD version 6 of 16 October 2009.</p> <p>Therefore, this CL is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>This process has been described in PDD Version 2 (Section B.7.2, page 27; Annex 4, page 38).</p> <p>3. Corrective actions will be taken at three levels. Primarily when the operator observes any unnecessary data (kWh) deviation in the daily record keeping, he will analyse the situation himself first and then inform the Regional Manager Engineering in AKRSP regional office. The Regional Manager will immediately send the concerned field engineer for further verification and to take necessary corrective action. If repairs and replacements will be needed the field engineer will take appropriate action in consultation with concerned maintenance committee of the project. Furthermore, during review of data in regional office and/or Islamabad office necessary action will be taken by the concerned regional</p>	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>Manager Engineering and/or Programme Manager Engineering in Islamabad office for rectification of the identified error in the data/results.</p> <p>This is clarified in the PDD Version 2 (Annex 4, page 38)</p>	
<p>CL 18</p> <p>National requirements regarding environmental impact assessment (EIA) need to be clarified.</p>	<p>D.1.1 D.1.2 D.1.3 D.1.4</p>	<p>According to the rules of Environmental Protection Agency (EPA) Pakistan, Initial Environmental Examination (IEE) is necessary for individual projects below 50 MW capacities and EIA is necessary for individual projects above 50 MW capacities. Furthermore, this project is in compliance with World Bank environmental and social safeguards and has an approved Environmental Impact Assessment (EIA) and Environmental Mitigation Plan.</p> <p>Since total generation capacity of 103 projects is 15 MW, the project has been required to submit an IEE report. To meet each provincial EPA requirements, separate IEE reports have been</p>	<p>It has been stated in the updated PDD, Version 2 of 3 July 2008 and version 6 of 16 October 2009 that only IEE are necessary for these individual projects. And that the IEEs have been accepted by provincial EPAs with the issuance of NOCs.</p> <p>Even though these NOCs have not been provided to DNV for review, issuance of LOA from DNA of Pakistan on 30 July 2008 is considered sufficient evidence by DNV that the national requirements regarding environmental impact assessment.</p> <p>Therefore, this CL is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>prepared, one for the projects falling in district Chitral and one for the projects in Northern Areas. These IEE reports have been accepted by the provincial EPAs and No objection Certificates (NOCs) have been issued by both provincial EPAs.</p> <p>This is clarified in the updated PDD (Section D.1).</p>	
<p>CL 19</p> <p>Clarification is needed on whether a stakeholder consultation process is required by regulations in the host country, and whether the stakeholder consultation process has been carried out in accordance with such regulations. Furthermore, the sample response referred to as Annex 4 needs to be provided.</p>	<p>E.1.3</p> <p>E.1.5</p>	<p>The host country codes do not have any specific requirements or regulations regarding stakeholder consultations.</p> <p>AKRSP has already submitted the request for LOA with the DNA of host country (CDM Cell, Ministry of Environment), which will fulfil all host country requirements with issuance of the LOA.</p> <p>DNA (CDM Cell, Ministry of Environment) Pakistan rules will be followed accordingly as per LOA process.</p>	<p>The stake holder consultation process is not required by regulations in the host country.</p> <p>In addition the LOA from the host country has been issued on 30 July 2008.</p> <p>Therefore, this CL is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>The reference to Annex 4 in PDD Version 1, in reference to the sample response, was an error. This has been removed. The sample response provided during a Third Dialogue process has been provided separately.</p>	

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Rafi-ud-Din Khawaja

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJ1-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
<i>Landfill gas</i>					
<i>Renewables</i>					
<i>Hydro power</i>	Jan 2009				
<i>Wind power</i>					
<i>Other renewable</i>					
<i>Biomass</i>					
<i>Grid connection of isolated system</i>					
<i>Cement</i>					
<i>Waste-heat / waste-gas recovery</i>					
<i>Efficiency of thermal power plants</i>					
<i>Coal mine methane</i>					
<i>Fuel switch</i>					
<i>Manure management</i>					
<i>Waste / wastewater treatment</i>					
<i>Energy efficiency</i>					
<i>N₂O</i>					
<i>HFCs</i>					
<i>Flare reduction</i>					
<i>PFCs</i>					
<i>Charcoal</i>					
<i>CO₂ recovery</i>					
<i>Transport</i>					
<i>Non-renewable biomass</i>					
<i>Biofuel</i>					
<i>Pipeline leakage reduction</i>					
<i>SF₆</i>					

