VALIDATION REPORT

OPTIMISATION OF KIAMBERE HYDRO POWER PROJECT IN KENYA

REPORT NO. 2008-1003

REVISION NO. 02

DET NORSKE VERITAS

VALIDATION REPORT

Date of first issue: 22-10-2008	ConCert Project No.: PRJC-103236-2008-CCS-NOR
Approved by: Michael Lehmann	Organisational unit: DNV KEMA Energy & Sustainability Accrecited Climate Change Services
Client: International Bank for Reconstruction and Development as Trustee of the Community Development Carbon Fund	Client ref.: Noreen Beg

DNV CLIMATE CHANGE SERVICES AS

Veritasveien 1,
1322 HØVIK, Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11
http://www.dnv.com
Org. No: NO 994 774 352 MVA

Summary:

Project Name: Optimisation of Kiambere Hydro Power Project
Country: Kenya
Methodology: ACM0002 **Version:** 13.0.0
Technical area: TA 1.2 Energy generation from renewable energy sources **Sectoral Scope:** 1
GHG reducing Measure/Technology: Grid connected electricity generation from renewable energy source (Hydro)
ER estimate: 41 204 tCO_2e per year (average)
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 project activity "Optimisation of Kiambere Hydro Power Project" in Kenya, as described in the PDD, version 10 of 14 September 2012, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology ACM0002, version 13.0.0. Hence DNV requests the registration of the project as a CDM project activity.

Report No.: 2008-1003	Subject Group: Environment
Report title: Optimisation of Kiambere Hydro Power Project in Kenya	
Work carried out by: Murali Govindarajulu, Decq Philippe, Agnes Dudek, Lumir Nemecek and Grant Little	
Work verified by: Rafi-ud-Din Khawaja Gaurav Srivastava	
Date of this revision: 2012-10-17	Rev. No.: 02 / Number of pages: 26

Indexing terms

Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism
☒ No distribution without permission from the client or responsible organisational unit ☐ free distribution within DNV after 3 years ☐ Strictly confidential ☐ Unrestricted distribution

Table of Content *Page*

Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CDCF	Community Development Carbon Fund
CH_4	Methane
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNA	Designated National Authority
DNV	DNV Climate Change Services AS
EMCA	Environmental Coordination and Management Act
ERPA	Emission Reduction Purchase Agreement
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IenM	Netherlands' Ministry of Infrastructure and the Environment
IPCC	Intergovernmental Panel on Climate Change
KenGen	Kenya Electricity Generating Company Ltd.
KPLC	Kenya Power and Lighting Company
LoA	Letter of approval
LoI	Letter of Intent
PLF	Plant load factor
PPA	Power purchase agreement
NEMA	National Environmental Management Authority
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
tCO_2e	Tonnes of CO_2 equivalents
UNFCCC	United Nations Framework Convention on Climate Change
VROM	The ministry of housing, spatial planning and the environment From 1 January 2012, now called *Netherlands' Ministry of Infrastructure and the Environment (IenM)*
VVM	Validation and Verification Manual

1 EXECUTIVE SUMMARY – VALIDATION OPINION

DNV Climate Change Services AS (DNV) has performed a validation of the project activity "Optimisation of Kiambere Hydro Power Project" in Kenya. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism 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 Kenya and the Annex I Party is the Netherlands. Both Parties fulfil the participation criteria and have approved the project and authorized the project participants Kenya Electricity Generating Company Ltd. (KenGen), International Bank for Reconstruction and Development as Trustee of the Community Development Carbon Fund (CDCF) and Netherlands' Ministry of Infrastructure and the Environment (IenM). The DNA from Kenya confirmed that the project assists in achieving sustainable development.

The project correctly applies the baseline and monitoring methodology ACM0002, version 13.0.0 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources".

The objective of the "Optimisation of Kiambere Hydro Power Project" is to rehabilitate the Kiambere power plant and includes the upgrade of the turbines with new efficient runners at the existing Kiambere power plant. The existing (2 x 72 MW) turbines will be replaced with (2 x 84.5 MW) turbines with new efficient runners. Thus, the upgrade will increase the plant's generation capacity by 25 MW from its existing capacity of 144 MW. As a result of increasing renewable power generation and thus displacing fossil fuel based electricity generation in Kenya, the project results in reductions of CO_2 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 41 204 tCO_2e per year over the selected 10-year fixed crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

The monitoring plan provides for the monitoring of the project's emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is DNV's opinion that the project participants are able to implement the monitoring plan.

In summary, it is DNV's opinion that the project activity "Optimisation of Kiambere Hydro Power Project" in Kenya, as described in the PDD, version 10 dated 14 September 2012, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology ACM0002, version 13.0.0. Hence, DNV requests the registration of the project as a CDM project activity.

Oslo, 2012-10-17

Agnes Dudek

Agnes Dudek
Validator
DNV Climate Change Services AS

Michael Lehmann
Director of Services and Technologies
DNV Climate Change Services AS

2 INTRODUCTION

The International Bank for Reconstruction and Development as Trustee of the Community Development Carbon Fund has commissioned DNV Climate Change Services AS (DNV) to perform a validation of the "Optimisation of Kiambere Hydro Power Project" in Kenya (hereafter called "the project"). This 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 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 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, and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology ACM0002 (version 13.0.0) /44/. The validation was based on the recommendations in the Validation and Verification Manual /43/.

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.

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 tables list the documentation that was reviewed during the validation.

3.1.1 Documentation provided by the project participants

/1/ World Bank: *CDM-PDD for project activity "Optimisation of* Kiambere Hydro Power Project*" in Kenya*, Version 02 dated 30 January 2008, Version 03 dated 9 March 2009, Version 07 dated 8 July 2010, Version 8 dated 17 December 2010, Version 9 dated 25 June 2012 and Version 10 dated 14 September 2012.

/2/ World Bank: *Kiambere hydropower project activity investment analysis*, dated 25 August 2012.

/3/ The ministry of housing, spatial planning and the environment (VROM) in the Netherlands (now – since 1st January 2012 - called The Netherlands' Ministry of Infraestructure and the Environment (IenM)): *Letter indicating "No diversion of ODA"*, dated 12 August 2005.

/4/ Kenya Power and Lighting Company (KPLC) and Kenya Electricity Generating Company Ltd. (KenGen): *Interim power purchase agreement for the bulk supply of electricity from KenGen 's generating facility*, dated 13 July 1999

/5/ KPLC and KenGen: *Agreement to renew the interim power purchase agreement*, dated 30 October 2001.

/6/ KPLC and KenGen: *Second supplemental agreement to the interim power purchase agreement*, dated 1 April 2005.

/7/ KPLC and KenGen: *Power purchase agreement for the upgraded Kiambere hydropower plant*, dated 4 June 2009.

/8/ KenGen: *Report of electricity tariff study for the electricity regulatory board conducted by Fichtner*, dated January 2007

/9/ KenGen: *Managing Director's Report published in the Kenya Electricity Generating Company Limited Annual Report 2006*, page 23, dated 2006.

KenGen: *Project Idea Note 'Optimisation of Kiambere Hydro Power Project'*, dated 3 July 2006 submitted to World Bank.

/10/ World Bank: *Emission reduction calculation and grid emission factor calculation spreadsheet*, 27 June 2012.

/11/ KPLC dispatch centre: *Dispatch data for the period from July 2007 to June 2008*, not

dated.

/12/ Norplan: *Feasibility study report for Kiambere hydropower project*, dated September 2003.

/13/ Norplan: *Kiambere efficient test final report*, dated November 2010.

/14/ Kengen and Voith Siemens Hydro Karftwerkstechnik: *Contract proposal for upgrading of Kiambere hydroelectric power station*, dated 4 November 2005.

/15/ Kengen and Voith Siemens Hydro Karftwerkstechnik: *Contract for upgrading of Kiambere hydroelectric power station*, dated 24 February 2006.

/16/ Kengen: *Kiambere project financial account*, as per 16 November 2011.

/17/ KPLC: *Annual report and financial statement for the year ended 30 June 2009*, dated 2009.

/18/ KPLC: *Financial year energy summary by months and stations from 2003 to 2008*, report dated 21 June 2012

(This evidence includes a summary of the invoice generated for Kimabere hydropower station for the period from 2003 to 2008).

/19/ Martin-René Atangana: *French investment in colonial Cameroon*, dated 2009

http://books.google.com/books?id=bYsBSDyFEEgC&pg=PA144&lpg=PA144&dq=edea+dam+construction&source=bl&ots=otP1hLk8y1&sig=AhxlOytKxyTogzsrB4_PxnV2JG0&hl=en&sa=X&ei=owsfT5f3OcGViAe_wtzpDQ&ved=0CE8Q6AEwBg#v=onepage&q=edea%20dam%20construction&f=false

/20/ Hydroworld article: *Cameroon finalizes deals to refurbish 263-MW Edea, 396-MW Song Loulou*, dated 15 December 2008 http://www.hydroworld.com/index/display/article-display/8019318576/articles/hrhrw/News/Cameroon_finalizes_deals_to_refurbish_263-MW_Edea_396-MW_Song_Loulou.html

/21/ Hydroworld article: *DSD Noell supplies gates to refurbish Cameroon's 263-MW Edea*, dated 15 December 2008.

http://www.hydroworld.com/index/display/article-display/4579713799/articles/hrhrw/News/DSD_Noell_supplies_gates_to_refurbish_Cameroons_263-MW_Edea.html

/22/
- Allafrica article: Cameroon: *Aes SONEL - Lenders Assess Use of Funds*, dated 21 April 2009. Available at http://allafrica.com/stories/201102150700.html
- Eskom: *Nalubaale power station*. http://www.eskom.co.ug/power_stations.php, last access May 2012
- World Commission on dam: Kariba Dam Zambia and Zimbabwe, final report, dated November 2000. http://www2.adb.org/water/topics/dams/pdf/cszzmain.pdf, lst access May 2012
- Norway, the official site in Ethiopia: Koka Dam, 50 years with 39 megawatts, http://www.norway.org.et/News_and_events/etiopia/Koka-Dam-50-years-with-39-megawatts/ , last access May 2012

/23/
- Massaschusetts Instiute of technology Press Book: *Sustainable Energy-choosing*

among options, dated 2005. http://books.google.com/books?id=AIbLqsJrW-QC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

- UNFCCC website: *The registered CDM project Felou regional hydropower project,* http://cdm.unfccc.int/Projects/DB/DNV-CUK1256566709.38/view
- Ontario Power generation: *Decew falls I website*, http://www.opg.com/power/hydro/niagara_plant_group/decew1.asp, last access May 2012
- Wikipedia: *Ardnacrusha power plant*, http://en.wikipedia.org/wiki/Ardnacrusha_power_plant, last access May 2012
-

/24/ Rakesh Nath (Chairman of Bhakra Beas Management Board): *Renovation, Modernization and Upgradation of Hydro Plants in the Bhakra Beas River Valley Development*, not dated.

/25/ National Environment Management Authority (NEMA): *Environmental Coordination and Management Act (EMCA)*, dated 1999.

/26/ KenGen: *Local stakeholder invitation letters to attend consultation meeting on 10 April 2007 and 5 December 2007 regarding the project activity*, dated April 2007 and November 2007.

/27/ KenGen: *local stakeholder consultation minutes of meeting*, dated 10 April 2007

/28/ KenGen: *local stakeholder consultation minutes of meeting*, dated 5 December 2007

/29/ World Bank Carbon Finance Unit: *Letter of intent for the potential purchase of emissions reduction for KenGen energy projects* (including the proposed project activity), dated 6 October 2006

/30/ World Bank Carbon Finance Unit and KenGen: *Emission reduction purchase agreement*, 30 July 2007

/31/ World Bank Carbon Finance Unit and KenGen: *Amendment to the Emission reduction purchase agreement*, 18 September 2009

/32/ Kenya Ministry of Finance to all Chief Executives of State corporations and Accounting Officers: *Treasury Circular Number 27/2003*, dated 2003

/33/ KenGen: historical O&M cost for the period from 2003 to 2005, not dated.

/34/ Price Waterhouse Coopers: Transfer pricing and developing countries, Appendix D – Country Study Kenya, dated 2006
http://www.doingbusiness.org/reports/thematic-reports/~/media/FPDKM/Doing%20Business/Documents/Special-Reports/DB07-Paying-Taxes.pdf
(this evidence indicate the tax rate for fiscal year 2005 in Kenya)

/35/ KPLC: Worksheet as the database for EF calculation, not dated

/36/ Government of Kenya: Sessional Paper No.4 of 2004, dated 2004

/37/ Government of Kenya: Energy Act No.12 of 2006, dated 2006

/38/ United Nations University and KenGen: *CDM potential from a geothermal perspective – a case study of olkaria II 3rd unit, Kenya*, page 6, dated November 2007.

http://www.os.is/gogn/unu-gtp-sc/UNU-GTP-SC-05-30.pdf

/39/ World Bank: *Energy Sector Recovery Project (Cr.3958-KE), Implementation Support Mission*, page 12, dated 3-16 May 2006

/40/ KenGen: *Financial account report*, dated 2006

3.1.2 Letters of approval

/41/ National Environment Management Authority (DNA of Kenya): *Letter of approval*, dated 26 May 2008

/42/ Netherlands' Ministry of Infraestructure and the Environment (IenM) (DNA of the Netherlands): *Letter of approval*, dated 21 January 2011

The letter of approval also confirms the public funding involved for this CDM project activity does not result in a diversion of official development assistance.

3.1.3 Methodologies, tools and other guidance by the CDM Executive Board

/43/ CDM Executive Board: *Validation and Verification Manual*, version 1.2

/44/ CDM Executive Board: *Baseline and monitoring methodology ACM0002*, version 13.0.0

/45/ CDM Executive Board: *Tool to calculate the emission factor for an electricity system*, Version 02.2.1

/46/ CDM Executive Board: *Tool for the demonstration and assessment of additionality*, Version 06.1.0

/47/ CDM Executive Board: *Guidelines on the demonstration and assessment of prior consideration of the CDM***,** Version 04

/48/ CDM Executive Board: *Guidelines on the assessment of investment analysis*, Version 05.0

/49/ Combined tool to identify the baseline scenario and demonstrate additionality, Version 04.0.0

/50/ CDM Executive Board: CDM glossary of terms, version 06.0

3.1.4 Documentation used by DNV to validate / cross-check the information provided by the project participants

/51/ Oanda: *historical exchange rate Kenyan shilling/USD*, available at: http://www.oanda.com/currency/historical-rates/ last access August 2012

/52/ Oanda: *historical exchange rate Euro/USD*, available at: http://www.oanda.com/currency/historical-rates/ last access August 2012

/53/ IPCC: *2006 IPCC Guidelines on National GHG Inventories*

/54/ UNFCCC website: Redevelopment of Tana Hydro Power Station Project, reference 5023. Available at: http://cdm.unfccc.int/Projects/DB/DNV-CUK1310725211.27/view

3.2 Follow-up interviews with project stakeholders

From 28 July 2008 to 31 July 2008 DNV visited Kiambere hydropower plant project site and performed interviews with project stakeholders. The plant is located in the Mbeere district, in Kenya eastern province.

	Date	Name	Organization	Topic
/55/	28 to 31 July 2008	Pius Kollikho	Kiambere Plant	• Project Technology and additionality • Technology applied and operational lifetime. • Monitoring and reporting procedures. • Calibration, internal audit and corrective action procedures. • Provisions for training, operation and maintenance.
/56/	28 to 31 July 2008	Simon Ngure	Kiambere Plant	• Project Technology and additionality • Technology applied and operational lifetime. • Monitoring and reporting procedures. • Calibration, internal audit and corrective action procedures. • Provisions for training, operation and maintenance.
/57/	28 to 31 July 2008	Samason Kimani	Kiambere Plant	• Project Technology and additionality • Technology applied and operational lifetime. • Monitoring and reporting procedures. • Calibration, internal audit and corrective action procedures. • Provisions for training, operation and maintenance.
/58/	28 to 31 July 2008	Noreen Beg	World Bank	• Calculation of CEF • Estimated emission reductions.
/59/	28 to 31 July 2008	Adelaide Schwab	World Bank	• Calculation of CEF • Estimated emission reductions.
/60/	28 to 31 July 2008	Emilly Massawa	NEMA (DNA of Kenya)	• Environmental compliance

3.3 Resolution of outstanding issues

The objective of this phase of the validation was to resolve any outstanding issues which needed clarification prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. 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 four tables. The different columns in these tables are described in the figure below. The completed validation protocol for the project activity "Optimisation of Kiambere Hydro Power Project" in Kenya is enclosed in Appendix A to this report.

Table 2 of the validation protocol documents the findings of the desk review of the project design documentation and follow-up interviews with project stakeholders. Any findings raised in Table 2 are listed in Table 3 of the protocol, and changes to the description of the project design as a result of these findings will be addressed in Table 3. Table 2 thus may not reflect all aspects of the project as described in the final PDD submitted for registration.

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

(a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;

(b) The CDM requirements have not been met;

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

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

A forward action request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration.

Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities		
Requirement	***Reference***	***Conclusion***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**) or a **corrective action request (CAR)** if a requirement is not met.*

Validation Protocol Table 2: Requirement Checklist				
Checklist question	***Reference***	***Means of verification (MoV)***	***Assessment by DNV***	***Draft and/or Final Conclusion***
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the CDM-PDD	*Gives reference to documents where the answer to the checklist question or item is found.*	*Means of verification (MoV) are **document review (DR)**, **interview (I)** or any other follow-up actions (e.g., on site visit and telephone or email interviews) and **cross-checking (CC)** with available information relating to projects or technologies similar to the proposed CDM project activity under validation.*	*The discussion on how the conclusion is arrived at and the conclusion on the compliance with the checklist question so far.*	*OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. A **corrective action request (CAR)** is raised when project participants have made mistakes, the CDM requirements have not been met or there is a risk that emission reductions cannot be monitored or calculated. A **clarification request (CL)** is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. A **forward action request (FAR)** during validation is raised to highlight issues related to project implementation that require review during the first verification of the project activity.*

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

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

Figure 1: Validation protocol tables

3.4 Internal quality control

The validation report underwent a technical review performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation team

				Type of involvement						
Role	***Last Name***	***First Name***	***Country***	Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	TA 1.2 competence	Financial expertise
Team leader (Validator) (From May 2012)	Dudek	Agnes	Norway	✓		✓	✓		✓	
Validator (Until May 2012)	Govindarajulu	Murali	India	✓	✓	✓	✓		✓	
Validator	Decq	Philippe	France	✓	✓	✓			✓	
Expert	Nemecek	Lumír	Czech Republic	✓					✓	
Expert	Little	Grant	South Africa	✓		✓				✓
Technical reviewer (until 31 August 2012)	Khawaja	Rafi-ud-Din	Norway					✓	✓	
Technical reviewer (from 31 August 2012)	Srivastava	Gaurav	India					✓	✓	

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

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 final validation findings relate to the project design as documented and described in the PDD, version 10 dated 14 September 2012 /1/.

4.1 Participation requirements

The project participants are Kenya Electricity Generating Company Ltd. (KenGen) from the host Party Kenya, the International Bank for Reconstruction and Development as Trustee of the CDCF from the Annex I Party the Netherlands and Netherlands' Ministry of Infrastructure and the Environment (IenM) from the Annex I Party the Netherlands. The host Party (Kenya) and the Annex I Party (the Netherlands) meet all relevant participation requirements.

A letter of approval (LoA) /41/ was issued by DNA of Kenya on 26 May 2008, authorizing KenGen of host Party as project participant and confirming that the project assists in achieving sustainable development.

