VALIDATION REPORT

Fiji Nadarivatu Hydropower Project

24 December 2012

Japan Consulting Institute

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CDM Validation Report for Fiji Nadarivatu Hydropower Project

Date of first issue 30 November 2012	Report Number JCI-CDM-VAL-10/035	
Approved by Akio Yoshida, Executive Director	Organizational Unit JCI CDM Center, Japan Consulting Institute (JCI)	
Client Fiji Electricity Authority (FEA)	Client ref., Mr. Hasmukh Patel	
Project name	Fiji Nadarivatu Hydropower Project	
Host Country The Republic of Fiji Islands	Methodology version ACM0002 version 12.1.0	Sectoral Scope Technical Area(s) Sectoral Scope 1, TA 1.2
Size Large Scale ~~/ Small Scale~~	ER estimate 47,361 t-CO_2e / year (average)	
GHG Reducing Measure/ Technology	Grid-connected hydropower generation	

A summary of the validation process and its conclusions, validation opinion

Japan Consulting Institute (JCI) has performed a validation work of the "Fiji Nadarivatu Hydropower Project". The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and the host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

- The desk review of the PDD and the subsequent follow-up interviews have provided JCI with sufficient evidence to determine the fulfilment of the stated criteria.
- The host country is the Republic of Fiji Islands and the Annex I country is not involved, and therefore the project is a unilateral project. The host country fulfils the participation criteria and has approved the project and authorized the project participant. The DNA from the Republic of Fiji Islands confirmed that the project assists in achieving sustainable development.
- The project correctly applies ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 12.1.0 and referenced Tools.
- The total emission reductions from the project are estimated to be on the average 47,361t-CO_2e per year over the selected 7 years crediting period. The starting date of crediting period is from 01/04/2013, or on the date of registration of the CDM project activity, whichever is later. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.
- Adequate training and monitoring procedures have been implemented.
- In summary, it is JCI's opinion that the "Fiji Nadarivatu Hydropower Project" as described in the PDD version 6 dated 20/09/2012 meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0002 version 12.1.0.
- JCI thus provides a positive opinion and requests the registration of the proposed project as a CDM project activity.

Date of revision 24 December 2012	
Checked by for Hideyuki Sato, Manager, Evaluation Group, JCI CDM Center Junji Yoshizawa	☑ No distribution without permission from the Client or responsible organisational unit
Technical Reviewed by Takayuki Abe	☐ Limited distribution
Work carried out by Junji Yoshizawa, Mutsuo Kato	☐ Unrestricted distribution

Abbreviations

BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CL	Clarification Request
CM	Combined Margin
CO2	Carbon Dioxide
CO2 e	Carbon Dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
EIA	Environmental Impact Assessment
ERPA	Emission Reduction Purchase Agreement
ERs	Emissions Reductions
FAR	Forward Action Request
FEA	Fiji Electricity Authority
Fiji	The Republic of Fiji Islands
FJD	Fiji Dollar
GHG	Greenhouse Gas
GWP	Global Warming Potential
IETA	International Emission Trading Association
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
JCI	Japan Consulting Institute
KP	Kyoto Protocol
LoA	Letter of Approval
MP	Monitoring Plan
NGO	Non-governmental Organization
ODA	Official Development Assistance
OM	Operating Margin
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax
VVM	Validation and Verification Manual

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I. VALIDATION SUMMARY AND OPINION

Japan Consulting Institute (JCI) has performed a validation work of the "Fiji Nadarivatu Hydropower Project". The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and the host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

- The desk review of the PDD and the subsequent follow-up interviews have provided JCI with sufficient evidence to determine the fulfilment of the stated criteria.
- The host country is the Republic of Fiji Islands and the Annex I country is not involved, and therefore the project is a unilateral project. The host country fulfils the participation criteria and has approved the project and authorized the project participant. The DNA from the Republic of Fiji Islands confirmed that the project assists in achieving sustainable development.
- The project correctly applies ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 12.1.0 and referenced Tools.
- The total emission reductions from the project are estimated to be on the average 47,361t-CO_2e per year over the selected 7 years crediting period. The starting date of crediting period is from 01/04/2013, or on the date of registration of the CDM project activity, whichever is later. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.
- Adequate training and monitoring procedures have been implemented.
- In summary, it is JCI's opinion that the "Fiji Nadarivatu Hydropower Project" as described in the PDD version 6 dated 20/09/2012 meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0002 version 12.1.0.

JCI thus provides a positive opinion and requests the registration of the proposed project as a CDM project activity.

II. INTRODUCTION OF CDM VALIDATION

Fiji Electricity Authority (FEA) has commissioned JCI to perform a validation of the "Fiji Nadarivatu Hydropower Project" (hereafter called "the proposed project"). This report summarises the findings of the validation of the proposed project, performed on the basis of CDM VVM version 01.2, and related 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.