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann

Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Tonje Folkestad

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJ1-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
Landfill gas					
Hydro power					
Renewables Wind power					
Other renewable					
Biomass					
Grid connection of isolated system					
Cement					
Waste-heat / waste-gas recovery					
Efficiency of thermal power plants					
Coal mine methane					
Fuel switch					
Manure management					
Waste / wastewater treatment					
Energy efficiency					
N ₂ O					
HFCs					
Flare reduction					
PFCs					
Charcoal					
CO ₂ recovery					
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF ₆					

Høvik, 9 January 2009

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CERTIFICATE OF COMPETENCE

Michael Lehmann

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJ1-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
<i>Landfill gas</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Renewables</i>			Jan 2009		
<i>Hydro power</i>	Jan 2009	Jan 2009			
<i>Wind power</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Other renewable</i>	Jan 2009	Jan 2009			
<i>Biomass</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Grid connection of isolated system</i>	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
<i>Cement</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Waste-heat / waste-gas recovery</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Efficiency of thermal power plants</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Coal mine methane</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Fuel switch</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Manure management</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Waste / wastewater treatment</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Energy efficiency</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>N₂O</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>HFCs</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Flare reduction</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>PFCs</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Charcoal</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>CO₂ recovery</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Transport</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Non-renewable biomass</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Biofuel</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Pipeline leakage reduction</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>SF₆</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009

Høvik, 9 January 2009

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CERTIFICATE OF COMPETENCE

zhi Ang (Walter) Tang

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJ1-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
<i>Landfill gas</i>					
<i>Hydro power</i>	Jan 2009				
<i>Renewables Wind power</i>	Jan 2009				
<i>Other renewable</i>					
<i>Biomass</i>					
<i>Grid connection of isolated system</i>					
<i>Cement</i>					
<i>Waste-heat / waste-gas recovery</i>					
<i>Efficiency of thermal power plants</i>					
<i>Coal mine methane</i>					
<i>Fuel switch</i>					
<i>Manure management</i>					
<i>Waste / wastewater treatment</i>					
<i>Energy efficiency</i>					
<i>N₂O</i>					
<i>HFCs</i>					
<i>Flare reduction</i>					
<i>PFCs</i>					
<i>Charcoal</i>					
<i>CO₂ recovery</i>					
<i>Transport</i>					
<i>Non-renewable biomass</i>					
<i>Biofuel</i>					
<i>Pipeline leakage reduction</i>					
<i>SF₆</i>					

Høvik, 9 January 2009

Michael Lehmann

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Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Anu Chaudhary

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-9-8-i1-CDMJ1-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
Landfill gas				Jan 2009	Jan 2009
Hydro power					
Renewables Wind power				Jan 2009	Jan 2009
Other renewable					
Biomass					
Grid connection of isolated system					
Cement					
Waste-heat / waste-gas recovery					
Efficiency of thermal power plants					
Coal mine methane					
Fuel switch					
Manure management					
Waste / wastewater treatment					
Energy efficiency					
N ₂ O					
HFCs					
Flare reduction					
PFCs					
Charcoal					
CO ₂ recovery					
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF ₆					