The DNA of the Netherland Party issued a LoA /42/ on 21 January 2011 and authorized the International Bank for Reconstruction and Development as the Trustee of the CDCF from Annex I Party as project participant.

The letters of approval were received from the project participants. DNV does not doubt the authenticity of the letters of approval. DNV considers the letters are in accordance with paragraphs 45- 48 of the VVM /43/.

The validation did not reveal any information that indicates that the public funding involved in this project activity can be seen as a diversion of official development assistance (ODA) funding towards Kenya and an affirmation was received by the Netherlands affirmation that the funding by the Netherlands to the CDCF does not result in a diversion of official development assistance /3//42/.

4.2 Project design

The project activity is located downstream of Kindaruma Power station, along the Tana cascade in the Mbeere district of Kenya’s Eastern province. The geographical coordinates of the project activity are: Latitude 0° 38' 24" S and Longitude 37° 54' 36" E. The geographical coordinates were confirmed by the validation team during the site visit and in Google map.

The project activity is to rehabilitate the Kiambere Power Plant that includes the upgrade of the turbines with new efficient runners at the existing Kiambere power plant. The project is connected to the Kenyan national grid as verified by DNV against the power purchase agreements (PPAs) signed between KPLC and KenGen on 13 July 1999 /4/, 30 October 2001 /5/ and 4 June 2009 /7/.

Prior the implementation of the project activity, the existing Kiambere hydropower plant had an installed capacity of 144 MW and was commissioned in 1988, this was verified by DNV through the review of *Kiambere efficient test final report* prepared by Norplan dated 13 July 1999 /4/. The existing Kiambere hydropower plant has two vertical shaft Francis turbine of 72

MW (total 144 MW) installed capacity /4/ and has supplied on average annual electricity of about 917.4 GWh to the Kenyan grid in the past five years (July 2003 to June 2008) /17/.

The project activity aims to optimise the electricity production from the existing plants by installing state of art runners. The existing (2 x 72 MW) Francis type turbines will be replaced with (2 x 84.5 MW i.e. a total installed capacity of 169 MW) Francis turbines with new cavitation-free runners as verified by DNV through the review of the *Kiambere efficient test final report* /4/ and the contract between the project participant (KenGen) and Siemens for upgrading Kiambere hydroelectric power station, dated 24 February 2006 /15/.

The upgrade will increase the plant's generation capacity by 25 MW from its existing installed capacity of 144 MW /4//15/. Of this additional 25 MW, at present only 20 MW is the contracted capacity to be supplied to the Kenyan grid according to the PPAs signed between KPLC and KenGen /5//7/. The additional contracted capacity of 20 MW will supply an estimated annual incremental power of 75 GWh to the Kenyan grid /7/. Hence, with this additional contracted capacity, the total electricity supply to the grid from the Kiambere power plant will be 992.4 GWh per year /5//7/.

The project activity utilises hydropower for electricity generation and will result in greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions from electricity generation by fossil fuel power plants, which form part of the generation mix in the Kenya's grid.

The starting date of the project activity is 24 February 2006 which is the date of the signature of the contract between the project participant (KenGen) and Siemens for upgrading Kiambere hydroelectric power station, dated 24 February 2006 /15/.

The expected operational lifetime of the project activity is 25 years according to the contract between the project participant (KenGen) and Siemens for upgrading Kiambere hydroelectric power station, dated 24 February 2006 /15/.

A fixed crediting period of 10 years has been chosen for the project, starting from 1 November 2012 (or the date of registration, whichever is later). The emission reductions are estimated to be 41 204 tCO_2e per year and 412 040 tCO_2e over the fixed 10-years crediting period.

DNV considers the project description of the project contained in the PDD to be complete and accurate and verified during the site visit to the project activity from 28 to 31 July 2008. The PDD complies with the relevant forms and guidance for completing the PDD.

4.3 Application of selected baseline and monitoring methodology

The project activity is to rehabilitate the Kiambere Power Plant that includes the upgrade of the turbines with new efficient runners at the existing Kiambere power plant. The application of the approved consolidated baseline methodology ACM0002 version 13.0.0 titled *Consolidated baseline methodology for grid-connected electricity generation from renewable sources* /44/ for the project is justified for the following reasons:

- The project activity is the replacement of an existing hydro power plant and the project activity is implemented in the existing reservoir with no change in the volume of reservoir, this was verified by DNV during the site visit and through the review of the *Kiambere efficient test final report* /4/ as well as the contract between the project participant (KenGen) and Siemens for upgrading Kiambere hydroelectric power station, dated 24 February 2006 /15/.

- The existing plant was in commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and no capacity expansion or retrofit of the plant has been undertaken in the five year period verified based on the generation summary for the past years (July 2003 to June 2008) /17/.
- The project activity does not involve switching from fossil fuels to renewable energy sources at the site of the project activity, this was verified by DNV during the site visit and through the review of the *Kiambere efficient test final report* /4/ and the contract between the project participant (KenGen) and Siemens for upgrading Kiambere hydroelectric power station, dated 24 February 2006 /15/.

Hence, it is DNV's opinion that the consolidated baseline methodology ACM0002, version 13.0.0 titled *Consolidated baseline methodology for grid-connected electricity generation from renewable sources* /44/ has been correctly applied. The assessment of the project's compliance with the applicability criteria of ACM0002 (version 13.0.0) are documented in detail in section B.2 of Table 2 in the validation protocol in Appendix A to this report.

4.4 Project boundary

The project boundary includes the project power plant and all power plants connected physically to the Kenyan grid to which the project activity is connected /4//5//7/. The system boundaries have been adequately described in the PDD and the same has been verified based on the site visit /55//60/.

The system boundaries are presented in the table below:

	GHGs involved	*Description*
Baseline emissions	CO_2	The major emission source. The GHG emission reduction achieved by replacing the electricity generated by the national grid of Kenya.
Project emissions	No Project emissions	No project emissions envisaged for the project activity.
Leakage	No Leakage	No leakage envisaged for the project activity.

The identified boundary and selected sources and gases are justified for the project activity. The validation of the project activity did not reveal other greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 1% of the overall expected average annual emission reduction, which are not addressed by ACM0002 (version 13.0.0).

4.5 Baseline identification

The project activity is the replacement of equipment of the existing grid-connected Kiambere hydropower plant. According to ACM0002 Version 13.0.0 /44/ if the project activity is a replacement or retrofit of an existing grid connected electricity generation facility, the baseline scenario needs to be identified using the step-wise procedure which was assessed by DNV as follow:

Step 1: Identification of alternative scenarios

Step 1a: Define alternative scenarios to the proposed CDM project activity

The project participant has identified and discussed scenarios P1, P2 and P3 for the project activity /1/. These are:

P1: The project activity not implemented as a CDM project;

P2: The continuation of the current situation i.e. to use all power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance. The additional power generated under the project would be generated in existing and new grid-connected power plants in the electricity system;

P3: All other plausible and credible alternatives to the project activity that provide an increase in the power generated at the site, which are technically feasible to implement

DNV considers the list of realistic and credible alternatives to be complete. All the three alternatives are in compliance with the laws and regulations of Kenya and might be considered as baseline scenarios.

Out of above listed alternatives, the following alternatives were considered by the project participants:

P1: The project activity not implemented as a CDM project;
According to the investment analysis discussion presented in Section 4.6 below, P1 is not a realistic and credible alternative since the project IRR of the activity at 9.20% is lower than the benchmark of 15% and hence not financially attractive as assessed in section 4.6 of this report.

P2: The continuation of the current situation without investment in the project activity and the additional electricity generated by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources does not face any barriers. This is a plausible scenario, c.f. section 4.8 of the report regarding $DATE_{BaselineRetrofit}$ which further describe that the continuation of the current situation without investment in the project activity indeed is plausible.

P3: All other plausible and credible alternatives to the project activity that provide an increase in the power generated at the site, which are technically feasible to implement. There are no other technically feasible implementation measures available for increasing power generation without making changes to the reservoir capacity, water passage and civil structure. This was verified by DNV through the review of the *Kiambere efficient test final report* /4/ and the contract between the project participant (KenGen) and Siemens for upgrading Kiambere hydroelectric power station, dated 24 February 2006 /15/.

Hence, P2 the continuation of the current situation is found to be appropriate as selected baseline scenario. It is DNV's opinion that the selected baseline scenario is in line with the approved baseline methodology ACM0002 version 13.0.0 /44/.

The approved baseline methodology has been correctly applied to identify a complete list of realistic and credible baseline scenarios, and the identified baseline scenario most reasonably represents what would occur in the absence of the proposed CDM project activity.

All the assumption and data used by the project participants are listed in the PDD and/or supporting documents. All documentation relevant for establishing the baseline scenario and

correctly quoted and interpreted in the PDD. Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD.

4.6 Additionality

The project activity is a large scale activity and additionality of the project has been established using the *Tool for the demonstration and assessment of additionality*, version 06.1.0 /46/.

4.6.1 Evidence for prior CDM consideration and continuous actions to secure CDM status

The CDM consideration and real and continued actions undertaken to secure CDM status have been demonstrated from the following chronology of events and evidences provided.

Project start date

The starting date of the project activity is 24 February 2006 which is the date of the signature of the contract between the project participant (KenGen) and Siemens for upgrading Kiambere hydroelectric power station /15/. DNV confirms that no other real action or other contract was signed for the implementation or construction of the project prior the 24 February 2006. The project start date is in line with the guidance provided by the EB on start dates /50/.

Prior CDM consideration:

The project start date of the project activity is before the date of project validation and before 2 August 2008. Hence, in accordance with the *Guidelines on the demonstration and assessment of prior consideration of the CDM* /47/, DNV has verified the project participant awareness of the CDM and that CDM was a decisive factor in the decision to proceed with the project activity. DNV has verified this through the review of the *Managing Director's Report* published in the *Kenya Electricity Generating Company Limited Annual Report 2006* /9/ (page 23) which states awareness of the CDM. The report /9/ also highlights the importance of CDM revenue as a decisive factor for the successful implementation and operation of the project activity. The CDM benefit as a decisive factor was also demonstrated through the submission of the project idea note to the World Bank on 3 July 2006 /9/.

Continuous action to secure the CDM:

The real and continues action to secure CDM status was evidenced through the activities listed below, which were completed in parallel with the implementation of the project activity:

- Signature of the letter of intent (LoI) for the potential purchase of CERs between KenGen and Carbon Finance Unit dated 6 October 2006 /28/.
- Signature of the emission reduction purchase agreement (ERPA) between KenGen and World Bank Carbon Finance unit on 30 July 2007 /30/.
- Signature of the CDM validation contract for the project activity between DNV and the World Bank Carbon Finance Unit, dated 30 November 2007.
- Publication of the project activity PDD for global stakeholder consultation on 11 March 2008.
- The project was commissioned in March 2009 with the commission of Unit 2 /4/

- Signature of the amended emission reduction purchase agreement (ERPA) between KenGen and World Bank Carbon Finance unit on 18 September 2009 /30/.
- Unit 1 was commissioned on November 2009 /4/

DNV considers that the evidences demonstrate the prior CDM consideration for the project activity and that real and continuous action to secure CDM status for the project were underway until the submission of the project for global stakeholder consultation. The time gap between each activities is less than two years. DNV confirms that the project activity is in compliance with the *Guidelines on the demonstration and assessment of prior consideration of the CDM* /47/.

4.6.2 Identification of alternatives to the project activity

As describe in section 4.5 of this report, the alternatives considered as baseline scenario for the project activity are i) project activity without CDM benefits ii) project proponent would have continued with current situation without investment in the project activity. The alternatives are in compliance with the laws and regulations of Kenya and might be considered as baseline scenarios. However, as discussed in the following sections of this report, the project without CDM benefits faces barriers in implementation.

4.6.3 Investment analysis

Choice of approach

The project proponent has selected a benchmark analysis for demonstrating the additionality of the project and the selected financial indicator is a post-tax project IRR. Since the proposed project generates financial and economic benefits through the sales of electricity other than CDM-related income and the alternative does not involve any investment, a benchmark analysis is applicable.

Benchmark selection

In accordance with the additionality tool /46/ Sub-step 2.b option III paragraph 30 (d), the benchmark for the project activity is derived from Kenya government bond rates.

The selected benchmark for the project activity is a post-tax project benchmark of 15% which is in accordance with the selected financial indicator (a post-tax project IRR). DNV has verified the applied benchmark against the latest Treasury Circular Number 27/2003 from the ministry of Finance to all Chief Executives of State corporations and Accounting Officers containing the general guidelines for the Capex projects /32/. DNV confirms that no other circular was issued between 2003 and 2007, therefore the benchmark is considered to be appropriate. The selected benchmark represents an official benchmark for the power generation market on new investments, supplied by a relevant national authority in Kenya.

DNV finds the benchmark of 15% adopted for the project to be in line with the guidance provided in the additionally tool and EB guidelines.

Input parameters

Investment costs:

The investment costs used in the project activity investment analysis /2/ is 7 581 146 Euro (i.e. 9.6 million USD). DNV has verified this value against the *Contract proposal for*

upgrading of Kiambere hydro electric power station, dated 4 November 2005 prepared by the third party Voith Siemens Hydro Karftwerkstechnik /14/. DNV confirms that this was the latest information at the time of the investment decision for the project activity.

Furthermore, DNV has cross checked the investment costs against the signed contract between KenGen and Voith Siemens Hydro Karftwerkstechnik for upgrading of Kiambere hydroelectric power station, the contract was signed on 24 February 2006 /15/, the contract indicate a fee of 7 108 225 Euro. The contract costs /15/ are lower than the estimated costs in the proposal /14/. DNV has verified than the IRR becomes 9.97% when the contract costs is considered, which is still below the benchmark of 15%.

In addition, since the project is already commissioned, DNV has also verified the actual cost of the project activity through the review of the project financial account as per 16 November 2011 /16/, the actual cost is 16 million USD, which is 77% higher that the value used in the investment analysis.

Thus, DNV considered that the investment costs used in the investment analysis is reasonable and represent the latest information available to the project participant at the time of the investment decision.

Capital replacement

The capital replacement costs used in the project activity investment analysis /2/ is 2 million USD in year 10 and year 25 of the investment analysis. This cost is estimated directly by the project participant based on its experience of operating Kiambere power plant. DNV has verified that even if this cost is considered to be zero the IRR becomes 10.37% which is still below the benchmark.

Increase in generation capacity during flooding period

The increase in generation capacity used in the project activity investment analysis /2/ is 20 MW. DNV has verified that the applied value is in accordance with the assumptions stated in the third party feasibility study report from Norplan dated September 2003 /12/ which is the latest information available to the project participant at the time of the investment decision.

Furthermore, DNV has also cross checked the latest PPA for the project activity dated 4 June 2009 /7/, the PPA confirms that although the project activity implementation result in an addition of 25 MW of installed capacity (i.e. from 144 MW to 169 MW), at present only 20 MW is the contracted capacity to be supplied to the Kenyan grid.

Furthermore, DNV has verified that even if 25 MW of incremental generation is considered the resulting IRR remains below the benchmark.

Thus, DNV considered that the increase in generation capacity value used in the investment analysis is reasonable and represent the latest information available to the project participant at the time of the investment decision.

Flooding period

The flooding period used in the project activity investment analysis /2/ is 120 days. As stated in the third party feasibility study report from Norplan dated September 2003 /12/, there is an estimated loss of between 2 x 7 MW to 2 x 10 MW power due to existing runner design which could not handle excess water available during the flood season and also due to

problem with inlet cavitation. The new cavitation-free runners to be installed as part of the project activity are expected to utilize the excess water available during the 120 days flooding period. As per the Norplan report /12/, the project activity with new runners is expected to generate additional power of 20 MW for export to the grid during flooding period only which is considered to be 120 days in a year /12/.

The Norplan report /12/ is the latest information available to the project participant at the time of the investment decision, thus DNV considers that the value applied is reasonable.

Plant load factor

The plant load factor used in the project investment analysis /2/ is 100%. DNV consider the application of this value to be conservative since this is the highest value that can possibly be applied.

Exchange rate Ksh/USD

The exchange rate Ksh/USD used in the project activity investment analysis /2/ is 75.2954 Ksh/USD which is the average for 2005. DNV has verified this is consistent with the average rate for the year 2005 recorded by Oanda /51/. DNV considered that the exchange rate Ksh/USD used in the investment analysis is reasonable and represent the latest information available to the project participant at the time of the investment decision.

Exchange rate Euro/USD

The exchange rate Euro/USD used in the project activity investment analysis /2/ is 0.8371 which is the average for 2005. DNV has verified this is consistent with the average rate for the year 2005 provided by Oanda /52/. DNV considered that the exchange rate Euro/USD used in the investment analysis is reasonable and represent the latest information available to the project participant at the time of the investment decision.

Electricity tariff

The electricity tariff used in the project activity analysis /2/ is 1.76 Ksh/kWh. DNV has verified this value against the power purchase agreement between Kengen and KPLC dated 1 April 2005 /6/ which states a price of 1.76 Ksh/kWh for the project activity. DNV considered that electricity tariff used in the investment analysis is reasonable and represent the latest information available to the project participant at the time of the investment decision.

Variable O&M costs

The O&M costs used in the project activity investment analysis /2/ is 0.010235 Ksh/kWh. DNV has verified this value against the average historical O&M cost for the Kiambere hydropower plant over the period from 2003 to 2005 /33/. Furthermore, DNV has verified that even when the O&M costs for the project activity are considered to be zero the IRR becomes 9.28% which is still below the selected benchmark of 15%.

Depreciation rate

In the investment analysis for the project activity the depreciation is calculated on a straight-line basis the lifetime of the project activity i.e. 25 year. DNV has verified that this is in accordance with KenGen 2006 Annual Account report /40/ and common practice in the host country /54/.

Tax

The tax rate used in the project activity investment analysis /2/ is 30%. DNV has verified this value against a third party report prepared by Price Waterhouse Coopers and the World Bank /34/. The report confirms that 30% is the rate which was applicable at the time of the project investment decision.

Calculation and conclusion

The IRR calculations and assumptions provided in the project investment analysis /2/ are consistent with the evidence verified and the calculations were checked and found to be in line with EB's guidance on investment analysis /48/. The assumptions used in the calculations are correct and have been verified by DNV. The post-tax project IRR of the project over 25 years is 9.20% which is less than the benchmark IRR of 15%.

Sensitivity analysis

A sensitivity analysis has been carried out for the major parameters: increase in incremental generation, O&M, tariff and project cost which contribute to more than 20% of revenues or costs to check the robustness of the financial analysis. The level of variation assumed for the sensitivity analysis has been suitably justified with relevant documents pertaining to the presented analysis and has been verified by DNV as follow:

Investment costs: with a decrease by 35% from the investment costs considered for the project activity the IRR reaches the benchmark. The project activity is already commissioned /4/ and DNV has verified the actual cost of the project activity, i.e. 16 million USD as verified against Kengen financial accounts /16/, which is about 7 million higher than the value considered in the investment analysis (9.06 million USD /14/). Thus the investment costs will not decrease by 35% in the future.

Operation and maintenance (O&M) cost: DNV has verified that even if O&M costs are considered as zero the IRR remains below the benchmark. Thus DNV confirms that the project activity O&M costs will not vary in the future such that the IRR reaches the benchmark.

Increase in the "Incremental generation": With an increase of 47% from the "incremental generation" considered for the project activity the project IRR reaches the benchmark. DNV has verified that this is unlikely to happen given that a PLF of 100% is already conservatively considered by the project participant for the project investment analysis. Furthermore, even if 25 MW of incremental generation is considered the resulting IRR is below the benchmark.