1. Objective of CDM Validation

The purpose of validation is to ensure a thorough, independent assessment of the proposed project activities submitted for registration as a proposed CDM project activity against the applicable CDM requirements.

JCI reports the results of its assessment in a validation report. JCI submits this validation report, along with the supporting documents to the CDM Executive Board, as part of the request for registration of a project activity as a proposed CDM project activity.

The validation report shall include a positive validation opinion only if the proposed project activity complies with the applicable CDM requirements.

2. Validation approach

The CDM is a rules-based mechanism. Therefore, it is JCI's responsibility to ensure that, in accordance with the CDM VVM version 01.2 and CDM requirements, these rules are complied with for any project activities requesting registration as a proposed CDM project activity.

During validation, JCI assesses whether the project design of the proposed CDM project activity meets the CDM requirements. For this purpose, JCI, using objective evidence, assesses the completeness and accuracy of the claims and conservativeness of the assumptions made in the project design document (PDD). The evidence used in this assessment is not limited to that provided by the project participants.

In assessing evidence, JCI does not omit evidence that is likely to alter the validation opinion, JCI uses the acceptable approaches as specified in Section E of Chapter V. CDM Validation in CDM VVM version 01.2, and JCI ensures that the project activity complies with the relevant requirements set out in the CDM modalities and procedures, the applicability conditions of the selected methodology and guidance issued by the CDM Executive Board before submitting a request for registration.

3. VALIDATION METHODS

3.1 Means of validation

JCI applies standard auditing techniques to assess the correctness of the information provided by the project participants, including, where appropriate, but not limited to:

1) Document review, including:
   (i) Review of data and information to verify the correctness, credibility and interpretation of presented information;
   (ii) Cross checks between information provided in the PDD and information from sources other than that used, if available, and if necessary independent background investigations;

2) Follow-up actions (e.g., on-site visit and telephone or email interviews), including:
   (i) Interviews with relevant stakeholders in the host country, personnel with knowledge of the project design and implementation;
   (ii) Cross-check of information provided by interviewed personnel (i.e. by checking sources or other interviews) to ensure that no relevant information has been omitted from the validation;

3) Reference to available information relating to projects or technologies similar to the proposed CDM project activity under validation; and

4) Review, based on the approved methodology being applied, of the appropriateness of formulae and correctness of calculations.

3.2 Clarification requests, corrective action requests and forward action requests

If, during the validation of the proposed project, JCI identifies issues that need to be further elaborated upon, researched or added to in order to confirm that the proposed project meets the CDM requirements and can achieve credible emission reductions, JCI ensures that these issues are correctly identified, discussed and concluded in the validation report.

JCI raises a corrective action request (CAR) 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.

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

JCI raises a forward action request (FAR) during validation to highlight issues related to the proposed project implementation that require review during the first verification of the proposed project activity. FARs don't relate to the CDM requirements for registration.

JCI resolves or "closes out" CARs and CLs only if the project participants modify the project design, rectify the PDD or provide adequate additional explanations or evidence that satisfies JCI's concerns. If CARs and CLs are not resolved, JCI does not recommend the project activity for registration to the CDM Executive Board.

JCI reports on all CARs, CLs and FARs in its validation report. This reporting will be undertaken in a transparent and unambiguous manner that allows the reader to understand the nature of the raised issues, the nature of the responses provided by the project participants, the means of validation of such responses and clear reference to any resulting changes in the PDD or supporting annexes.

The validation protocol consists of two tables. The different columns in these tables are described as followings.

Validation protocol tables

Table 1: Requirements checklist

- ✧ **Requirement (Checklist Question) :**
  The various requirements in Table 1 are checklist questions the project should meet. The checklist is organised in different sections, following the logic of the latest VVM, the PDD Guidelines and the large-scale PDD template, version 03 - in effect as of: 28 July 2006. Each section is then further sub-divided.
- ✧ **Reference :**
  Gives reference to documents where the checklist question or item is found. Paragraph No. of VVM is referred.
- ✧ **Check Comment :**
  The column is used to elaborate and discuss the checklist question and/or the conformance to the question.
- ✧ **ID No. of CAR, CL and FAR :**
  - · **ID No. of CAR, CL and FAR is described.**
  - · **Corrective Action Request** (**CAR**) is used due to non-compliance with the checklist question.
  - · **Clarification Request** (**CL**) is used when the validation team has identified a need for further clarification.
  - · **Forward Action Request** (**FAR**) is used to highlight issues related to project implementation that require review during the first verification of the project activity.