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann

Technical Director, Climate Change Services

APPENDIX C

FOLLOW-UP INTERVIEWS WITH PROJECT STAKEHOLDERS

S/N	Date	Name	Organization	Topic
1	20-11-07	Tajwar Khan; Amir Hussain; Ghulam Haider	Works Dept. Govt. of Pakistan	<ul style="list-style-type: none"> – Possible concerns on project development – Consultation process for stakeholder's comments – No objection consent on project development and operations
2	21-11-07	Yasir Hussain	Northern Areas Tourism, Environment, Sports, & Culture Directorate – Gilgit, NA-EPA	<ul style="list-style-type: none"> – The approval status (incl. EIA / IEE approval, CDM project approval)
3	22-11-07	Dr. Parvez Akhtar	Pakistan Council of Renewable Energy Technologies	<ul style="list-style-type: none"> – Project Management – Consultation process for stakeholder's comments – Risks v/s investments
4	22-11-07	Bikash Pandey	Winrock International, Pakistan	<ul style="list-style-type: none"> – Project design document – Baseline determination of the project – Emission reductions calculation – Emission reduction & monitoring plan – Issues related to the Project additionality
5	18 – 22-11-07	Sher Khan, Programme Coordinator Community Physical Infrastructure (CPI); Iftikhar Ahmed Mughal, Programme Manager F&A; Izhar Hunzai, General Manager	AKRSP – Islamabad	<ul style="list-style-type: none"> – Project design document – Baseline determination of the project – Emission reductions calculation – Emission reduction & monitoring plan – Monitoring of sustainable development indicators – Estimation of leakages – Issues related to the Project additionality – Feasibility Studies

6	18 – 22-11-07	Sardar Ayub, Regional Programme Manager; Jehadzeb Khan, Coordinator CPI; Fazl Rabbi, E&M Engineer; Qazi Ahmad Saeed, Institutional Development Officer (IDO)	AKRSP - Chitral	<ul style="list-style-type: none"> – Project status – Size and coverage – Current electricity situation v/s other means – Baseline determination of the project – Emission reduction & monitoring plan – Estimation of leakages
7	18 – 22-11-07	Aman Ali Shah, Manager CPI; Muhammad Muzzafar, Regional Programme Manager; Hayat Baig, Field Engineer E&M	AKRSP – Gilgit	<ul style="list-style-type: none"> – Project status – Size and coverage – Current electricity situation v/s other means – Baseline determination of the project – Emission reduction & monitoring plan – Estimation of leakages
8	18 – 22-11-07	Muhammad Yousaf, Regional Manager CPI; Hamza Ali, Field Engineer; Khawaja Shujaat, Field Engineer; Khalil Ahmad, Manager Accounts; Dr. Mohammad Abbass, Institutional Development Officer	AKRSP - Baltistan, Skardu	<ul style="list-style-type: none"> – Project status – Size and coverage – Current electricity situation v/s other means – Baseline determination of the project – Emission reduction & monitoring plan – Estimation of leakages
9	18 – 22-11-07	Khurshid Ahmad Wazir Kalash Misbah Michalik Shah Abdul Majeed	BOMBORATE (Community)	<ul style="list-style-type: none"> – Diesel generation data – ToP – Consultation process for stakeholder's comments – Agreement on water

		Naib Nazeem		resources
10	18 – 22-11-07	Sharif Ahmad Niat Khan Asad Baig	BIREER (Community)	<ul style="list-style-type: none"> – Diesel generation data – ToP – Consultation process for stakeholder's comments – Agreement on water resources
11	18 – 22-11-07	Shahzad Zafar Ahmad Alam Khan Mohammad Khan	MASTUJ (Community)	<ul style="list-style-type: none"> – Diesel generation data – ToP – Consultation process for stakeholder's comments – Agreement on water resources
12	18 – 22-11-07	Ajdar Khan Sharaf Khan Jamal Shah Akbar Hussain Farman Jafar	BALEEM (Community)	<ul style="list-style-type: none"> – Diesel generation data – ToP – Consultation process for stakeholder's comments – Agreement on water resources
13	18 – 22-11-07	Ali Gohor Habibullah Sarwar Faraj Enayat Ullah	AHMADABAD (Community)	<ul style="list-style-type: none"> – Diesel generation data – ToP – Consultation process for stakeholder's comments – Agreement on water resources
14	18 – 22-11-07	Muhammad Sultan Hassan Fida Ali Akhund Ishaq Ali Mohammad Mohammad Hussain	MEHMUSHTHAN G (Community)	<ul style="list-style-type: none"> – Diesel generation data – ToP – Consultation process for stakeholder's comments – Agreement on water resources