Electricity Tariff: The IRR crosses the benchmark if the tariff increases by 47%. As per the power purchase agreement signed with KPLC the tariff has been fixed for twenty years /6//7/.

It has also been checked from the Report of Electricity Tariff Study for the Electricity Regulatory board conducted by Fichtner dated January 2007 /8/ that no revisions in tariff has been proposed. Hence, it can be reasonably inferred that the increase of tariff by 47% is unlikely to happen.

The sensitivity analysis shows that even with likely variations of the key input parameters, the post-tax project IRR of the proposed project is lower than the benchmark. In conclusion, the assessment of the arguments presented is deemed to sufficiently demonstrate that the project is not financially attractive.

4.6.4 Barrier analysis

No barrier analysis was considered for this project.

4.6.5 Common practice analysis

A common practice analysis was carried out considering similar projects in the same region, of similar scale, and taking place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing.

A hydropower project power plant is considered within the group of measures "*Switch of technology with or without change of energy source (including energy efficiency improvement as well as use of renewable energies)*" which is listed in paragraph 6 of the "*Tool for the demonstration and assessment of additionality*" version 06.1.0 /46/. Therefore, the step-wise approach for the common practice analysis listed in paragraph 47 of the "*Tool for the demonstration and assessment of additionality*" version 06.1.0 /46/ is applicable to the proposed project activity, as considered below:

Step 1*: Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity.*

DNV has verified that the correct output range (82.5 MW to 247.5 MW) were considered for the common practice analysis considering the project installed capacity.

Step 2: In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. Registered CDM project activities shall not be included in this step.

The geographical scope for the common practice analysis was determined by the project proponents to be the entire host country of Kenya. DNV considers the defined scope appropriate.

The plants selected for comparison are all electric plants that are connected to the grid and operational before the start date of the project i.e. 24 February 2006. DNV has verified that the list power plants provided in the PDD is completed and in accordance with the information provided by KPLC /11//35/.

In accordance with the additionality tool /46/ and out of the list of power plants in Kenya:

a) All plants with an installed capacity outside the selected range for the common practice analysis were excluded,
b) All power plants commissioned after the project start date were excluded from the common practice analysis.
c) All registered CDM projects and CDM projects under validation were excluded from the list as verified by DNV through the review of the UNFCCC website.

Based on the evidence reviewed by DNV /11//35/, DNV confirm that Nall = 3.

Step 3: Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the proposed project activity. Note their number Ndiff.

DNV has assessed that the three hydropower plants identified above (Turkwel, Gitaru and Kamburu) differ from the project activity for the following reasons:

- Since year 2000, the energy sector as a whole has been undergoing restructuring and reforms as articulated in the Sessional Paper No.4 of 2004 and the Energy Act No.12 of 2006 /36//37/. Considering this, the regulatory and investment environment under which these three projects were implemented were different since Turkwel, Gitaru and Kamburu were commissioned in 1991, 1978 and 1974 respectively /11//35/ and the project activity was implemented in 2006 /15/.
  Furthermore, as a consequence of these restricting reforms the ownership structure of KenGen was changed in 2006 when the Government of Kenya sold 30% of its KenGen share /38/. This further confirms that the regulatory and investment environment for the project activity is different that for the three projects (Turkwel, Gitaru and Kamburu).
- The prices of relevant input materials for the manufacture of equipment have increased by more than 30% in recent years /39/ making investments in new hydropower projects and new capacity additions more expensive. That means, the cost per MW of investment made for these three hydro projects (Turkwel, Gitaru and Kamburu) is lower than for the project activity.

Based on the evidence reviewed, $N_{diff} = 3$

Step 4: Calculate factor $F=1- N_{diff}/N_{all}$ representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity. The proposed project activity is a "common practice" within a sector in the applicable geographical area if the factor F is greater than 0.2 and $N_{all}-N_{diff}$ is greater than 3.

Based on outcomes of step 2 and step 3, $F = 1 – (3/3) = 0$; and $N_{all}-N_{diff} = 0$

Considering above, the proposed project activity is not a common practice within a sector in the applicable geographical area as both of the following conditions are not fulfilled:

a) the factor F is greater than 0.2, and
b) $N_{all}-N_{diff}$ is greater than 3.

In conclusion, it is DNV's opinion that it has been correctly demonstrated that the project activity does not represents a common practice and thus the emission reductions achieved by the project are additional to any that would happen in absence of the project.

4.7 Monitoring

The monitoring methodology selected complies with the requirement of applied methodology ACM0002 (version 13.0.0) "*Consolidated baseline methodology for grid connected electricity generation from renewable sources*" /44/. The project monitoring plan is in compliance with the monitoring methodology ACM0002 (version 13.0.0). The monitoring plan will give opportunity for real measurement of emission reductions achieved and the monitoring arrangements have been physically verified by DNV during the site visit assessment. It is DNV's opinion that the project participants are able to implement the monitoring plan.

Monitoring of sustainable development indicators is not required by the Kenyan DNA.

4.7.1 Parameters determined ex-ante

- **Annual average historical net electricity generation delivered to the grid by the existing facility:** The Annual average electricity generation form the exiting project facility has been fixed as 917 400 MWh per year. This has been arrived based on the details of the last 5 years of electricity generation from the Kiambere hydro power plant 2003/04: 1,010 GWh; 2004/05: 814 GWh; 2005/06: 852 GWh; 2006/07: 973 GWh; 2007/08: 938 GWh. DNV has verified this values through the review of the KPLC's *Annual report and financial statement for the year ended 30 June 2009*, dated 2009 /17/ and through the review of sampled invoices from KPLC for the period from 2003 to 2008 /18/.

- **Standard deviation of the annual average historical net electricity generation delivered to the grid by the existing Facility:** The parameter has been fixed as 82 248 MWh per year based on the 5 years generation data from the Kiambere hydropower plant /17/.

- **$DATE_{BaselineRetrofit}$;** This parameter has been fixed *ex-ante* as 31 December 2022 and has been justified based on the data of the hydro plants operating in the African region /21//22//23//24/. This parameter is further explained in section 4.8 of this report.

- **The Build margin emission coefficient:** The parameter has been calculated *ex-ante* for the entire crediting period based on 20% most recent capacity additions in the grid based on net generation as described in *tool to calculate the emission factor for an electricity system* /45/ and has been fixed at 0.4665 tCO_2/MWh, and this value has been sourced from the KPLC database /11//35/. DNV has verified that the data has been sourced from KPLC, which is Government of Kenya organization and authentic.

4.7.2 Parameters monitored ex-post

- $EG_{facility,y}$: Quantity of net electricity generated supplied and delivered by the project to the grid
  This parameter will be determined as a difference between (i) quantity of electricity supplied by the project plant/unit to the grid and quantity of electricity delivered to the project plant/unit from the grid. The electricity meters will be installed in compliance with industry standards in the country. The parameter will be measured continuously and recorded on a monthly basis and will be cross checked based on the sales receipt.

- $EF_{grid,OM\text{-}DD,y}$: Operating Margin Emission factor using Dispatch data analysis
  This parameter will be derived based on the KPLC dispatch center data and IPCC default factors and will be calculated using the latest version of the *tool to calculate the emission factor for an electricity system* /45/. Calculation should be done after KPLC energy balance to ensure data validity.

- $EG_{n,h}$ *and* $EG_{m,y}$: Net electricity generated and delivered to the Kenyan grid by power plants *m* in year *y* or n in hour *h*
  This parameter will be derived based on data from KenGen and KPLC Dispatch Centre. The actual net generation and export to the grid by each power unit will be measured and recorded. The monitoring frequency will be hourly for OM dispatch data OM (as stated above, the BM is determined *ex-ante* for the first crediting period). The electricity supplied by the power units to the grid will be double checked by receipt of sales.

- $EG_{PJ,h}$: Electricity displaced by the project activity in hour *h* in year *y*
  This parameter will be derived based on data from KenGen and KPLC Dispatch Centre. The total electricity displaced by the project activity will be cross checked against sales receipts.

4.7.3 Management system and quality assurance

The responsibilities and authorities for project management, procedures for monitoring and reporting, QA/QC procedures and handling data uncertainties have been established and formalized /1/. Data will be saved and archived until 2 years after the end of the crediting period.

4.8 Algorithms and/or formulae used to determine emission reductions

The calculations are documented in line with the consolidated baseline and monitoring methodology ACM0002, version 13.0.0 /44/. All aspects related to the direct and indirect GHG emissions as relevant to the project activity have been addressed and are presented in a transparent manner.

Baseline emission:

The net incremental electricity supplied to the grid due to the implementation of the project activity has been calculated in accordance with ACM0002 version 13.0.0 /25/.

The annual average historical net electricity delivered to the grid from the project site and the standard deviation of the annual average historical net electricity delivered to the grid from the project site prior to the implementation of the project activity have been calculated based on the historical electricity generation data for 5 years (2003 – 2008) prior to the implementation of the project activity in March 2009 with the commission of the first Unit /4/ (the second unit was commissioned in November 2009 /4/). The 5 years of historical data of electricity generated and supplied to the grid from the site prior to the implementation of the project activity has been checked against the KPLC's *Annual report and financial statement for the year ended 30 June 2009*, dated 2009 /17/ and through the review of sampled invoices from KPLC for the period from 2003 to 2008 /18/.

The project activity has selected the Dispatch Data analysis approach for the calculations of OM from the Kenya power and lighting company (KPLC) database /11//35/ based on the power units that are actually dispatched at the margin during each hour where the project is displacing electricity. This database provides information about all the power plants connected to the national grid of Kenya. DNV has confirmed that the database has been sourced from the KPLC, which is a government organization of Kenya. The values for NCV and EF_{CO2} for the fuel types used have been sourced from the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 and Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories /53/. The data from 1 July 2007 to 30 June 2008 has been used in the PDD for the purpose of estimation of the baseline emissions, which is as per the requirement of the applied methodology. The OM emission factor will be updated *ex-post.*

The build margin emission factor is calculated *ex-ante* based on 20% most recent capacity additions in the grid based on net generation as described in *tool to calculate the emission factor for an electricity system* /45/.

The operating margin has been determined as 0.6330 tCO2e/MWh and the build margin as 0.4665 tCO2e/MWh /11//35/. The weights for OM and BM have been considered at 50:50. The combined margin emission coefficient for the national grid of Kenya has been calculated as 0.5497 tCO2e/MWh.

$DATE_{BaselineRetrofit}$

The date of baseline retrofit is 31 December 2022 and this date was determined in accordance with ACM0002 version 13.0.0 /25/. This was verified by DNV as summarized in the paragraphs below.

The project participant took into account the following two approaches:

a) The typical average technical lifetime of the type equipment may be determined and documented, taking into account common practices in the sector and country, e.g. based on industry surveys, statistics, technical literature, etc.
b) The common practices of the responsible company regarding replacement/retrofitting schedules may be evaluated and documented, e.g. based on historical replacement/retrofitting records for similar equipment.

Approach a) - Typical operation life of power plants of comparable size in the region/country/sector

Based on publicly available information for various countries of Africa, DNV has verified that the typical operational lifetime for normal large scale project in the hydropower sector in Africa is at least about 50 years, this was confirmed by DNV through the review of:

- The book from Martin-René Atangana: *French investment in colonial Cameroon*, dated 2009 /19/,
- The article from Hydroworld entitled *Cameroon finalizes deals to refurbish 263-MW Edea, 396-MW Song Loulou*, dated 15 December 2008 /20/,
- The article from Hydroworld entitled *DSD Noell supplies gates to refurbish Cameroon's 263-MW Edea*, dated 15 December 2008 /21/,
- The article from Allafrica entitled *Cameroon: Aes SONEL - Lenders Assess Use of Funds*, dated 21 April 2009 /22/
- The Eskom website for the Nalubaale power station /22/
- The report from the World Commission for the Kariba Dam /22/
- The article from the Norwegian embassy in Ethiopia regarding the Koka Dam /22/

Furthermore, DNV has verified technical literature that supports the operational life of hydropower plants beyond 50 years, this was reviewed against:

- The book from MIT entitled *Sustainable Energy-choosing among option* dated 2005 /23/.
- The registered CDM project Felou regional hydropower project /23/
- The Decew Falls I hydropower plant in service since August 1898 /23/
- The Ardnacrusha power station in Ireland, installed in 1929 is operating for 80 years /23/

Furthermore, DNV has also verified that the typical operational lifetime for projects similar to the project activity in the hydropower sector (i.e. large scale hydropower project presenting similar runner problems as for the project activity) is 34 years. DNV has verified this through the review of article entitled *Renovation, Modernization and Upgradation of Hydro Plants in the Bhakra Beas River Valley Development* from Rakesh Nath, chairman of the Bhakra Beas management Board in India /24/.

Thus, in the context of the evidence reviewed, DNV confirms that an operational lifetime of at least 34 year is reasonable. For the $DATE_{Baselineretrofit}$ this corresponds to the following: 1988 (commission date of the existing plant) + 34 years = 2022, i.e. 31 December 2022. Given that the project activity has a crediting period of 10 years, i.e. to end in 2022, the $DATE_{Baselineretrofit}$ is after the end of the crediting period for the project activity.

Project emission and Leakage:

The project activity is replacement of an existing hydropower plant and with no change in existing reservoir hence no project emissions and leakage is associated with the project activity.

Based on the above emission factor and estimated annual electricity generated, the emission reductions from the project activity has been determined to be 41 204 tCO_2 per year .The baseline emission estimate can be replicated using the data and parameter values provided in the PDD /1/. The data sources mentioned have been verified by DNV.

All assumptions and data used by the project participants are listed in the PDD and/or supporting documents, including their references and sources. All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD. All values used in the PDD are considered reasonable in the context of the proposed CDM project activity. The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions. All estimates of the baseline, project and leakage emissions can be replicated using the data and parameter values provided in the PDD.

4.9 Environmental impacts

At the time Kiambere was constructed, there was no requirement for EIA in the country. The regulatory framework, Environmental Coordination and Management Act (EMCA) came into force in 1999 /25/. However, the requirement was for projects initially commissioned prior to coming into force of EMCA to undertake annual audits. The optimized Kiambere did not require an EIA to be done as verified by DNV through the review of the *Environmental Coordination and Management Act* issued by NEMA dated 1999 /25/ since the project was similar to undertaking the annual overhaul. The Act does not require a new EIA when the main project work consists of replacement of mechanical equipment within the plant. Nonetheless, as required by the Act, the Kiambere power station will be subject to annual Environmental Audits under the guidance of the National Environmental Management Authority (NEMA).

4.10 Comments by local stakeholders

Local stakeholders were invited through personal letters /26/ to attend two stakeholder consultation meetings conducted on 10 April 2007 /27/ and 5 December 2007 /28/.
During these 2 meetings the representatives of KenGen and local leaders have agreed on the allocation of employment opportunities among the districts close to the project site; local leaders to set up a committee to assess schools to community and the company will continue working in partnership with the local residents. The Community Development Carbon Fund will provide some funds towards education and health projects in the project vicinity /27//28/.

DNV considers the local stakeholder consultation carried out adequately and in accordance with the requirements from the VVM /43/.

4.11 Comments by Parties, stakeholders and NGOs

The PDD (version 2 dated 30 January 2008) was made publicly available on DNV's climate change website:

http://cdm.unfccc.int/Projects/Validation/DB/90LCHGY79Z5CZOHF58FIIZ6Y0309CC/view.html

Parties, stakeholders and NGOs were through the CDM website invited to provide comments during the period from 11 March 2008 to 9 April 2008. No Comments were received.

- o0o -

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	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	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	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
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	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	OK

Requirement	Reference	Conclusion
For large-scale projects only		
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK
About stakeholder involvement		
13. 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	OK
14. 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		
15. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
16. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
17. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
18. 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	Assessment by DNV	Draft Concl.	Final Concl.
A General description of project activity					
A.1 Title of the project activity (VVM para 55-57)					
A.1.1 Does section A.1 of the PDD include a clearly identifiable project title, version number of the PDD and date of the PDD?	/1/	DR	☒ Clearly identifiable title of the project activity ☐ Version number of the PDD is included ☐ Date of the PDD is included.		OK
A.1.2 Is the PDD is in accordance with the applicable requirements for completing PDDs?	/1/	DR	☐ Yes *If no, list where the PDD is not in accordance:* - The latest PDD template under the VVM needs to be used.	~~CL 1~~	OK
A.2 Description of the project activity (VVM para 58-64 and VVM para 135 and 136 (a) & (c) for small-scale project activities, as applicable)					
A.2.1 How was the design of the project assessed?	/1/	DR	*What type is the project?* ☒ Project in existing facility or utilizing existing equipment(s) ☒ Project is either a large scale project or a small scale project with emission reductions exceeding 15 000 tCO_2e per year. In this case, a site visit must be performed. ☐ Project is a bundled small scale project, with each project in the bundle with emission reductions not exceeding 15,000 tCO_2e per year. In such case the number of physical site visits may be based on sampling, if the sampling size is		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				appropriately justified through statistical analysis. ☐ The project is an individual small scale project activity with emission reductions not exceeding 15 000 tCO_2e per year. In this case, DOE may not conduct a physical site visit as appropriate. ☐ Greenfield project *How was the design of the project assessed?* ☒ Physical site inspection ☒ Reviewing available designs and feasibility studies *If a physical site inspection is not undertaken, justify why no site visit was undertaken:*		
A.2.2	If a greenfield project, describe the physical implementation of the project when the validation was commenced.	/1/	DR	This is a Redevelopment of the existing power project and the project was under construction when validation commenced.		OK
A.2.3	If physical site visits were performed based on sampling (only applicable for bundled small scale projects, each with emission reductions not exceeding 15 000 tCO_2e per year), justify the sampling through a statistical analysis.	/1/	DR	This is a project activity at single site and no sampling involved.		OK
A.2.4	Is the description of the proposed CDM project activity as contained in the PDD sufficiently covers all relevant elements, is accurate and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity?	/1/	DR	The project activity aims to optimise the electricity production from the existing plants by installing state of art runners. The existing (2 x 72 MW) turbines will be replaced with (2 x 84.5 MW) turbines with new cavitation-free runners.	~~CL 2~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				What type of turbine is installed for the project activity? The upgrade will increase the plant's generation capacity by 25 MW from its existing capacity of 144 MW. **Evidence justifying that the plant's generation capacity will increase by 25 MW due to the project activity needs to be provided.** Of this additional 25 MW, at present only 20 MW is the contracted capacity to be supplied to the Kenyan grid. The additional contracted capacity of 20 MW will supply an estimated annual incremental power of 75.0 GWh to the Kenyan grid. Hence, with this additional contracted capacity, the total electricity supply to the grid from the Kiambere power plant will be 992.4 GWh per year. **Evidence for the contract with the Kenyan grid needs to be provided.**		
A.2.5	Does the project activity involve alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/	DR	Yes. The project activity involves the alteration of an existing installation. **Pre-project is:** The existing plant is a 144 MW hydropower plant commissioned in 1988. **Evidence that the existing plant is 144 MW needs to be provided.** **Evidence that the existing plant was commissioned in 1988 needs to be provided.** The existing plant has two vertical shaft Francis	~~CL 3~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				turbine of 72 MW (total 144 MW) installed capacity and has supplied on average annual electricity of about 917.4 GWh to the Kenyan grid in the past five years . The underground powerhouse that accommodates the existing 144 MW plant is situated 4 km away from the saddle dam where the intake structure is located. The water conveyance is by a 6 m diameter headrace. **An accurate description of the existing needs to be provided together with the supporting evidence.** **<u>Post project is:</u>** The project activity aims to optimise the electricity production from the existing plants by installing state of art runners. The existing (2 x 72 MW) turbines will be replaced with (2 x 84.5 MW) turbines with new cavitation-free runners.		
A.2.6	Does the project design engineering reflect current good practices?	/1/	DR	Further information needs to confirm the project engineering design.	~~CL 2~~ ~~CL 3~~	OK
A.2.7	Would the technology result in a significantly better performance than any commonly used technologies in the host country? Is any transfer of technology from any Annex-I Party involved?	/1/	DR	Further information needs to confirm the project engineering design.	~~CL 2~~ ~~CL 3~~	OK
A.3	**Participation requirements (VVM para 51-54, 125-127)**					
A.3.1	Do all participating Parties fulfil the participation requirements as follows:	/1/	DR	A letter of approval (LoA) was issued by DNA of Kenya on 26 May 2008, authorizing KenGen of host Party as project participant and confirming that the project assists in achieving sustainable	~~CAR 1~~	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			development. The DNA of the Netherland Party issued the LoA on 26 March 2008 and authorized the International Bank for Reconstruction and Development as the Trustee of the CDCF from Annex I Party as project participant. The Annex I country in the PDD is different than in the LoA from The Netherlands has been presented and the PDD needs to be revised accordingly.		
			Kenya (host) / The Netherlands		
a) Party has ratified the Kyoto Protocol			☐ Yes ☐ No / ☐ Yes ☐ No		
b) Party has designated a Designated National Authority			☐ Yes ☐ No / ☐ Yes ☐ No		
c) The assigned amount has been determined			☐ Yes ☒ No / ☒ Yes ☐ No		
A.3.2 Do the letters of approval meet the following requirements?	/1/ /41/ /42/	DR	A letter of approval (LoA) was issued by DNA of Kenya on 26 May 2008, authorizing KenGen of host Party as project participant and confirming that the project assists in achieving sustainable development. The DNA of the Netherland Party issued the LoA on 26 March 2008 and authorized the International Bank for Reconstruction and Development as the Trustee of the CDCF from Annex I Party as project participant.		OK
			Kenya (host) / The Netherlands / Country Y		OK
a) LoA confirms that Party has ratified the Kyoto Protocol			☒ Yes ☐ No / ☒ Yes ☐ No / ☐ Yes ☐ No		
b) LoA confirms that participation is voluntary			☒ Yes ☐ No / ☒ Yes ☐ No / ☐ Yes ☐ No		