Table 2: Resolution of Corrective Action and Clarification Requests

- ✧ **Clarifications and corrective action requests :**
  If the conclusions from the draft Validation are either a **CAR,** a **CL** or a **FAR**, these should be listed in this section.
- ✧ **Ref. to checklist question in Table1 :**
  Reference to the checklist question number in Table1 where the **CAR, CL** or **FAR** is explained.
- ✧ **Summary of project participant response :**
  The responses given by the project participants during the communications with the validation team should be summarised in this section.
- ✧ **Validation team conclusion :**
  This section should summarise the validation team's responses and final conclusions.

The completed validation protocol for the "Fiji Nadarivatu Hydropower Project" is attached to this report as Appendix A.

4. STAKEHOLDER CONSULTATION PROCESS

JCI makes the PDD of the proposed project activity under consideration make publicly available (https://cdm.unfccc.int/Projects/Validation/DB/3569YRB3YA3IWIA0SAJR643AP7T98Y/view.html) (from 24 January 2011 to 22 February 2011) in accordance with the latest version of the "Procedures For Processing And Reporting On Validation of CDM Project Activities"*1.

*1 <http:// cdm.unfccc.int/EB/043/eb43_proc02.pdf >.

During the validation of the proposed project activity, JCI takes into account the comments received and the validation report includes details of actions taken to take due account of the comments during the validation process.

If comments are not sufficiently substantiated or indicate that the proposed project activity does not comply with the CDM requirements, then JCI requests further clarification from the entity providing the comment. However, JCI is not required to enter into a dialogue with Parties, stakeholders or NGOs that comment on the CDM requirements. If no additional information or substantiation is provided in response to a request for clarification, JCI proceeds to assess the comments as originally provided.

III. VALIDATION WORK

JCI carried out the validation work to ensure that the proposed project activity complies with the requirements of paragraph 37 of the CDM modalities and procedures.

1. Validation Team

Details of the validation team are shown in below Table.

Role/Qualification	Name	Qualified Technical Areas related to the Project	On-site Visit
All relevant issues / Team Leader	Junji YOSHIZAWA	TA 1.2 Energy Generation from renewable energy sources	✔
CDM auditor / Team Member	Mutsuo Kato	TA 1.2 Energy Generation from renewable energy sources	---

Details of the technical reviewer are shown in below Table.

Name	Qualified Technical Areas related to the Project
Takayuki ABE	TA 1.2 Energy Generation from renewable energy sources

2. Appointment certificate of JCI validation team member

The certificate of appointment of the validation team members is attached to this report as Appendix B.

3. Quality Control of the Validation Process within the team

The validation report worked out by the team underwent an internal review process to ensure the compliance with the applicable requirement of VVM.

JCI applies internally established Quality Management Program for the required review process, which is defined as follows;

1. Internal Review for the interim check by the internal audit team and the interim technical review by the technical reviewer
2. The evaluation of the validation work in the CDM evaluation committee consisting of outside experts (The role and the members of JCI's CDM Evaluation Committee are available at JCI's Website : http://www.jci-plant.or.jp/index.php?page_id=131)
3. Internal review for the final check by internal audit team and the final technical review by the technical reviewer

The review and evaluation including the technical review are implemented for every validation work by the competent personnel assigned in accordance with JCI's qualification scheme for CDM validation and verification.

4. Desk Review

Document review includes:

(i) Review of data and information to verify the correctness, credibility and interpretation of presented information;

(ii) Cross checks between information provided in the PDD and information from sources other than that used, if available, and if necessary independent background investigations

4.1 Document list

The following table outlines the documentation reviewed during the validation.

Document list

No.	Title
	<Project related Documents>
/1/	PDD for Fiji Nadarivatu Hydropower Project, version 2.6, dated 23/01/2011
/2/	PDD for Fiji Nadarivatu Hydropower Project, version 6, dated 20/09/2012
/3/	IRR Spreadsheet without CER and with CER
/4/	DESIGN REPORT (Nadarivatu Renewable Energy Project Design Report) by MWH New Zealand Ltd in November 2007
/5/	Consolidated EIA by Sinclair Knight Merz in April 2008
/6/	Emission Reductions Calculation Spreadsheet
/7-1/	Letter of Intent to register a CDM project sent to Fiji DNA dated 30/01/2009
/7-2/	CDM Project Notification to Fiji DNA dated 24/03/2009
/8-1/	Submission of the Prior Consideration with the UNFCCC dated 16/04/2010
/8-2/	Acknowledgement of Prior Consideration received from UNFCCC dated 26/05/2010
/9-1/	CDM Project Idea Note (PIN) dated 09/10/2007
/9-2/	FEA Paper FINSC 64 dated 05/11/2007
/10/	FEA Paper MPSC 01, dated 16/07/2008
/11/	FEA Board Paper 4980 (CDM Decision Making), dated 17/07/2008
/12/	FEA Board Paper 5360 (CDM Decision Making), dated 26/11/2009
/13/	CDM Monitoring & QC Manual prepared by FEA
/14/	CDM Training Program prepared by FEA