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	c) The LoA confirms that the project contributes to the sustainable development of the host country? d) The LoA refers to the precise project activity title in the PDD e) The LoA is unconditional with respect to (a) to (d) above f) The LoA is issued by the respective Party's DNA g) The LoA was received directly by the DNA or the PP h) In case of doubt regarding the authenticity of the letter of approval, describe how it was verified that the letter of approval is authentic	☒ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☐ DNA ☒ PP		NA ☒ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☐ DNA ☒ PP	NA ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ DNA ☐ PP		
A.3.3	Have all private/public project participants been authorized by an involved Party?	/1/ /41/ /42/	DR	Yes. All private/public project participants have been authorized by an involved Party.		OK
A.4	**Technical description of the project activity (VVM para 58-64)**					
A.4.1	Is the project's location clearly defined?	/1/	DR	The project is located in Kenya, in the Eastern province, Mbeere district, downstream of Kindaruma Power station, along the Tana cascade. The geographical coordinates of the project activity are: Latitude 0° 38' 24" S and Longitude 37° 54' 36" E. The geographical coordinates were confirmed by the validation team during the site visit.		OK
A.5	**Public funding of the project activity**					
A.5.1	In case public funding from Parties included in Annex I is used for the project activity, have these Parties provided 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?	/1/	DR	The project funding is not a diversion of official development assistance (ODA) needs to clarified.	~~CL 4~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B Application of a baseline and monitoring methodology						
B.1	**Methodology applied (VVM para 65-76 and VVM para 136 (b) for small-scale project activities, as applicable)**					
B.1.1	Does the project apply an approved methodology and the correct and valid version thereof?	/1/	DR	The project is using ACM0002 version 7. However this version is no longer valid.	~~CAR 2~~	OK
B.1.2	If applicable, has any specific guidance provided by the CDM EB in respect to the applied methodology been considered?	/1/	DR	There is no specific guidance provided by the CDM EB in respect to the applied methodology considered.		OK
B.2	**Applicability of methodology (and tools) (VVM para 65-76)** *Insert a row for each applicability criteria of the applied methodology (and tools)*					
B.2.1	How was it validated that project complies with the following applicability criteria: *This methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).*	/1/	DR	The project activity involves a retrofit of an existing plant. Evidence needs to be provided to justify that the project activity is a retrofit of an existing plant.	~~CL 5~~	OK
B.2.2	How was it validated that project complies with the following applicability criteria:	/1/	DR	The project activity involve a retrofit of an existing hydro power plant (with a run-of-river reservoir)	~~CL 5~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	The methodology is applicable if the project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit.			Evidence needs to be provided to justify that the project activity is a hydro power plant of run-of-river type.		
B.2.3	How was it validated that project complies with the following applicability criteria: *The methodology is applicable if in the case of capacity additions, retrofits or replacements (except for capacity addition projects for which the electricity generation of the existing power plant(s) or unit(s) is not affected): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity addition or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.*	/1/	DR	5 years of electricity generation data is available for the existing power plant. Evidence for these needs to be provided to justify the values for 2003/04, 2004/05, 2005/06, 2006/07 and 2007/08. Invoices for electricity sales also need to be provided for cross checking. It needs to be justified and evidenced that the existing power plant started commercial operation prior to the start of a minimum historical reference period of five years. It needs to be justified and evidenced that no retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	~~CL 5~~	OK
B.2.4	How was it validated that project complies with the following applicability criteria: *In case of hydro power plants, at least one of the following conditions must apply:* • *The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of*	/1/	DR	Evidence needs to be provided to justify that the project activity is implemented in an existing reservoir. Evidence needs to be provided to justify that there is no change in the volume of the existing reservoir.	~~CL 5~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	any of the reservoirs; or • *The project activity is implemented in an existing single or multiple reservoirs, where the volume of any of reservoirs is increased and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m2 after the implementation of the project activity; or* • *The project activity results in new single or multiple reservoirs and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m2 after the implementation of the project activity.*					
B.2.5	How was it validated that project complies with the following applicability criteria: *The methodology is not applicable to the following:* • *Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;* • *Biomass fired power plants;* • *A hydro power plant2 that results in the creation of a new single reservoir or in the increase in an existing single reservoir where the power density of the reservoir is less than 4 W/m2.*			Evidence needs to be provided to justify that the project activity does not involve switching from fossil fuels to renewable energy sources at the site of the project activity. Evidence needs to be provided to justify that the project is not a biomass fired power plants.	~~CL 5~~	OK
B.2.6	How was it validated that project complies with the following applicability criteria: *In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible*			The selected baseline is the baseline described in the methodology and this hence confirms the applicability of the methodology. The selected baseline is the continuation of the current situation, i.e. to use the power generation		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	baseline scenario, as a result of the identification of baseline scenario, is 'the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance'.			equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance.		
B.2.7	Is the selected baseline one of the baseline(s) described in the methodology and this hence confirms the applicability of the methodology?	/1/	DR	The selected baseline is the baseline described in the methodology and this hence confirms the applicability of the methodology. The selected baseline is the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance.		OK
B.3	**Project boundary (VVM para 78-80)**					
B.3.1	What are the project's system boundaries (components and facilities used to mitigate GHGs)? Are they clearly defined and in accordance with the methodology?	/1/ /4/ /5/	DR	The project boundary includes the project power plant and all power plants connected physically to the Kenyan grid, to which the project activity is connected The system boundaries have been adequately described in the PDD and the same has been verified based on the site visit.		OK
B.3.2	Which GHG sources are identified for the project? Does the identified boundary cover all possible sources linked to the project activity? Give reference to documents considered to arrive at this conclusion.	/1/	DR	The project activity exports the generated power to the national grid and so the GHG sources identified are the CO_2 emission that would have otherwise occurred to generation of equivalent power from the grid connected power plants.		OK
B.3.3	Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources	/1/	DR	The validation report shall contain information regarding greenhouse gas emissions occurring within the proposed CDM project activity	~~CL 6~~	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
contribute with more than 1% of the estimated emission reductions of the project?			boundary as a result of the implementation of the proposed CDM project activity which are expected to contribute more than 1% of the overall expected average annual emissions reductions, which are not addressed by the applied methodology.		
B.4 Baseline scenario determination (VVM para 81-88, 105-107) *Ensure that the evaluation of all alternatives provided in the PDD and required by the methodology and also possible alternatives/offshoots of alternatives are discussed. Check that all alternatives required to be considered by the methodology are included in the final PDD. If baseline alternatives required to be considered by the methodology are considered not applicable, please assess the justification for this.*					
B.4.1 Which baseline scenarios have been identified? Is the list of baseline scenarios complete?	/1/	DR	The baseline scenario defined in the PDD is "electricity that would have been otherwise generated by the operation of grid-connected power plants and by the addition of new generating sources". However this needs to be clarified in light of the step-wise procedure to identify the baseline scenario for modification / retrofit provided in the applied methodology. The PDD uses the 'combined tool to identify the baseline scenario and demonstrate additionality' version 2.2. The applied version of the tool is no longer valid. DNV is not able to confirm that the baseline is the continuation of the situation prior to the implementation of the proposed CDM project	~~CL 7~~ ~~CL 8~~ ~~CL 9~~ ~~CL 10~~	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			activity According to ACM0002, for projects like Kiambere which involve the retrofit of an existing hydropower plant, the date the generation facility would likely be retrofitted (DATEBaselineRetrofit) in absence of the CDM has to be determined. The project participants claim that Kiambere hydropower plant could continue to be operated with repairs of the runners and that no design change and retrofit of the runner would have happened in absence of the CDM. In order to estimate the point in time when the existing equipment would need to be retrofitted in the absence of the project activity (DATEBaselineRetrofit), project participants may take the following approaches into account: (a) The typical average technical lifetime of the type equipment may be determined and documented, taking into account common practices in the sector and country, e.g. based on industry surveys, statistics, technical literature, etc.; (b) The common practices of the responsible company regarding replacement / retrofitting schedules may be evaluated and documented, e.g. based on historical replacement/retrofitting records for similar equipment.		

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.

			For (a) the project participants have provided information on the typical lifetime of hydropower plants in Africa. However, no information was provided on the specific lifetime of runners. Moreover, a comparison with other hydropower plants is in our opinion not appropriate as the specific situation of the Kiambere project, which has experienced more cavitation than normal, makes the Kiambere project not comparable with other hydropower plants in Africa.
			
			For (b) the project participants claim that the problems with the runners were dealt with as part of the regular maintenance practice by Kengen engineers and with the help of spare runner they have in the plant. However, no evidence has been provided for this as required by ACM0002, i.e. on historical replacement/retrofitting records for similar equipment.
			
			Also, as per "Tool to determine the remaining lifetime of equipment", the remaining lifetime of the equipment can be determined based on one of the following options:
			
			Option (a): Use manufacturer's information for the technical lifetime of equipment and compare to the date of first commissioning
			Option (b): Obtain an expert evaluation
			Option (c): Use default values
			
			In using the options (a) and (c) above, it need to		

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				be demonstrated that the that the equipment was not having any design problem or it is being operated under design conditions, and to use option (b) opinion from an expert satisfying the conditions indicated in the "Tool to determine the remaining lifetime of equipment". However, no evidence has been provided to justify the remaining lifetime of the equipment as required the "Tool to determine the remaining lifetime of equipment".		
B.4.2	How have the other baseline scenarios been eliminated in order to determine the baseline?	/1/	DR	The PDD uses the 'combined tool to identify the baseline scenario and demonstrate additionality' version 2.2. The applied version of the tool is no longer valid.	~~CL 9~~	OK
B.4.3	What is the baseline scenario?	/1/	DR	The PDD uses the 'combined tool to identify the baseline scenario and demonstrate additionality' version 2.2. The applied version of the tool is no longer valid.	~~CL 9~~	OK
B.4.4	Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/1/	DR	The PDD uses the 'combined tool to identify the baseline scenario and demonstrate additionality' version 2.2. The applied version of the tool is no longer valid.	~~CL 9~~	OK
B.4.5	Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	The PDD uses the 'combined tool to identify the baseline scenario and demonstrate additionality' version 2.2. The applied version of the tool is no longer valid.	~~CL 9~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.4.6	Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	The PDD uses the 'combined tool to identify the baseline scenario and demonstrate additionality' version 2.2. The applied version of the tool is no longer valid.	~~CL 9~~	OK
B.4.7	Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	The PDD uses the 'combined tool to identify the baseline scenario and demonstrate additionality' version 2.2. The applied version of the tool is no longer valid.	~~CL 9~~	OK
B.4.8	Is the baseline determination adequately documented in the PDD? • 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. • All documentation is relevant as well as correctly quoted and interpreted. • Assumptions and data can be deemed reasonable • Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. • The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity	/1/	DR	All the assumptions and data used by the project participants for establishing the baseline scenario shall be correctly quoted and interpreted in the PDD.	~~CL 10~~	OK
B.5 Additionality determination (VVM para 94-121 and VVM para 137 for small-scale project activities, as applicable)						
B.5.1	What approach/tool does the project use to assess additionality? Is this in line with the methodology?	/1/	DR	The assessment and demonstration of the additionality has been done as per "Tool for the assessment and demonstration of additionality", version 5.2. This is in line with the methodology.		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.2	Have the regulatory requirements correctly been taken into account to evaluate the project activity and the alternatives?	/1/	DR	The PDD uses the 'combined tool to identify the baseline scenario and demonstrate additionality' version 2.2. The applied version of the tool is no longer valid.	~~CL 9~~	OK
B.5.3	Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR	The PDD uses the 'combined tool to identify the baseline scenario and demonstrate additionality' version 2.2. The applied version of the tool is no longer valid.	~~CL 9~~	OK
B.5.4	What is the project additionality mainly based on (Investment analysis or barrier analysis)?	/1/	DR	The project additionality is based on an investment analysis.		OK
	Prior consideration of CDM (VVM para 98-103)					
B.5.5	What is the evidence for serious consideration of CDM prior to the time of decision to proceed with the project activity?	/1/ 6/	DR	The project participant has demonstrated awareness of the CDM through the following evidence: Managing Director's Report" published in the Kenya Electricity Generating Company Limited Annual Report 2006 (p.23) as verified by DNV. Evidence demonstrating that the benefits of the CDM were a decisive factor in the decision to proceed with the project needs to be provided. The PDD refers to EB 49 Annex 22 (Version 03) as guideline for the CDM consideration assessment, however this is not the latest applicable guideline for CDM consideration.	~~CL 11~~	OK
B.5.6	If the starting date is after 2 August 2008 and before the	/1/	DR	The project starting date is before 2 August 2008.		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	global stakeholder consultation, has the DNA and UNFCCC confirmed that the project participants have informed in writing of the project's intention to seek CDM status?					
	Continuous efforts to secure CDM status (only to be completed if starting date is before 2 August 2008)					
B.5.7	What initiatives where taken by the project participants from the starting date of the project activity to the start of validation in parallel with the physical implementation of the project activity?	/1/	DR	The PDD states that the project start date is 24 February 2006 and the PDD was published for GSC on 11 March 2008. The project participant demonstrated continuous efforts to secure CDM status as follow: 24 February 2006 – project start date 30 July 2007 - The World Bank and KenGen signed the Emissions Reduction Purchase Agreement (ERPA) for the project 30 November 2007 - The World Bank and Det Norske Veritas AS (DNV) signed the contract for validation of project. 28 July 2008 - DNV conducted a site visit of the project during the period of July 28-31, 2008. 18 September 2009 – ERPA is amended. Evidence for the item above needs to be provided.	~~CL 12~~	OK
B.5.8	When did the construction of the project activity start?	/1/	DR	When did the construction of the project activity	~~CL 12~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				start?		
B.5.9	When was the project commissioned?	/1/	DR	When was the project commissioned?	~~CL 12~~	OK
B.5.10	Does the timeline of the project confirm that continuous actions in parallel with the implementation were taken to secure CDM status?	/1/	DR	Further information needs to be provided on the project timeline.	~~CL 12~~	OK
	Investment analysis (VVM para 108-114) *The list of questions below must be adjusted to the parameters in the investment analysis relevant to the project under validation.*					
B.5.11	Does the project activity or any of the remaining alternatives generate revenues apart from CDM? Is this reflected in the PDD?	/1/	DR	The proposed project generates financial and economic benefits through the sales of electricity other than CDM related income, which has been correctly described in the PDD.		OK
B.5.12	Do any of the alternatives to the project activity involve investment? Is this reflected in the PDD?	/1/	DR	The proposed baseline scenario of sourcing electricity from the grid does not involve a new investment, which has been correctly described in the PDD.		OK
B.5.13	Is the choice of benchmark analysis, investment comparison or simple cost analysis correct?	/1/	DR	The benchmark analysis (option III) is justified for conducting the investment analysis.		OK
B.5.14	Is the benchmark/discount rate the latest available at the time of decision?	/1/	DR	The benchmark applied is sourced from the Kenyan government. This document needs to be presented in order to conclude whereas the choice of benchmark is the latest available at the time of the decision.	~~CL 24~~	OK
B.5.15	What is the financial indicator? Is it on equity/project basis? Before/after tax? Is the financial indicator in correspondence	/1/	DR	The financial indicator used for the financial analysis is and equity post-tax IRR	~~CL 25~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	with the benchmark?					
B.5.16	Are the underlying assumptions appropriate, e.g. what is considered as waste in the baseline is considered to have zero value?	/1/	DR	The benchmark applied is sourced from the Kenyan government. This document needs to be presented in order to conclude whether underlying assumption are correct.	~~CL 24~~	OK
B.5.17	Does the income tax calculation take depreciation into account? Is the depreciation year in accordance with normal accounting practice in the host country?	/1/	DR	The income tax calculation take depreciation into account. Straight line depreciation over 50 years has been applied. This needs to be justified.	~~CL 26~~	OK
B.5.18	Is the time period of the investment analysis and operating time of the project realistic? Has salvage value been taken into account? Is working capital returned in the last year of operation?	/1/	DR	It needs to be clarified whether the time period of the investment analysis and operating time of the project realistic and reflect the period of expected operation of the project activity? It needs to be clarified whether a salvage value shall be taken into account? And whether a working capital shall be returned in the last year of operation?	~~CL 27~~	OK
B.5.19	When a feasibility study report or similar approved by the government is used as the basis for the investment analysis: Can it be confirmed that the values used in the PDD are fully consistent with the FSR and is the period of time between finalization of the FSR and the investment decision adequate?	/1/	DR	No feasibility study report has been provided by the project participant.		OK
B.5.20	How was the amount of output (e.g. sales of electricity) assessed? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/	DR	☐ The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project activity for implementation approval	~~CL 28~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				☐ The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company) ☐ Other approach. *Provide details on how the load factor was validated:* All input values into the investment analysis need to be clearly referenced to the source documentation so that all assumptions and values applied can be validated as being accurate and relevant. And relevant evidence needs to be provided. The project participant shall clarify that the input value applied are applicable to the project activity.		
B.5.21	How was the output price (e.g. electricity price) assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☐ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants *Provide details on how the output price was validated:* All input values into the investment analysis need to be clearly referenced to the source documentation so that all assumptions and values applied can be validated as being accurate and relevant. And relevant evidence needs to be	~~CL 28~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				provided. The project participant shall clarify that the input value applied are applicable to the project activity.		
B.5.22	How were the investment costs assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☐ Review of feasibility reports, public announcements, contracts and annual financial reports related to the project and the project participants *Provide details on how the investment costs were validated:* All input values into the investment analysis need to be clearly referenced to the source documentation so that all assumptions and values applied can be validated as being accurate and relevant. And relevant evidence needs to be provided. The project participant shall clarify that the input value applied are applicable to the project activity. A breakdown of the total investment shall be provided describing what the total investment parameter includes.	~~CL 28~~	OK
B.5.23	How were the O&M costs assessed? Were the data available and valid at the time of decision? Remember to include all	/1/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices)	~~CL 28~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.			☐ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants *Provide details on how the O&M costs were validated:* All input values into the investment analysis need to be clearly referenced to the source documentation so that all assumptions and values applied can be validated as being accurate and relevant. And relevant evidence needs to be provided. The project participant shall clarify that the input value applied are applicable to the project activity.		
B.5.24	Describe the assessment of the other input parameters. Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☐ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants *Provide details on how other input parameters were validated:* All input values into the investment analysis need to be clearly referenced to the source documentation so that all assumptions and values applied can be validated as being accurate and relevant. And relevant evidence needs to be provided. The project participant shall clarify that the input value applied are applicable to the project activity.	~~CL 28~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.25	Was the financial calculation spreadsheet verified and found to be correct?	/1/	DR	All input values into the investment analysis need to be clearly referenced to the source documentation so that all assumptions and values applied can be validated as being accurate and relevant. And relevant evidence needs to be provided. The project participant shall clarify that the input value applied are applicable to the project activity.	~~CL 28~~	OK
B.5.26	Sensitivity analysis: Have the key parameters contributing to more than 20% of the revenue/costs during operating or implementation been identified? Has possible correlation between the parameters been considered?	/1/	DR	All input values into the investment analysis need to be clearly referenced to the source documentation so that all assumptions and values applied can be validated as being accurate and relevant. And relevant evidence needs to be provided. The project participant shall clarify that the input value applied are applicable to the project activity.	~~CL 28~~	OK
B.5.27	Sensitivity analysis: Is the range of variations is reasonable in the project context?	/1/	DR	Variation of the parameters considered in the sensitivity analysis have not been justified in the PDD.	~~CL 29~~	OK
B.5.28	Have the key parameters been varied to reach the benchmark and the likelihood of this to happen been justified to be small?	/1/	DR	Variation of the parameters considered in the sensitivity analysis have not been justified in the PDD.	~~CL 29~~	OK
	Barrier analysis (VVM para 115-118)					
B.5.29	Are the barriers identified complimentary to a potential	/1/	DR	Barrier analysis is not applied for the propose		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	investment analysis? Does the barrier have a clear impact on the financial returns so that it can be assessed in an investment analysis? Each barrier is discussed separately.			CDM project activity.		
B.5.30	How were the investment barriers assessed to be real? Are the investment barriers substantiated by a source independent of the project participants?	/1/	DR	Barrier analysis is not applied for the propose CDM project activity.		OK
B.5.31	How does CDM alleviate the investment barriers?	/1/	DR	Barrier analysis is not applied for the propose CDM project activity.		OK
B.5.32	Is the project activity prevented by the investment barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Barrier analysis is not applied for the propose CDM project activity.		OK
B.5.33	How were the technological barriers assessed to be real? Are the technological barriers substantiated by a source independent of the project participants?	/1/	DR	Barrier analysis is not applied for the propose CDM project activity.		OK
B.5.34	How does CDM alleviate the technological barriers?	/1/	DR	Barrier analysis is not applied for the propose CDM project activity.		OK
B.5.35	Is the project activity prevented by the technological barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Barrier analysis is not applied for the propose CDM project activity.		OK
B.5.36	How were the barriers due to prevailing practise assessed to be real? Are the barriers due to prevailing practise substantiated by a source independent of the project participants?	/1/	DR	Barrier analysis is not applied for the propose CDM project activity.		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.37	How does CDM alleviate the barriers due to prevailing practise?	/1/	DR	Barrier analysis is not applied for the propose CDM project activity.		OK
B.5.38	Is the project activity prevented by the barriers due to prevailing practise and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Barrier analysis is not applied for the propose CDM project activity.		OK
B.5.39	How were the other barriers assessed to be real? Are the other barriers substantiated by a source independent of the project participants?	/1/	DR	Barrier analysis is not applied for the propose CDM project activity.		OK
B.5.40	How does CDM alleviate the other barriers?	/1/	DR	Barrier analysis is not applied for the propose CDM project activity.		OK
B.5.41	Is the project activity prevented by the other barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Barrier analysis is not applied for the propose CDM project activity.		OK
Common practice analysis (VVM para 119-121)						
B.5.42	What is the geographical scope of the common practice analysis? Is this justified?	/1/	DR	The common practice analysis needs to be revised in accordance with the latest version of the additionality tool.	~~CL 9~~ ~~CL 13~~	OK
B.5.43	What is the scope of technology and size (e.g. capacity of power plant) for the common practice analysis and how has this been justified?	/1/	DR	The common practice analysis needs to be revised in accordance with the latest version of the additionality tool.	~~CL 9~~ ~~CL 13~~	OK
B.5.44	What is the data source(s) used for the common practice analysis?	/1/	DR	The common practice analysis needs to be revised in accordance with the latest version of the additionality tool.	~~CL 9~~ ~~CL 13~~	OK
B.5.45	How many similar non-CDM-projects exist in the region	/1/	DR	The common practice analysis needs to be	~~CL 9~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	within the scope?			revised in accordance with the latest version of the additionality tool.	~~CL 13~~	
B.5.46	How were possible essential distinctions between the project activity and similar activities assessed?	/1/	DR	The common practice analysis needs to be revised in accordance with the latest version of the additionality tool.	~~CL 9~~ ~~CL 13~~	OK
B.5.47	What is the conclusion of the common practice analysis?	/1/	DR	The common practice analysis needs to be revised in accordance with the latest version of the additionality tool.	~~CL 9~~ ~~CL 13~~	OK
	Conclusion					
B.5.48	What is the conclusion with regard to the additionality of the project activity?	/1/	DR	Further information is required from the project participant before the validation team can conclude on the additionality of the project	~~CL 9~~ ~~CL 13~~ ~~CL 24~~ ~~CL 25~~ ~~CL 26~~ ~~CL 27~~ ~~CL 28~~ ~~CL 29~~	OK
B.6	**Calculations of GHG emission reductions**					
	Data and parameters that are available at validation and that are not monitored (VVM para 199-203)					
B.6.1	How was the ER_y available at validation verified?	/1/	DR	ER_y is the emission reduction for the project activity in year y, it is calculated in accordance with the *tool to calculate the emission factor for an electricity system* version 2. This is in accordance with the methodology. The parameter is calculated as follow: $ER_y = BE_y - PE_y$ BE_y and PE_y are described below.	~~CL 16~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				ER_y ex-ante is 29 165.4 tCO_2 per year ER_y will be calculated during the project monitoring period.		
B.6.2	How was the BE_y available at validation verified?	/1/	DR	BEy is the baseline emission in year y. It is calculated in accordance with the *tool to calculate the emission factor for an electricity system* version 2. This is in accordance with the methodology.	~~CL 16~~	OK
B.6.3	How was the PE_y available at validation verified?	/1/	DR	PEy is the project emission in year y. In accordance with the methodology the parameter is considered to be zero for the purpose of the ex-ante emission reduction calculation. And PEy is fixed ex-ante PE_y is fixed ex-ante to 0 tCO_2 per year	~~CL 16~~	OK
B.6.4	How was the $EG_{PJ,y}$ available at validation verified?	/1/	DR	$EG_{PJ,y}$ is the quantity of net electricity generation supplied by the project plant to the grid in year y. It is calculated in accordance with the *tool to calculate the emission factor for an electricity system* version 2. This is in accordance with the methodology. The parameter is calculated as follow: $EG_{PJ,y} = EGfacility,y - (EGhistorical + \sigma_{historical})$ until $DATE_{BaselineRetrofit}$ $EG_{PJ,y} = 0$ on/after $DATE_{BaselineRetrofit}$ $EG_{PJ,y}$ ex-ante is 49 100 MWh per year	~~CL 16~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			$EG_{PJ,y}$ will be calculated during the project monitoring period.		
B.6.5 How was the $EG_{historical}$ available at validation verified?	/1/	DR	EGhistorical is the annual average of historical net electricity generation, delivered to the grid by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity. The project participant chose the 5 last calendar years prior to the implementation of the project activity to determine $EG_{historical}$. $EG_{historical}$ covers the following 5 years: July 2003 to June 2004 July 2004 to June 2005 July 2005 to June 2006 July 2006 to June 2007 July 2007 to June 2008 The resulting value is 917.4 GWh Five years of electricity generation data is available for the existing power plant. Evidence for these needs to be provided to justify the values for 2003/04, 2004/05, 2005/06, 2006/07 and 2007/08 as indicated in the PDD. Invoices for electricity sales also need to be provided for cross checking. Project implementation date needs to be justified	~~CL 14~~ ~~CL 16~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				and evidence. $EG_{historical}$ is fixed ex-ante to 917 400 MWh per year		
B.6.6	How was the $DATE_{BaselineRetrofit}$ available at validation verified?	/1/	DR	Evidence and justification to estimate the point in time when the existing equipment would need to be retrofitted in the absence of the project activity ($DATE_{BaselineRetrofit}$) needs to be provided.	~~CL 8~~ ~~CL 16~~	OK
B.6.7	How was the $\sigma_{historical}$ available at validation verified?	/1/	DR	$\sigma_{historical}$ is the standard deviation of the annual average historical net electricity generation delivered to the grid by the existing facility that was operated at the project site prior to the implementation of the project activity. Five years of electricity generation data is available for the existing power plant. Evidence for these needs to be provided to justify the values for 2003/04, 2004/05, 2005/06, 2006/07 and 2007/08 as indicated in the PDD. Invoices for electricity sales also need to be provided for cross checking	~~CL 14~~ ~~CL 16~~	OK
B.6.8	How was the EGfacility,y available at validation verified?	/1/	DR	EGfacility,y is the net electricity generation generation supplied by the project plant/unit to the grid in year y. EGfacility,y ex-ante is estimated as 73% historical average load factor, i.e. 1 048 750 MWh.	~~CL 15~~ ~~CL 16~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			Evidence and justification for the historical average load factor needs to be provided. EGfacility,y will be measured during the project monitoring period.		
B.6.9 How was the $EF_{grid,CM,y}$ available at validation verified?	/1/ /10/	DR	$EF_{grid,CM,y}$ is the combine grid emission factor of the Kenyan grid. $EF_{grid,CM,y}$ was calculated as the weighted average of the operating margin (OM) emission factor and build margin (BM) emission factor. The weights for calculating the combined margin are the default 50% for each margin in accordance with the applied methodology: $EF_{grid,CM,y} = 50\% \times EF_{grid,CM,y} + 50\% \times EF_{grid,CM,y}$ $EF_{grid,CM,y}$ ex-ante is 0.594 tCO_2/MWh. $EF_{grid,CM,y}$ will be updated annually during the monitoring period. The PDD is in accordance with the emission reduction calculation spreadsheet provided for the project activity /10/.	~~CL 16~~	OK
B.6.10 How was the $EF_{grid,OM,y}$ available at validation verified?	/1/	DR	$EF_{grid,OM,y}$ is the operating emission factor of the Kenyan grid. The operating margin method selected is the dispatch data analysis OM. $EF_{grid,OM,y}$ is determined based on the grid power units that are actually dispatched at the margin during each hour *h* where the project is displacing	~~CL 16~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			grid electricity. For purposes of estimating the dispatch data analysis OM emission factor (EFgrid,OM-DD,y), data during the year July 2007-June 2008 are used. The methodology requires using the year in which the project activity actually displaces grid electricity. In accordance with this requirement, EFgrid,OM-DD,y will be updated annually during monitoring. The calculation are based on: • data provided by the Kenyan dispatch center for July 2007 to June 2008. The dispatch data include the merit order of plants list and hourly power demand data for the set of power units falling within the top 10% of the system dispatch. • Data from the IPCC 2006 for CO_2 emission factor for power units in the top of the dispatch order. • Data from IPCC for the NCV The PDD shall describe the data source used for all parameters used to calculate the $EF_{grid,OM,y}$		
B.6.11 How was the $EF_{grid,BM,y}$ available at validation verified?	/1/	DR	The PDD shall describe the data source used for all parameters used to calculate the $EF_{grid,BM,y}$	~~CL 16~~	OK
Baseline emissions (VVM para 89-93)					
B.6.12 Are the calculations documented according to the approved	/1/	DR	The baseline emission are calculated according	~~CL 16~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	methodology and in a complete and transparent manner?			the Tool to calculate the emission factor for an electricity system version 2. This is in accordance with the methodology. According to the VVM, all assumptions and data used by the project participants for emission reduction calculation shall be listed in the PDD, including their references and sources. The PDD needs to be updated accordingly. The PDD page 26 refers to annex 6 for detailed calculation of the CO2 emission factor of the Kenyan grid, however no Annex 6 is available in the PDD. The annual average over the crediting period of estimated reduction for the project activity provided in the emission reduction calculation is not consistent with the value provided in the PDD.		
B.6.13	Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	Further information have been requested.	~~CL 16~~	OK
B.6.14	Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	Further information have been requested.	~~CL 16~~	OK
Project emissions (VVM para 89-93)						
B.6.15	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	There is no project emission according ACM0002		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.6.16	Have conservative assumptions been used when calculating the project emissions?	/1/	DR	There is no project emission according ACM0002		OK
B.6.17	Are uncertainties in the project emission estimates properly addressed?	/1/	DR	There is no project emission according ACM0002		OK
	Leakage (VVM para 89-93)					
B.6.18	Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	There is no leakage according ACM0002		OK
B.6.19	Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR	There is no leakage according ACM0002		OK
B.6.20	Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	There is no leakage according ACM0002		OK
	Emission Reductions (VVM para 89-93)					
B.6.21	Algorithms and/or formulae used to determine emission reductions: • 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 data provided in the PDD and supporting files to be submitted for registration.	/1/	DR	According to the VVM, all assumptions and data used by the project participants for emission reduction calculation shall be listed in the PDD, including their references and sources. The PDD needs to be updated accordingly.	~~CL 16~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.7	**Monitoring plan (VVM para 122-124)**					
	Data and parameters monitored					
B.7.1	Do the means of monitoring described in the plan comply with the requirements of the methodology?	/1/	DR	The PDD is not clear regarding how the excess electricity generated by the project activity will be measured and accounted.	~~CL 17~~ ~~CL 18~~	OK
B.7.2	Does the monitoring plan contains all necessary parameters, and are they clearly described?	/1/	DR	The monitoring plan lacks clarity on the following: a) Parameters to be monitored as per the "Tool to calculate Emission factor of the electrical system" and ACM0002 b) The monitoring equipment, frequency of monitoring, QA/QC procedures and the period of archival.	~~CL 17~~ ~~CL 18~~	OK
B.7.3	In case parameters are measured, is the measurement equipment described? Describe each relevant parameter.	/1/	DR	The monitoring plan lacks clarity on the following: a) Parameters to be monitored as per the "Tool to calculate Emission factor of the electrical system" and ACM0002 b) The monitoring equipment, frequency of monitoring, QA/QC procedures and the period of archival.	~~CL 17~~ ~~CL 18~~	OK
B.7.4	In case parameters are measured, is the measurement accuracy addressed and deemed appropriate? Describe each relevant parameter.	/1/	DR	The monitoring plan lacks clarity on the following: a) Parameters to be monitored as per the "Tool to calculate Emission factor of the electrical system" and ACM0002 b) The monitoring equipment, frequency of	~~CL 17~~ ~~CL 18~~	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				monitoring, QA/QC procedures and the period of archival.		
B.7.5	In case parameters are measured, are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate? Describe each relevant parameter.	/1/	DR	The monitoring plan lacks clarity on the following: a) Parameters to be monitored as per the "Tool to calculate Emission factor of the electrical system" and ACM0002 b) The monitoring equipment, frequency of monitoring, QA/QC procedures and the period of archival.	~~CL 17~~ ~~CL 18~~	OK
B.7.6	Is the monitoring frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR	The monitoring plan lacks clarity on the following: a) Parameters to be monitored as per the "Tool to calculate Emission factor of the electrical system" and ACM0002 b) The monitoring equipment, frequency of monitoring, QA/QC procedures and the period of archival.	~~CL 17~~ ~~CL 18~~	OK
B.7.7	Is the recording frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR	The monitoring plan lacks clarity on the following: a) Parameters to be monitored as per the "Tool to calculate Emission factor of the electrical system" and ACM0002 b) The monitoring equipment, frequency of monitoring, QA/QC procedures and the period of archival.	~~CL 17~~ ~~CL 18~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	Ability of project participants to implement monitoring plan					
B.7.8	How has it been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/1/	DR	The monitoring plan is a simple monitoring set up, including meters which will be installed in compliance with industry standards in the country. The parameter will be measured continuously and recorded on a monthly basis and will be cross checked based on the sales invoices. DNV does not have reason to doubt that the monitoring arrangements are feasible within the project design.		OK
B.7.9	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, procedure are identified for the day-to-day records handling.		OK
B.7.10	Are the data management and quality assurance and quality control procedures sufficient to ensure that the emission reductions achieved by/resulting from the project can be reported ex post and verified?	/1/	DR	The procedures related to internal review, corrective and preventive action need to precise in the PDD	~~CL 19~~	OK
B.7.11	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	All monitored data required for verification and issuance will 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.		OK
	Monitoring of sustainable development indicators/ environmental impacts					
B.7.12	Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR	No requirements on monitoring the sustainable development parameters as per the DNA of Kenya approval.		OK
B.7.13	Does the monitoring plan provide for the collection and	/1/	DR	No requirements on monitoring the sustainable		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	archiving of relevant data concerning environmental, social and economic impacts?			development parameters as per the DNA of Kenya approval.		
B.7.14	Are the sustainable development indicators in line with stated national priorities in the host country?	/1/	DR	No requirements on monitoring the sustainable development parameters as per the DNA of Kenya approval.		OK
C Duration of the project activity / crediting period						
C.1.1	**Start date of project activity (VVM para 99-100, 104)**					
C.1.2	How has the starting date of the project activity been determined? What are the dates of the first contracts for the project activity? When was the first construction activity?	/1/	DR	A detailed timeline describe the milestone of the CDM proposed project activity implementation.	~~CL 20~~	OK
C.1.3	Is the stated expected operational lifetime of the project activity reasonable?	/1/	DR	Evidence for the technical lifetime of the project activity needs to be provided. Technical lifetime is defined as the total time for which the equipment is technically designed to operate from its first commissioning. The technical lifetime is expressed in years or hours of operation. Evidence for the operational lifetime of the project activity needs to be provided. Operational time is defined as the total time that the equipment has been operating since its first commissioning. The operational time is expressed in years or hours of operation. Evidence for the remaining lifetime of the project activity needs to be provided. Remaining lifetime (RL). The remaining lifetime of the equipment is	~~CL 7~~ ~~CL 8~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				the time for which the existing equipment can continue to operate before it has to be replaced/discarded for technical reasons, such as the age of the equipment, safety reasons, or deteriorated performance. The remaining lifetime is expressed in years or hours of operation. Evidence and justification to estimate the point in time when the existing equipment would need to be retrofitted in the absence of the project activity (DATEBaselineRetrofit) needs to be provided.		
C.1.4	Is the start date, the type (renewable/fixed) and the length of the crediting period clearly defined and reasonable?	/1/	DR	The crediting period start date needs to be updated in accordance with the CDM EB requirements.	~~CL 21~~	OK
D Environmental Impacts (VVM para 131-133 and VVM para 136 (d) for small-scale project activities, as applicable))						
D.1.1	Are there any host country requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved? Does the approval contain any conditions that need monitoring?	/1/ /25/	DR	The project activity entails rehabilitation works that will take place within the confines of the existing power plant. No environmental impact assessment was conducted in accordance with the provisions of the Environmental Coordination and Management Act (EMCA, 1999). The Act does not require EIA when the main project work consists of replacement of mechanical equipment within the plant. Nonetheless, as required by the Act, the Kiambere power station will be subject to annual Environmental Audits under the	~~CL 22~~	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				guidance of the National Environmental Management Authority (NEMA). Evidence for the approved EIA needs to be provided.		
D.1.2	Does the project comply with environmental legislation in the host country?	/1/ /25/	DR	Yes, the project complies with the environmental legislation in the host country.		OK
D.1.3	Will the project create any adverse environmental effects?	/1/ /25/	DR	Since the project is a retrofitting activity, this does not require any separate EIA. The EIA for the entire Kiambere hydro power plant has been approved by NEMA.		OK
D.1.4	Have identified environmental impacts been addressed in the project design?	/1/ /25/	DR	Since the project is a retrofitting activity, this does not require any separate EIA. The EIA for the entire Kiambere hydro power plant has been approved by NEMA.		OK
D.1.5	Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/ /25/	DR	Since the project is a retrofitting activity, this does not require any separate EIA. The EIA for the entire Kiambere hydro power plant has been approved by NEMA.		OK
D.1.6	Are transboundary environmental impacts considered in the analysis?	/1/ /25/	DR	Since the project is a retrofitting activity, this does not require any separate EIA. The EIA for the entire Kiambere hydro power plant has been approved by NEMA.		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
E Stakeholder Comments (VVM para 128-130)						
E.1.1	Have relevant stakeholders been consulted?	/1/	DR	Yes, two meeting were done in 2007 with stakeholders before project implementation. The details and the minutes of the stake holder meeting needs to be provided.	~~CL 23~~	OK
E.1.2	Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	Yes, appropriate media has been used for the stakeholders consultations.		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 in accordance with such regulations/laws?	/1/	DR	No, since the project is a modification of the existing plant. The legislation does not call for any stake holder consultations.		OK
E.1.4	Is a summary of the stakeholder comments received provided?	/1/	DR	The details and the minutes of the stake holder meeting needs to be provided.	~~CL 23~~	OK
E.1.5	Has due account been taken of any stakeholder comments received?	/1/	DR	The details and the minutes of the stake holder meeting needs to be provided.	~~CL 23~~	OK

Table 3 Resolution of corrective action requests and clarification requests

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
CAR 1 *Letter of approval* *According to the VVM, the DOE shall confirm that the letters of approval has been issued by the respective Party's designated national authority (DNA) and is valid for the proposed CDM project activity under validation* The Annex I country in the PDD is different than in the LoA provided from The Netherlands.	A.3.1	PDD Section A.3: Government of Spain replaced by Government of The Netherlands. Similar revisions were done in Annex 1.	DNV has reviewed the revision made in the PDD. DNV confirms that the PDD and the LOA issued by the DNA of the Netherlands are now consistent. **CAR 1 is closed.**
CAR 2 *Applied baseline and monitoring methodology* *The VVM requires that the PDD to select a baseline and monitoring methodology previously approved by the CDM EB that is applicable to the project activity, including that the used version is valid.* The PDD submitted for global stakeholder consultation applies ACM0002 version 7. This version of the methodology is no longer applicable.	B.1.1	PDD has been updated to use the latest version of the methodology	DNV has reviewed the revised PDD and confirm that it was updated in accordance with the latest version of the methodology ACM0002 version 13. Furthermore the PDD was also updated to applied the latest version of the additionality tool version 6, the latest version of the combined tool to identify the baseline scenario and demonstrated additionality version 4.0.0. **CAR 2 is closed.**
CL 1 *Applicable requirements for completing PDDs*	A.1.2	PDD has been updated to use the latest template available on the UNFCCC CDM	DNV has verified that the latest version of the PDD uses the latest template and

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
The VVM requires that the PDD used as a basis for validation shall be prepared in accordance with the latest template and guidance from the CDM Executive Board available on the UNFCCC CDM website. The PDD version 08 dated 17 December 2010 is not consistent with the latest template available on the UNFCCC CDM.			guidance from the CDM EB. **CL 1 is closed.**
CL 2 *Project activity description* *The VVM requires the PDD to contain a clear description of the project activity that provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation.* 1. The fact that the CDM project activity is a replacement project needs to be evidenced. 2. With regards to the technical aspect of the project, the technical specification of turbine that are installed as part of the project activity needs to be described and evidence also needs to be provided. 3. When has the project activity been implemented, and in particular when were the turbine replaced? Evidence needs to be provided.	A.2.4 A.2.6 A.2.7	1. Final efficiency test submitted to the DOE: Norplan_Efficiency test_November 2010 (p.3) 2. Final efficiency test submitted to the DOE: Norplan_Efficiency test_November 2010 (p.3) 3. Final efficiency test submitted to the DOE: Norplan_Efficiency test_November 2010 (p.3) 4. Final efficiency test submitted to the DOE: Norplan_Efficiency test_November 2010 (p.3) 5. PPA provided to DOE (Extracts of the 2009 PPA.pdf) 6. Final efficiency test submitted to the DOE: Norplan_Efficiency test_November 2010 (p.3) 7. Yes, the technology provider (Siemens) is a German company	1. DNV has verified the Kiambere efficient test final report prepared by Norplan on November 2010 /4/. Norplan is a third party contracted by the project participant. Norplan's final's report clearly describes page 3 that the project is a replacement of units at the existing Kiambere hydropower plant. The existing (2 x 72 MW) turbines will be replaced with (2 x 84.5 MW) turbines with new efficient runners. Thus, the upgrade will increase the plant's generation capacity by 25 MW from its existing capacity of 144 MW. However, of this additional 25 MW, at present only 20 MW is the contracted capacity to be supplied to the Kenyan grid. 2. DNV has verified the Kiambere

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
4. Evidence justifying that the plant's generation capacity will increase by 25 MW due to the project activity needs to be provided. 5. Of this additional 25 MW, at present only 20 MW is the contracted capacity to be supplied to the Kenyan grid. Evidence for the contract needs to be provided, indicating the contracting parties and signature date of the contract. 6. Would the technology result in a significantly better performance than any commonly used technologies in the host country? 7. Is any transfer of technology from any Annex-I Party involved?			efficient test final report prepared by NORPLAN on November 2010 /4/ which describe page 2 the technical specification of the new turbines (2 x 84.5 MW) installed as part of the project activity. The technical specification of the 2 new turbines, as described in the final report, are as followed: - Turbine type: Francis - Rated output: 84.5 MW - Manufacturer: Voith Siemens 3. DNV has verified the Kiambere efficient test final report prepared by Norplan /4/ which confirms that the existing Kiambere hydropower plant was commissioned in 1988 and included 2 vertical Francis units with an original capacity of 72 MW. The Norplan's report also indicates that: - Numerous problems have been encountered with the units since commissioning, including heavy inlet cavitation on the runners, cavitation on the guide vanes, excessive hydraulic thrust giving high bear-ing temperatures, and rotor poles failures. - A feasibility study which was

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
			performed recommended a complete upgrading of the turbines as it could, in addition to solving existing problems, give a substantial increase in power from the units. - Upgrading was implemented including renewal of main non-embedded turbine parts (covers, guide vanes, runner) and necessary modifications of other parts. Works were also carried out on the generators including the introduction of interpolar spacers on the rotor, permitting to handle the higher output from the turbines. The upgraded turbines have a guaranteed output of 84.5 MW for the conditions corresponding to two units in operation. - The upgraded units were set in operation in March 2009 for unit 2 and November 2009 for unit 1 4. DNV has verified the Kiambere efficient test final report prepared by Norplan /4/ which confirms that the existing Kiambere hydropower plant had a capacity of 144 MW, with the replacement of the two original

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
			turbine (2 x 72 MW) with 2 new turbines (2 x 84.5 MW) the replacement will increase the plant's generation capacity by 25 MW. 5. DNV has verified the power purchase agreement /7/ issued by the Kenya power and lighting company limited for the Kiambere ugraded hydropower plant. The power purchase agreement comfirms that of this additional 25 MW due to the project activity, at present only 20 MW is the contracted capacity to be supplied to the Kenyan grid. 6. DNV has verified the Kiambere efficient test final report prepared by Norplan /4/ which confirms that the ugrade due to the project activity improves the performance of the Kiambere hydropower plant. Furthermore the type of technical equipment used is typical for this sector and DNV confirm that it represent a good practice. 7. DNV has reviewed the contract between Siemens and Kengen /15/. The turbine manufacture is Siemens, a German company. Thus DNV confirms that there is a transfer of technical from an Annex I country

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
			for the project activity. **CL 2 is closed.**
CL 3 *Pre-project description* *The VVM required that if the proposed CDM project activity involves the alteration of an existing installation or process, the DOE shall ensure that the project description clearly states the differences resulting from the project activity compared to the pre-project situation.* 1. Evidence that the existing plant is 144 MW needs to be provided. 2. Evidence that the existing plant was commissioned in 1988 needs to be provided. 3. An accurate description of the existing plant (i.e. prior the implementation of the CDM proposed activity) needs to be provided together with the supporting evidence.	A.2.5 A.2.6 A.2.7	1. Final efficiency test submitted to the DOE: Norplan_Efficiency test_November 2010 (p.3) 2. Final efficiency test submitted to the DOE: Norplan_Efficiency test_November 2010 (p.3) 3. Final efficiency test submitted to the DOE: Norplan_Efficiency test_November 2010 (p.2 and 3)	DNV has verified the Kiambere efficient test final report prepared by Norplan /4/ which confirms that the existing Kiambere hydropower plant was commissioned in 1988 and included 2 vertical Francis units with an original capacity of 72 MW, i.e. a total capacity of 144 MW. The Norplan's report also indicates that: - Numerous problems have been encountered with the units since commissioning, including heavy inlet cavitation on the runners, cavitation on the guide vanes, excessive hydraulic thrust giving high bearing temperatures, and rotor poles failures. - A feasibility study which was performed recommended a complete upgrading of the turbines as it could, in addition to solving existing problems, give a substantial increase in power from the units. - Upgrading was implemented including renewal of main non-embedded turbine parts (covers, guide vanes, runner) and necessary modifications of other parts. Works were also carried out on the generators including the

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
			introduction of interpolar spacers on the rotor, permitting to handle the higher output from the turbines. The up-graded turbines have a guaranteed output of 84.5 MW for the conditions corresponding to two units in operation. - The upgraded units were set in operation in March 2009 for unit 2 and November 2009 for unit 1 **CL 3 is closed.**
CL 4 *Official development assistance.* *The guideline for completing the CDM-PDD requires project participants to describe the source of public funding for the project if any. Annex I party involve shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of those Parties* Evidence that the project funding is not a diversion of official development assistance (ODA) needs to be provided.	A.5.1	PDD Section A.4.5 and Annex 2: The Annex 1 public funding involved for this CDM project activity does not result in a diversion of official development assistance (ODA). See Attachment 1- VROM: Affirmation Regarding No Diversion of Official Development Assistance	The letter on the "Non diversion of ODA" from the project Annex I party has been received and reviewed by DNV /3/. Furthermore, the validation of the project does not reveal any diversion of public funding from any Annex I Parties involved in the project activity. **CL 4 is closed.**
CL 5 *Applicability of the methodology*	B.2.1 B.2.2	Section B.2. of the PDD has been updated to quote the evidence used to justify the applicability of the	The project is a grid-connected hydro power generation activity and meets all the conditions stated in the approved

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
The VVM required the project participants to show that the project activity meets each of the applicability conditions of the approved methodology or any tool or other methodology component referred to therein. The DOE shall validate the documentation referred to in the PDD and by verifying that its content is correctly quoted and interpreted in the PDD. The PDD describes how the project activity meets the applicability of the methodology however the PDD does not quote evidence to justify that the project activity is applicable to the selected methodology.	B.2.3 B.2.4 B.2.5	methodology	methodology ACM0002 version 13.0.0. This was verified by DNV as follow: • The project activity is the replacement of units of a hydro power plant (with a run-of-river reservoir) that supplies electricity to the grid /4/. • The project activity is implemented in an existing single reservoir, with no change in the volume of reservoir /15/. • The existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section /17/. • Five years of historical data are available, without any capacity addition or replacement being undertaken between the start of this five-year historical period and the implementation of the project activity /17/. **CL 5 is closed.**
CL 6 *Project boundary* *The VVM requires that the validation report shall contain information regarding*	B.3.3	1. As per the methodology ACM0002, ver 13.0.0, the emission sources from a run-of-river hydro power plant with no dam involved covers emissions from following activities.	Since the PDD was updated to version 13.0.0 of ACM0002, and in accordance with the applied methodology, DNV confirms that the use of fossil fuels for the back up or emergency purposes (e.g.

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed CDM project activity which are expected to contribute more than 1% of the overall expected average annual emissions reductions, which are not addressed by the applied methodology. 1. In this context, the project participants are requested to clarify whether the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology such as diesel generator typically used for hydro power for emergency start-up? 2. Do these sources contribute with more than 1% of the estimated emission reductions of the project?		i) Electricity generation and supplying to the grid. ii) Imports of electricity during the emergency from the grid iii) Use of the emergency diesel based generator as back-up in emergency conditions. The methodology covers emissions from (i) and (ii) and excludes emissions from (iii) due to their negligible volumes. The project boundary section of the PDD has been updated accordingly. 2. As explained above, there are no sources excluded that contribute to more than 1% of the estimated emission reductions of the project, following the methodology.	diesel generators) can be neglected. No other sources of emission were revealed for the project activity. Thus the project emissions described in the PDD are in accordance with the applied methodology and what was observed by DNV. **CL 6 is closed.**
CL 7 *Project operational lifetime* Evidence and justification for the operational lifetime of the project activity needs to be provided. Operational time is defined as the total time that the equipment has been operating since its first commissioning.	B.4.1 C.1.3	The project has been commissioned since March 2009 (Unit 2) and November 2009 (Unit 1). Norplan_Efficiency Test_Nov 2010.	DNV has reviewed the Norplan efficiency test report /4/ and confirm that the project was commission since March 2009 (Unit 2) and November 2009 (Unit 1). Hence, DNV confirms that the total time that the project activity has been operating since its first commissioning in March 2009 is about 3.5 years as per September 2012.

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
			CL 7 is closed.
CL 8 *DATEBaselineRetrofit* *According to ACM0002, for projects like Kiambere which involve the retrofit of an existing hydropower plant, the date the generation facility would likely be retrofitted ($DATE_{BaselineRetrofit}$) in absence of the CDM has to be determined. The project participants claim that Kiambere hydropower plant could continue to be operated with repairs of the runners and that no design change and retrofit of the runner would have happened in absence of the CDM.* 1. The selected DATEBaselineRetrofit need to be justified as per the adopted methodology of the project "In order to estimate the point in time when the existing equipment would need to be retrofitted in the absence of the project activity (DATEBaselineRetrofit), project participants may take the following approaches into account: 1. The typical average technical lifetime of the type equipment may be determined and documented, taking into account common practices in the sector and country, e.g. based on industry surveys, statistics, technical	B.4.1 B.6.6 C.1.3	**A. <u>Typical operation life of power plants of comparable size in the region/country/sector</u>** **Plant # 1: Edea Dam (Cameroon, 204MW, 57 years in operation):** <u>Commissioning date:</u> Construction – Feb/5/ 1954 (opening ceremony), construction actually took place during 1953 Sources: 1) French investment in colonial Cameroon - Martin-René Atangana – 2009 – Library of the congress USA http://books.google.com/books?id=bYsBSDyFEEgC&pg=PA144&lpg=PA144&dq=edea+dam+construction&source=bl&ots=otP1hLk8y1&sig=AhxlOytKxyTogzsrB4_PxnV2JG0&hl=en&sa=X&ei=owsfT5f3OcGViAe_wtzpDQ&ved=0CE8Q6AEwBg#v=onepage&q=edea%20dam%20construction&f=false 2) The aluminum industry in West and Central Africa, WB 2009 (see attachment) <u>Proof that it has been in operation for more than 50 years:</u> Hydroworld article (12/15/08) http://www.hydroworld.com/index/display/article-display/8019318576/articles/hrhrw/News/Cameroo	Based on the evidence provided DNV has verified that the typical lifetime for normal large scale project in the hydropower sector is about 50 years. This was confirmed by DNV through the review: • Book from Martin-René Atangana: *French investment in colonial Cameroon*, dated 2009 /19/ • Hydroworld article entitled *Cameroon finalizes deals to refurbish 263-MW Edea, 396-MW Song Loulou*, dated 15 December 2008 /20/ • Hydroworld article: *DSD Noell supplies gates to refurbish Cameroon's 263-MW Edea*, dated 15 December 2008. /21/ • Allafrica article: Cameroon: Aes SONEL - Lenders Assess Use of Funds , dated 21 April 2009. /22/ • Book from MIT entitled *Sustainable Energy-choosing among option* dated 2005 /23/. Furthermore, DNV has verified, based on the evidence provided, that the typical lifetime for projects similar to the CDM proposed project activity in

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
literature, etc.; 2. The common practices of the responsible company regarding replacement / retrofitting schedules may be evaluated and documented, e.g. based on historical replacement/retrofitting records for similar equipment". 2. Although there are hydropower projects running for more than 85 years, in the case of this project activity where the runner is being replaced, could you provide additional evidence that the runners can be used for more than 85 years. 3. The PDD indicates that there were 'Frequent repairs of the runners due to cavitation and cracking' which indicates that the plant had problems with the runners. Could you provide a justification which demonstrate why the runners were not correctly operating? 4. Furthermore, one of the runner is in use from 1988 and the replacement/optimisation has happened during 2008, the project has already been in operation for 20 years. Could you provide a justification and evidence demonstrating that the runner would have been used for more years without replacement.		n_finalizes_deals_to_refurbish_263-MW_Edea_396-MW_Song_Loulou.html Hydroworld article (12/15/08) http://www.hydroworld.com/index/display/article-display/4579713799/articles/hrhrw/News/DSD_Noell_supplies_gates_to_refurbish_Cameroons_263-MW_Edea.html Allafrica article (4/21/09) http://allafrica.com/stories/201102150700.html **Plant # 2: Nalubaale Power station [originally called Owen Falls Dam] (Uganda, 180 MW, 56 years in operation)** Commissioning date: Construction date: 1954 (the year when the lake reached its designed altitude). Construction of the dam commenced in 1950 and it was commissioned on 29th April 1954 by Her Majesty the Queen Elizabeth the second Sources: Eskom Uganda http://www.eskom.co.ug/power_stations.php Proof that it has been in operation for more than 50 years: Eskom Uganda http://www.eskom.co.ug/power_stations.php **Plant # 3: Kariba South Station (Zimbabwe, 705 MW, 50 years in operation)**	the hydropower sector (i.e. large scale hydropower project presenting similar runner problems as for the project activity) is 34 years. DNV has verified this through the review of article entitled *Renovation, Modernization and Upgradation of Hydro Plants in the Bhakra Beas River Valley Development* from Rakesh Nath, chairman of the Bhakra Beas management Board in India /24/. This project also demonstrates that plants with cavitation problem can continue to operate beyond 50 years, without necessarily requiring a rehabilitation of the turbine, as there is engineering solution available for addressing this aspect as part of regular maintenance practice. Thus, in the context of the evidence reviewed, DNV confirms that a $DATE_{Baselineretrofit}$ of 34 year is acceptable corresponding to: 1988 (commission date of the existing plant) + 34 years = 2022. Given that the project activity has a crediting period of 10 years, i.e. to end in 2022. The $DATE_{Baselineretrofit}$ is after the end of the crediting period for the project activity. **CL 8 is closed.**

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
5. Documents in the public domain indicate that the problem of cavitation in the Kiambere project is more than the normal problems faced in other francis turbines due to design issues and after optimizing the runner the project has run for longer periods without any cavitation issues.		Commissioning date Construction: between 1955 and 1959 Source: World Commission of Dams and ADB (http://www.adb.org/water/topics/dams/pdf/cszzmain.pdf) Proof that it has been in operation for more than 50 years: Source: World Commission of Dams and ADB (http://www.adb.org/water/topics/dams/pdf/cszzmain.pdf) **Plant # 4:_Koka Power Station (Ethiopia, 43 MW, 50 years in operation)** Commissioning date Commissioning year May/June 1960 Source:http://www.norway.org.et/News_and_events/etiopia/Koka-Dam-50-years-with-39-megawatts/ Proof that it has been in operation for more than 50 years: Source: http://www.norway.org.et/News_and_events/etiopia/Koka-Dam-50-years-with-39-megawatts/ **B. Typical operation life of power plants based on technical literature** We have also found one more technical literature that supports the operational life of hydro plants	

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
		beyond 50 years. The source for this information is : Name of the book: "Sustainable Energy-choosing among options" Source: http://books.google.com/books?id=AIbLqsJrW-QC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false Page no: 532 **C. <u>Typical life of hydro plant that has got similar runner problem</u>** As no information is available on whether the above mentioned plants have experienced similar activities in the plant, the analysis boundary has been further expanded to identify any such plants exist in the World and found one example in India. The details are as follows: Plant Name: Bhakra Beas Left Bank Power Plant Capacity: 5 x 106 MW Operation since: 1962 Have runners faced similar issue as that of Kiambere plant: Yes, they also experienced the cavitation during after 2 years it got commissioned. When the runners are proposed to be replaced with new: 2012 (the rehab work has just started) How long runners operated without any operational	

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
		issues: 49 years (as also evidenced through their high availability factor and plant load factor). **Conclusion** Based on above, it is once again clear that hydro plants operate more than 50 years and any cavitation issues with turbines can be easily handled following standard industry practices without any immediate need for their replacement. Considering the present lifetime of Kiambere plant (which is 23 years), the plant would operate beyond the crediting period without any need for undergoing rehabilitation. PDD has been updated accordingly	
CL 9 *Baseline scenario (1)* *DNV is not able to confirm that the baseline is the continuation of the situation prior to the implementation of the proposed CDM project activity.* 1. The baseline scenario defined in the PDD is "electricity that would have been otherwise generated by the operation of grid-connected power plants and by the addition of new generating sources".	B.4.1 B.4.2 B.4.3 B.4.4 B.4.5 B.4.6 B.4.7 B.5.2 B.5.3 B.5.42 B.5.43 B.5.44	1. The PDD has been updated following the step 1 and step 2 of the combined tool the methodology referred to in order to establish the baseline for the project activity. Please note that as the methodology already specifies the list of alternatives that need to be considered for these kinds of project activities, the same has been adopted; also following the guidance in the combined tool, page 2, para 2 under 'Applicability'. The establishment of baseline scenario follows the same procedure adopted in recently registered project activity implemented by the same project participant ("Tana hydro	1. DNV has verified that the PDD was correctly revised in accordance with the latest version of the ACM0002 version 13 and the baseline scenario for the project activity is described in the PDD in accordance with the step-wise procedure as required in the methodology. 2. DNV has verified that the PDD is correctly updated and uses the latest version of the *combined tool to identify the baseline scenario and demonstrate additionality*.

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
However this needs to be clarified in light of the step-wise procedure to identify the baseline scenario for modification / retrofit provided in the applied methodology and as per the latest version of the *combined tool to identify the baseline scenario and demonstrate additionality*. 2. The PDD uses the 'combined tool to identify the baseline scenario and demonstrate additionality' version 2.2. The applied version of the tool is no longer valid.	B.5.45 B.5.46 B.5.47 B.5.48	power plant"). 2. The version of the combined tool has been updated.	**CL 9 is closed.**
CL 10 *Baseline scenario (2)* *The VVM requires the baseline determination to be adequately documented in the PDD.* All the assumptions and data used by the project participants for establishing the baseline scenario shall be correctly quoted and interpreted in the PDD.	B.4.1 B.4.8	The baseline scenario establishment has been performed following the step wise procedure prescribed in the methodology. As the identified alternatives involve no external data or assumptions to be made, the same is reflected in the updated section of the PDD.	DNV has reviewed the revised PDD and confirms that the PDD adequately document the assumptions and data used for the determination of the baseline scenario. **CL 10 is closed.**
CL 11 *CDM Consideration* *The project start date is prior the date of publication of the PDD for stakeholder comments thus according to the VVM it shall be demonstrated that the CDM benefit were*	B.5.5	1. This element has been addressed by including the detailed explanation on how important was the decision made at the Managing Director level for the project implementation, 2. The same has been updated in the PDD.	1. The project start date of the project activity is before the date of project validation and before 2 August 2008. Hence, in accordance with the *Guidelines on the demonstration and assessment of prior consideration of the CDM* /47/, DNV has verified that serious

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
considered necessary in the decision to undertake the project as a proposed CDM project activity. 1. The project participant has demonstrated awareness of the CDM through the following evidence: *Managing Director's Report" published in the Kenya Electricity Generating Company Limited Annual Report 2006 (p.23)* as verified by DNV. However, no evidence demonstrating that the benefits of the CDM were a decisive factor in the decision to proceed with the project was provided. 2. The PDD refers to EB 49 Annex 22 (Version 03) as guideline for the CDM consideration assessment, however this is not the latest applicable guideline for CDM consideration.			consideration of CDM and continuation actions taken to secure CDM status is demonstrated in the *Managing Director's Report* published in the *Kenya Electricity Generating Company Limited Annual Report 2006* /9/ (page 23) which states that the potential for generation of revenues from CDM was considered for the project activity. The report /9/ highlights the importance of CDM revenue for the successful implementation and operation of the project activity. 2. DNV has reviewed the revised PDD and confirm that the PDD correctly refer to the latest version of the guideline for the CDM consideration assessment. **CL 11 is closed.**
CL 12 *Continuing and real actions were taken to secure CDM status* The project participant demonstrated continuous efforts to secure CDM status as follow: 1. 24 February 2006 – project start date 2. 30 July 2007 - The World Bank and	B.5.7 B.5.8 B.5.9 B.5.10	1. Evidences: • Project start date: EPC contract with Voith Siemens provided to DOE • ERPA provided to DOE • ERPA amendment provided to DOE 2. Unit 2 was stopped for upgrading works with Voith on 12th April 2008. Unit 1 was stopped on 22nd April 2009 for the upgrading project site work	1. The real and continues action to secure CDM status was evidenced through the activities listed below, which were completed in parallel with the implementation of the project activity: • Signature of the letter of intent (LoI) for the potential purchase of CERs between KenGen and

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
KenGen signed the Emissions Reduction Purchase Agreement (ERPA) for the project 3. 30 November 2007 - The World Bank and Det Norske Veritas AS (DNV) signed the contract for validation of project. 4. 28 July 2008 - DNV conducted a site visit of the project during the period of July 28-31, 2008. 5. 18 September 2009 – ERPA is amended. 1. Evidence for the item above needs to be provided excluding the item referring to DNV validation contract and site visit. 2. When did the construction of the project activity start? 3. When was the CDM proposed project commissioned?		(See Power station reprt). 3. The project was commissioned in March 2009 (Unit 2) and November 2009 (Unit 1). Norplan_Efficiency Test_Nov 2010.	Carbon Finance Unit dated 6 October 2006 /28/. • Signature of the emission reduction purchase agreement (ERPA) between KenGen and World Bank Carbon Finance unit on 30 July 2007 /30/. • Signature of the CDM validation contract for the project activity between DNV and the World Bank Carbon Finance Unit, dated 30 November 2007. • Publication of the project activity PDD for global stakeholder consultation on 11 March 2008. • The project was commissioned in March 2009 with the commission of Unit 2 /4/ • Signature of the amended emission reduction purchase agreement (ERPA) between KenGen and World Bank Carbon Finance unit on 18 September 2009 /30/. • Unit 1 was commissioned on November 2009 /4/ DNV considers that the evidences demonstrate CDM consideration for the project activity and that real and continuous real action to obtain CDM status for the project was

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
			underway with the time gap between activities being less than two years thereby complying with the *Guidelines on the demonstration and assessment of prior consideration of the CDM* /47/. 2. The project started construction after the signature of the contract between the project participant (KenGen) and Siemens for upgrading Kiambere hydroelectric power station /15/. 3. The project was commissioned in March 2009 with the commission of Unit 2 /4/ **CL 12 is closed.**
CL 13 *Common practice* The common practice analysis does not comply with the latest version of the latest version of the additionality tool version 6.0.0. **NB:** Below are listed issues that were previously raised as part of CL 13 after site visit. However these issues are no longer valid in light of the latest version of the additionality tool and thus not address as part of the response and conclusion for CL 13:	B.5.42 B.5.43 B.5.44 B.5.45 B.5.46 B.5.47 B.5.48	The common practice analysis in PDD has been revised in accordance with the the latest version of the additionality tool, version 06.1.0.	DNV has reviewed the revised PDD and confirm that the common practice analysis for the project activity was revised in the PDD in accordance with the latest version of the additionality tool, version 06.1.0. Since the proposed project activity is a hydropower project power plant thus it is considered within the group of measures "*Switch of technology with or without change of energy source (including energy efficiency improvement as well as use of*

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
1. The Sondu Miriu project was not recommended for CDM, it needs to be clarified why the project is excluded from the common practice analysis. 2. Evidence that no upgrade of capacity of hydropower project was done before 2005 in Kenya needs to be provided. 3. The data source and evidence for the tables included in the common practice analysis needs to be provided.			*renewable energies)*" which is listed in paragraph 6 of the "*Tool for the demonstration and assessment of additionality*" version 06.1.0 /46/. Therefore, the step-wise approach for the common practice analysis listed in paragraph 47 of the "*Tool for the demonstration and assessment of additionality*" version 06.1.0 /46/ is applicable to the proposed project activity. DNV has verified the revised common practice analysis and confirms that it is in line with the "*Tool for the demonstration and assessment of additionality*" version 06.1.0 /46/. **CL 13 is closed**
CL 14 *EGhistorical* *As per the VVM it shall be confirmed that the monitoring plan contains all necessary parameters, that they shall be clearly described and that the means of monitoring described in the plan complies with the requirements of the methodology.* The project participant chose the 5 last calendar years prior to the implementation of the project activity to determine $EG_{historical}$, the	B.6.5 B.6.7	1. The project was commissioned in March 2009 (Unit 2) and November 2009 (Unit 1). Norplan_Efficiency Test_Nov 2010. 2. KPLC annual report submitted to DOE (KPLC Annual Account 2009 Pg 100.pdf)	1. The project was commissioned in March 2009 with the commission of Unit 2 /4/. 2. The Annual average electricity generation from the exiting project facility has been fixed as 917 400 MWh per year. This has been arrived based on the details of the last 5 years of electricity generation from the Kiambere hydro power plant 2003/04: 1 010 GWh; 2004/05: 814 GWh; 2005/06: 852

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
period covered is as follow: July 2003 to June 2004 July 2004 to June 2005 July 2005 to June 2006 July 2006 to June 2007 July 2007 to June 2008 1. Project implementation date needs to be justified and evidence with the intention to describe why the selected 5 years period is from July 2003 to June 2008. 2. Five years of electricity generation data is available for the existing power plant. Evidence for these needs to be provided to justify the values for 2003/04, 2004/05, 2005/06, 2006/07 and 2007/08 as indicated in the PDD. Invoices for electricity sales also need to be provided for cross checking.			GWh; 2006/07: 973 GWh; 2007/08: 938 GWh. DNV has verified this values through the review of the KPLC's *Annual report and financial statement for the year ended 30 June 2009*, dated 2009 /17/ and through the review of sampled invoices from KPLC for the period from 2003 to 2008 /18/. **CL 14 is closed.**
CL 15 *EGfacility,y* *As per the VVM it shall be confirmed that the monitoring plan contains all necessary parameters, that these shall be clearly described and that the means of monitoring described in the plan complies with the requirements of the methodology.* EGfacility,y ex-ante is estimated as 73%	B.6.8	The historical average load factor comes from using the installed capacity and the electricity generated during the period 03/04 to 07/08	DNV has verified the historical average load factor of 73% through the review of the installed capacity /4/ and electricity generated during the period from 2003 to 2008 /17//18/. **CL 15 is closed.**

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
historical average load factor, i.e. 1 048 750 MWh. Evidence and justification for the historical average load factor needs to be provided.			
CL 16 *Emission reduction calculation and emission factor for the Kenyan grid.* 1. The calculation has been done according to ACM0002 using the dispatch data analysis for calculating the OM and BM using weighted average of the 5 most recently built plants. However : a. the latest tool to calculate the baseline emission factor has not been referred b. the data and documents related to the emission factor calculation need to be provided *c.* The PDD indicates that the BM has been calculated using option I of the "Tool to calculate grid emission factor" and the BM will be calculated annually. This needs to be clarified (page 43 of the PDD). 2. According to the VVM, all assumptions and data used by the project participants for emission reduction calculation shall be listed in the PDD, including their	B.6.1 B.6.2 B.6.3 B.6.4 B.6.5 B.6.6 B.6.7 B.6.8 B.6.9 B.6.10 B.6.11 B.6.12 B.6.13 B.6.14 B.5.21	1. The entire PDD Section B.6 was re-written in accordance with ACM0002 Version 13. 2. All the baseline information used is shown in Annex 3. Spreadsheets for the Dispatch data analysis are provided in the last annex.	1. DNV has reviewed the revised PDD, the revised grid emission factor calculation and revised emission reduction calculation and confirms that these are in accordance with the latest version of ACM0002 version and associated tools. 2. DNV has reviewed the revised PDD and confirms that all assumptions and data used by the project participants for emission reduction calculation are listed in the PDD, including their references and sources. **CL 16 is closed**

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
references and sources. The PDD needs to be updated accordingly.			
CL 17 *Data and parameter to be monitored (1)* 1. The PDD is not clear regarding how the excess electricity generated by the project activity will be measured and accounted. 2. Also, the monitoring plan lacks clarity on the following: a) Parameters to be monitored as per the "Tool to calculate Emission factor of the electrical system" and ACM0002 b) The monitoring equipment, frequency of monitoring, QA/QC procedures and the period of archival.	B.7.1 B.7.2 B.7.3 B.7.4 B.7.5 B.7.6 B.7.7	B10.1 is already addressed in the re-write of PDD Section B.6.1. Following ACM0002 Version 13: The project activity follows the steps provided by the methodology in estimating the baseline emissions. Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, calculated using Equations (7), (9) and (10). ***(7)*** $BE_y = (EG_y - EG_{baseline}) * EF_{grid,CM,y}$ ***(9)*** $EG_{baseline} = EG_{historical}$ ***, until*** $DATE_{Baseline\ Retrofit}$ ***(10)*** $EG_{baseline} = EG_y$ ***, on/after*** $DATE_{Baseline\ Retrofit}$ Where: BE_y Baseline emissions in year *y* (tCO_2/yr) EG_y Electricity supplied by the project activity to the grid (MWh) $EG_{baseline}$ Baseline electricity supplied to the grid in the case of modified or retrofit facilities (MWh). $EF_{grid,CM,y}$ Combined margin CO_2 emission factor for grid connected power generation in year *y* calculated using the latest version of the "Tool to calculate the emission factor for an electricity system". $EG_{historical}$ Average of historical electricity delivered by the existing facility to the grid (MWh)	1. DNV has reviewed the latest version of the PDD and confirm that it clearly describes how the excess electricity generated by the project activity will be a measured and accounted. The quantity of electricity exported to the grid by the project activity will be metered by KenGen and KPLC, and readings of meters will be done jointly by them. Readings will be double checked by receipts of sales each month. In accordance with the approved methodology, hourly measurement and monthly recording will be done. Meters will be subject to a regular maintenance regime to ensure accuracy. 2. DNV has reviewed the revised PDD and confirm that the monitoring plan correctly describe the parameters to be monitored in accordance with ACM0002 version 13. **CL 17 is closed.**

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
		$DATE_{BaselineRetrofit}$ Point in time when the existing equipment would need to be replaced in the absence of the project activity (date) $EG_{historical}$ is estimated based on data from the most recent available year (July 2007-June 2008). A minimum of five years of historical generation data is used, excluding those years that were affected by unusual circumstances such as extreme droughts and natural disasters. $DATE_{BaselineRetrofit}$ is the typical average lifetime of the existing turbine. The project sponsor estimated that, if current costly routine maintenance practices are maintained, it has a remaining lifetime of 35 years from year 2008. **See Attachment 3 on lifetime of existing turbines.** Please note that with proper routine maintenance, the effective lifetime can go beyond the initial 25 years. Regarding parameters to be monitored as per the "Tool" and ACM0002, please see PDD Section 7.1. The tables shown under this section include the frequency of monitoring and QA/QC procedures. Under the head Section 7, the following is written: All data collected as part of monitoring will be archived electronically and be kept at least for 2 years after the end of the last crediting period. 100% of the data will be monitored if not indicated	

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
		otherwise in the tables below. All measurements will be conducted with calibrated measurement equipment according to relevant industry standards.	
CL 18 *Data and parameter to be monitored (2)* *According to the VVM the monitoring plan shall contains all necessary parameters, they shall be clearly described and the means of monitoring described in the plan complies with the requirements of the methodology.* 1. The data source for $FC_{i,n,h}$ and $FC_{i,m,y}$ is not in accordance with the requirements of the tool *2.* For the parameter NCVi,y, it needs to be justified whether value from the fuel supplier of the power plant in invoices is available. *3.* For the parameter NCVi,y is needs to be justified whether regional or national average default value is available. *4.* For the parameter $EF_{CO2,i,y}$ *and* $EF_{CO2,m,i,y}$ it needs to be justified whether value from the fuel supplier of the power plant in invoices is available. *5.* For the parameter $EF_{CO2,i,y}$ *and* $EF_{CO2,m,i,y}$ it needs to be justified whether regional or	B.7.1 B.7.2 B.7.3 B.7.4 B.7.5 B.7.6 B.7.7	1. Section B.7.1. of the PDD has been updated and these parameters have been removed 2. Section B.7.1. of the PDD has been updated and this parameter has been moved to section B.6.2. Default data from IPCC has been used as Country specific data is not available. 3. Section B.7.1. of the PDD has been updated and this parameter has been moved to section B.6.2. Default data from IPCC has been used as Country specific data is not available. 4. Section B.7.1. of the PDD has been updated and this parameter has been moved to section B.6.2. Default data from IPCC has been used as Country specific data is not available. 5. Section B.7.1. of the PDD has been updated and this parameter has been moved to section B.6.2. Default data from IPCC has been used as Country specific data is not available. 6. Section B.7.1. of the PDD has been updated to clarify the measurement and recording frequency of this parameter	DNV has reviewed the revised PDD and confirm that the monitoring plan contains all necessary parameters and these are clearly described in compliance with the requirements of the applied methodology. **CL 18 is closed.**

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
national average default value is available *6.* The applied methodology requires EGfacility,y to be measured continuous least and recorded at least monthly however this is not clearly indicate din the PDD.			
CL 19 *Project management planning.* The procedures related to internal review, corrective and preventive action need to precise in the PDD	B.7.10	Please refer to Annex 5 of the PDD	DNV has reviewed the revised PDD and confirms that the monitoring plan describe the relevant procedure to ensure that the emission reductions resulting from the project can be reported ex post and verified. **CL 19 is closed.**
CL 20 *Project start date* *The DOE shall confirm that the start date of the project activity, reported in the PDD, is in accordance with the Glossary of CDM terms.* In order to determine the earliest date at which either the implementation or construction or real action of the CDM proposed project activity begins, the project participant is requested to provide a detailed timeline describe the milestone of the CDM proposed project activity implementation. The relevant evidence needs to be provided.	C.1.2	Section B.5. of the PDD has been updated to add a project timeline table with the supporting evidences.	DNV has reviewed the project timeline and the associated evidence. The starting date of the project activity is 24 February 2006 which is the date of the signature of the contract between the project participant (KenGen) and Siemens for upgrading Kiambere hydroelectric power station /15/. DNV confirms that no other real action or other contract was signed for the implementation or construction of the project prior the 24 February 2006. The project start date is in line with the guidance provided by the EB on start dates.

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
The project timeline shall include among other milestones: the dates of the first contracts for the project activity, and the date when was the first construction activity started. The timeline shall be included and adequately documented in the PDD.			**CL 20 is closed.**
CL 21 *Crediting period start date* The crediting period start date needs to be updated in accordance with the CDM EB requirements.	C.1.4	Section C.2.1.1 of the PDD has been updated to change the starting date of the crediting period to comply with EB requirements	The crediting period starting date has been updated to 1 November 2012, DNV confirms that this is line with the CDM EB requirements. **CL 21 is closed.**
CL 22 *Environmental impact assessment* *According to the VVM The DOE shall confirm, by means of a document review and/or using local official sources and expertise, whether the project participants have undertaken an analysis of environmental impacts and, if required by the host Party, an environmental impact assessment.* Evidence for the approved EIA for the existing Kiambere project (i.e. prior the implementation of the project activity) needs to be provided.	D.1.1	At the time Kiambere was constructed, there was no requirement for EIA in the country. The regulatory framework, EMCA, 1999 came into force in 1999. However, the requirement was for projects initially commissioned prior to coming into force of EMCA to undertake annual audits. The optimized Kiambere did not require an EIA to be done, since the project was similar to undertaking the annual overhaul.	DNV has verified that at the time Kiambere was constructed, there was no requirement for EIA in the country. The regulatory framework, Environmental Coordination and Management Act (EMCA) came into force in 1999 /25/. However, the requirement was for projects initially commissioned prior to coming into force of EMCA to undertake annual audits. The optimized Kiambere did not require an EIA to be done as verified by DNV through the review of the *Environmental Coordination and Management Act* issued by NEMA dated 1999 /25/ since the project was similar to undertaking

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
			the annual overhaul. The Act does not require a new EIA when the main project work consists of replacement of mechanical equipment within the plant. Nonetheless, as required by the Act, the Kiambere power station will be subject to annual Environmental Audits under the guidance of the National Environmental Management Authority (NEMA). **CL 22 is closed.**
CL 23 *Local stakeholder consultation* *The DOE shall, by means of document review and interviews with local stakeholders as appropriate, determine whether: (a) Comments by local stakeholders that can reasonably be considered relevant for the proposed CDM project activity, have been invited; (b) The summary of the comments received as provided in the PDD is complete; (c) The project participants have taken due account of any comments received and have described this process in the PDD.* The details and the minutes of the stake holder meeting needs to be provided.	E.1.1 E.1.4 E.1.5	PDD Section E was re-written: **E.1. Brief description how comments by local stakeholders have been invited and compiled:** Stakeholder consultations were carried out to compile and consider comments from the local residents before project implementation. Two stakeholder meetings were held in late 2007. The first stakeholder meeting was held on 10th April 2007 in the Gitaru conference room, attended among others by the community liaison officer and various members of the community. The role of KenGen in clean power generation was highlighted and its efforts in corporate social responsibility (CSR) were emphasized. The CSR committee of KenGen announced a plan to provide assistance to the community in terms of awarding scholarships to five nearby neighborhoods as well as assisting in construction of schools, roads and hospitals as possible component of the community development	The records of the stakeholder meetings was provided to and reviewed by DNV. DNV confirms that the information in the PDD is in accordance with the evidence reviewed. **CL 23 is closed.**

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
		plan to be associated with implementing the proposed CDM project. The second stakeholder meeting was on 5th December 2007. In this meeting, the CDCF (Community Development Carbon Fund) community benefit plan was discussed in more detail. Participants during the meeting, including liaison officer and HRO training and development officials, agreed to design the community benefit plan by first visiting the projects done by the CSR committee and also based on those projects specifically requested by the local community. **E.2. Summary of the comments received:** Comments received pertain mainly on the provisions of the community benefits plan. (See Section E.3 below.) **E.3. Report on how due account was taken of any comments received:** Based on the needs listed on the stakeholder meeting held on December 5th 2007, KenGen and local community leaders agreed on the following items to make up the community benefit plan: providing water to certain parts of the community; constructing six water kiosks at Musumaa sub-location around the Masinga power station; constructing classrooms in primary schools; and building health centers. Financing of the benefit plan would be met through the sale of ERs to the CDCF.	

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
CL 24 *Benchmark (1)* *In accordance with the Guidelines on the assessment of investment analysis, EB62 Annex 5: input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant.* 1. The benchmark applied is sourced from the Kenyan government. This document needs to be presented. 2. It needs to be justified that the choice of benchmark is the latest available at the time of the decision.	B.5.14 B.5.16 B.5.48	1. Circular Number 27/2003 from the ministry of Finance to all Chief Executives of State corporations and Accounting Officers containing the general guidelines for the Capex projects provided to the DOE. (Investment costs -15% for State Corporations.pdf) 2. No circular was issued between 2003 to 2005, the benchmark is considered to be appropriate	1. DNV has verified that in accordance with the additionality tool /46/ Sub-step 2.b option III paragraph 30 (d), the benchmark for the project activity is derived from Kenya government bond rates. The selected benchmark for the project activity is a post-tax benchmark of 15% which is in accordance with the selected financial indicator (a post-tax project IRR). DNV has verified the applied benchmark against the latest Treasury Circular Number 27/2003 from the ministry of Finance to all Chief Executives of State corporations and Accounting Officers containing the general guidelines for the Capex projects /32/. 2. DNV confirms that no other circular was issued between 2003 and 2007, therefore the benchmark is considered to be appropriate. The selected benchmark represents an official benchmark for the power generation market on new investments, supplied by a relevant national authority in Kenya. DNV finds the benchmark of 15% adopted for the project to be in line with the guidance provided in the

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
			additionally tool and EB guidelines. . **CL 24 is closed.**
CL 25 *Benchmark (2)* *In accordance with the VVM, to confirm the suitability of any benchmark applied in the investment analysis, the DOE shall determine whether the type of benchmark applied is suitable for the type of financial indicator presented.* 1. The investment analysis of the project activity calculates an equity post-tax IRR, in this context it needs to be demonstrated that the benchmark applied is suitable for the type of financial indicator applied. 2. It needs to be clarified whether any risk premium was applied in the investment analysis – and the assumptions thereof presented.	B.5.15 B.5.48	1. The reference used as a benchmark is a post-tax indicator 2. No risk premium has been applied to the financial analysis	1. DNV has verified that the selected benchmark for the project activity is a post-tax benchmark of 15% which is in accordance with the selected financial indicator (a post-tax project IRR). DNV has verified the applied benchmark against the latest Treasury Circular Number 27/2003 from the ministry of Finance to all Chief Executives of State corporations and Accounting Officers containing the general guidelines for the Capex projects /32/. 2. DNV has verified that the benchmark for the project activity is derived from Kenya government bond rates and no risk premium has been applied to the benchmark. **CL 25 is closed.**
CL 26 *Depreciation rate* *As per the VVM, to verify the accuracy of financial calculations carried out for any investment analysis the DOE shall:*	B.5.17 B.5.48	The depreciation rate applied (4% annual) is the result of applying a linear depreciation using the expected operation of the project activity (25 years). This rate is also in line with the practice of the company. An extract of the annual accounts -	1. In the investment analysis for the project activity the depreciation is calculated on a straight-line basis the lifetime of the project activity i.e. 25 year. DNV has verified that

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
(a) Conduct a thorough assessment of all parameters and assumptions used in calculating the relevant financial indicator, and determine the accuracy and suitability of these parameters using the available evidence and expertise in relevant accounting practices *(b) Cross-check the parameters against third-party or publicly available sources, such as invoices or price indices;* *(c) Assess the correctness of computations carried out and documented by the project participants.* 1. Evidence for the depreciation rate applied need to be provided. 2. It needs to be justified whether the depreciation rate applied is in accordance with normal accounting practice in the host country?		KenGen MDs Report 2006 Annual Account - Property Plant Equipment and Depreciation has been provided to the DOE.	this is in accordance with KenGen 2006 Annual Account report /40/. 2. DNV has reviewed other registered CDM project implemented by the project participant (UNFCCC reference 5023) and confirms that the depreciation rate applied in accordance with the practice of the company, and in the host country. **CL 26 is closed.**
CL 27 *Salvage value / working capital* *In accordance with the Guidelines on the assessment of investment analysis, EB62 Annex 5: The period of assessment should not be limited to the proposed crediting period of the CDM project activity. Both project IRR and equity IRR calculations shall as a preference reflect the period of expected operation of the underlying project activity (technical lifetime),*	B.5.18 B.5.48	1. The time period of the Financial Analysis (25 years) is in line with the expected operation of the project activity 2. No, the depreciation is set to 25 years	1. The expected operational lifetime of the project activity is 25 years according to the contract between the project participant (KenGen) and Siemens for upgrading Kiambere hydroelectric power station, dated 24 February 2006 /15/. 2. DNV confirms that no salvage value need to be taken into account since the expected operation

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
or . if a shorter period is chosen . include the fair value of the project activity assets at the end of the assessment period. In general a minimum period of 10 years and a maximum of 20 years will be appropriate. 1. It needs to be clarified whether the time period of the investment analysis reflect the period of expected operation of the project activity? 2. It needs to be clarified whether a salvage value shall be taken into account? And whether a working capital shall be returned in the last year of operation?			**CL 27 is closed.**
CL 28 *Input values for investment analysis:* *As per the VVM, to verify the accuracy of financial calculations carried out for any investment analysis the DOE shall:* *(a) Conduct a thorough assessment of all parameters and assumptions used in calculating the relevant financial indicator, and determine the accuracy and suitability of these parameters using the available evidence and expertise in relevant accounting practices* *(b) Cross-check the parameters against third-party or publicly available sources, such as invoices or price indices;* *(c) Assess the correctness of computations*	B.5.20 B.5.21 B.5.22 B.5.23 B.5.24 B.5.25 B.5.26 B.5.48	1. PDD and Financial analysis have been updated to indicate the sources for the input values 2. The input values applied are applicable to the project 3. It has been provided to the DOE the Voith Siemens proposal with a breakdown of the investment costs 4. The O&M costs considered in the Financial analysis are just the variable O&M costs, which are based on the historical values.	1. DNV has reviewed the revised investment analysis and PDD, and confirms that sources for the input values to the investment analysis are correctly reported. 2. DNV has reviewed evidence for all input values and confirm that these are applicable to the project activity and in accordance with the CDM EB requirement and guidelines. 3. DNV has reviewed the Voith Siemens proposal and the breakdown of the investment costs. 4. DNV has verified this value against

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
carried out and documented by the project participants. *And in accordance with the Guidelines on the assessment of investment analysis, EB62 Annex 5: input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant.* 1. All input values into the investment analysis need to be clearly referenced to the source documentation so that all assumptions and values applied can be validated as being accurate and relevant. And relevant evidence needs to be provided. 2. The project participant shall clarify that the input value applied are applicable to the project activity. 3. A breakdown of the total investment shall be provided describing what the total investment parameter includes. 4. A breakdown of the O&M costs shall be provided describing what the O&M parameter includes.			the average historical O&M cost for the Kiambere hydropower plant over the period from 2003 to 2005 /33/. Furthermore, DNV has verified that even when the O&M costs for the project activity are considered to be zero the IRR becomes 9.28% which is still below the selected benchmark of 15%. **CL 28 is closed.**

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
CL 29 *Sensitivity analysis* *As per the VVM, the sensitivity analysis shall be assessed project participants to determine under what conditions variations in the result would occur, and the likelihood of these conditions.* The PDD does not describe nor justifies the likelikhood of the variation presented in the sensitivity analysis.	B.5.27 B.5.28 B.5.48	The PDD has been updated.	DNV has reviewed the revised PDD and confirms that the likelihood of the variation of each parameter considered in the sensitivity analysis is described in the PDD. *Investment costs:* with a decrease by 35% from the investment costs considered for the project activity the IRR reaches the benchmark. The project activity is already commissioned /4/ and DNV has verified the actual cost of the project activity, i.e. 16 million USD as verified against Kengen financial accounts /16/, which is about 7 million higher than the value considered in the investment analysis (9.06 million USD /14/). Thus DNV confirm that the investment costs will not decrease by 35% in the future. *Operation and maintenance (O&M) cost:* DNV has verified that even if O&M costs are considered as zero the IRR remains below the benchmark. Thus DNV confirms that the project activity O&M costs will not vary in the future such that the IRR reaches the benchmark. *Increase in the "Incremental generation":* With an increase of 47% from the "incremental generation"

Corrective action and/ or clarification (requests	Reference to Table 2	Response by project participants	Validation conclusion
			considered for the project activity the project IRR reaches the benchmark. DNV has verified that this is unlikely to happen given that a PLF of 100% is already conservatively considered by the project participant for the project investment analysis. *Electricity Tariff:* The IRR crosses the benchmark if the tariff increases by 47%. As per the power purchase agreement signed with KPLC the tariff has been fixed for twenty years /6//7/. It has also been checked from the Report of Electricity Tariff Study for the Electricity Regulatory board conducted by Fichtner dated January 2007 /8/ that no revisions in tariff has been proposed. Hence, it can be reasonably inferred that the increase of tariff by 47% is unlikely to happen. The sensitivity analysis shows that even with likely variations of the key input parameters, the post-tax project IRR of the proposed project is lower than the benchmark. In conclusion, the assessment of the arguments presented is deemed to sufficiently demonstrate that the project is not financially attractive. **CL 29 is closed.**

Table 4 Forward action requests

Forward action request	Reference to Table 2	Response by project participants
Not applicable		

- o0o -

APPENDIX B

CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS

Murali Govindarajulu

Holds a Bachelor's Degree in Chemical Engineering and has done a Short term diploma course in Management. Having an overall experience of around eleven years. Prior to joining DNV having around seven years experience in Chemical process industry covering production, energy efficiency improvement and equipment design erection and commissioning. His experience also covers the fields of environmental management and resource conservation including identification of alternative fuels. He has also been actively involved in implementation of Management Systems such as ISO 140001 and OHSAS 18001 standards in chemical process industry for more than three years.

He has experience of around 5 years in validation and verification of numerous CDM projects in DNV, both in India & abroad. His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in energy generation from renewable energy sources.

Decq Phillipe

Philippe Decq holds a Master Degree in Geography and has an overall experience of around 20 years. Prior to joining DNV, he has 10 years experience in Environmental consulting in Africa and France. Philippe was involved in Environmental impact study, due diligence audit, Environmental Management Systems auditing and was Project Manager for large Oil and Gas or Waste Management projects including composting and landfill.

He has experience of around 10 years as Environmental Management System Auditor including 5 years in validation and verification of CDM projects/JI and other 3rd party validation/verification services (including EU ETS verification).

His qualification, industrial experience and experience in CDM demonstrate him sufficient sectoral competence in waste handling and disposal and Energy Generation from renewable energy sources.

Dudek Agnes

Agnes Dudek holds a PhD Degree in applied physics. Having an overall experience of around 7.5 years. Prior to joining DNV having 6 years experience in scientific research covering satellite remote sensing, mesoscale weather forecast modelling and air pollution dispersion modelling and monitoring.

She has experience of around 2.5 years in validation and verification of numerous CDM projects.

Her qualification, research experience and experience in CDM demonstrate her sufficient sectoral competence in energy generation from renewable energy sources.

Rafi-ud-Din Khawaja

Rafi-ud-Din Khawaja holds a Master's Degree in Environmental Engineering with over 8 years of experience in air pollution control technology, air pollution monitoring, risk management reviews, ambient air quality analysis, transport phenomena, urban and industrial air quality management .

He has acquired over three years of experience in validation and verification of numerous CDM and JI projects while working in DNV. He has been qualified as a CDM validator/technical reviewer for technical area Renewables and as a CDM validator/verifier as well as a Technical Reviewer (TR) for technical area N2O (i.e. under Methodology group 11) under the Qualification Scheme of Climate Change Services of DNV.

His qualification, industrial and work experience in CDM facilitate him to assess all technical areas to sufficient degree.

Gaurav Srivastava

CDM Validator/Verifier, DNV Bangalore, India holds a Master**'**s Degree in Energy Systems. His educational qualification covers the fields of sustainable development, power plant technology, renewable energy technology, performance of thermal & electrical utilities and project financing. He has completed ISO 14001:2004 - Environmental Management System Auditor / Lead Auditor Program, certified by IRCA.

He has experience of 5 years in validation and verification of numerous CDM projects in DNV, both in India & abroad. His qualification, training and experience in CDM demonstrate his sufficient sectoral competence in energy generation from renewable energy sources.

Grant Stephen Little

Holds a Bachelor Degree in Pure and Applied Chemistry; with a Secondary Degree in Forest Products Manufacture and a Masters Degree in Business Administration (MBA). He has over 20 years of industrial experience. Prior to joining DNV, Grant gained 16 years' experience in the forest products industry covering Process Engineering, energy projects, Sustainable Development, Forest eco-labelling and Environmental Management Systems. He also has over 5 years' experience in the business development for carbon project development and carbon markets in Africa and the Middle East where he worked for a carbon aggregator and a government owned carbon management and environmental project development company. He is passionate about Africa and sees his work as a contribution to the development of the continent.

Lumir Nemecek

Mr. Lumír Nemecek holds a MSc. Degree in Energy industries. Having an overall experience of around 32 years. Prior to joining DNV having 33 years experience in nuclear, hydro, fossil-fuelled power and other renewables . He worked for large and medium size energy companies in different roles and capacities including project management, project engineering and consulting. He has acquired his experience in energy industry markets from both Subcontractor and Client Company's perspective combined with understanding of business climate and adopted practice covering

1. Staff member of power plant during the construction - direct participation on construction and equipment installations, supervision of suppliers and designers, safety aspects of construction and operation.

2. Energy utility (10yrs) - Project preparation and project management activities, preparation and supervision of the plants technical development, site visits, supervision of suppliers

installations., bidding procedures and construction preparation of new power plants, plant operations support, project management, supervision individual plants technical departments.

3. Consultancy activities in energy sector (11yrs) - feasibility studies, site visits, supervision of suppliers, supervision of installations, bidding procedures, supervision of reengineering and plant renovations, time scheduling, administrative and legal procedures during projects preparations

4. Export/import of complete power plants, equipment and technology (5yrs) Bidding procedures, preparation and realization supervision of power facilities, project management, planning, monitoring, and reporting.

He has experience of around 3 year in validation and verification of numerous CDM and JI projects. His qualification, industrial experience and experience in CDM demonstrate him sufficient sectorial competence in 1.1, 1.2 .”

- o0o -