No.	Title
/15/	CDM LoA Application Form to Fiji DNA, dated 03/02/2011
/17/	FEA DCF Valuations 2005 by Beca Valuations Ltd, New Zealand, dated 12/10/2005
/19/	Project Actual Cost Summary as of July 2012
/20/	Summary of the On-site Assessment
/21-1/	Newspaper Notice on Public Consultation Meeting, dated 28/04/2010
/21-2/	Stakeholders Consultation Minutes of Meeting, dated 07/05/2010
/21-3/	Stakeholders Consultation Answers to Questionnaire, dated 07/05/2010
/21-4/	Stakeholders Consultation Participants List, dated 07/05/2010
/22/	Brochure of MWH New Zealand Ltd.
/23/	Sinclair Knight Merz (SKM) Company Website (http://www.skmconsulting.com/Home/)
/24/	Engineering News Record July 2009
	<Approval Letter, Permission >
/32/	Letter of Approval issued by DNA of Fiji, dated 01/12/2011
/35/	Approval Letter for EIA Report by the Ministry of Local Government, Urban Development, Housing and Environment of Fiji, dated 22/10/2008
/37/	Tariff Determination and the tariff trend in Fiji by the Commerce Committee of Fiji, dated 18/08/ 2009
	<Contract >
/41/	Construction Contract of the Hydropower Plant with Sinohydro Corporation of China dated 08/09/2008
/42/	Owners Engineer Contract with MWH of New Zealand dated 17/02/2009
/43/	CDM Consultancy Contract with IT Power dated 25/02/2010
/52/	Loan Agreement with ANZ dated 01/12/2008
/53/	Loan Agreement with China Development Bank dated 19/01/2009
/54/	Validation Contract with the DOE (JCI) dated 10 November 2010
	<Drawings >
/55/	General Arrangement Drawing of Dam Site
/56/	Electrical One Line Diagram
/57/	Dam & Tunnel Details
/58/	Power House Details

No.	Title
/59/	Reservoir Volume - water level - Surface Area Curve
	<Referenced Documents (Methodology, Guidelines, Criteria, etc. of UNFCCC)>
/61/	CDM Validation and Verification Manual (VVM) Version 01.2
/62/	ACM0002 version 12.1.0 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"
/63/	Tool for the demonstration and assessment of additionality (Version 06)
/64/	Tool to calculate the emission factor for an electricity system (Version 02)
/65/	Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM) (Version 07)
/67/	Guidelines on the Assessment of Investment Analysis (Version 05)
/68/	Guidelines on the Demonstration and Assessment of Prior Consideration of the CDM (version 01-version 04)
/69/	Glossary of CDM Terms (Version 06)
/70/	Guidelines for the Reporting and Validation of Plant Load Factors (Version 01)
	<Referenced Documents (Books, Regulation, Code, of Fiji) >
/71/	2006 IPCC Guidelines for National Greenhouse Gas Inventories
/72/	Consumer Price Index - 2005 to 2011 by Fiji Islands Bureau of Statistics - March 2011
/76/	FEA Website (http://www.fea.com.fj/pages.cfm/downloads/annual-reports.html)
/77/	FEA Annual Reports (FEA Electricity Generation Data) (2005-2011)
/78/	Fiji Environment Management Act - 2005
/79/	Fiji Health and Safety Act 1996
/80/	Fiji Tax Authority Decision (FIRCA Incentives Brochure 2001-2011)
/81/	Fiji DNA Website
/82/	The Fiji Times ONLINE (20% Devaluation of FD), dated 15/04/2009
/83/	

4.2 Major Changes in the PDD

Major changes of the content from the PDD for GSC/1/ to the final PDD/2/ are summarized in the table below.

Major Changes in the Content of the PDDs

Subject and section in the PDD	Original content in the PDD /1/	Revised content in the PDD /2/	Issued CAR or CL Relevant tool, guidance, or guidelines applied
The installed capacity of the Project throughout the PDD	It was 41.8MW based on the performance guarantee offered by the manufacturer	It was corrected to 44MW (22MWx2Units) according to the nominal capacity.	CAR-2 PDD guidelines (Version 07) /65/
Relevant sections to Emission Reductions	ER=51,456 t-CO_2e per year, calculated based on the power generation	ER=47,361t-CO_2e per year, calculated based on the power supplied to the Grid	CL-4 PDD guidelines (version 07) /65/
The description about the specification of Generators in Section A.4.3 Table A	Insufficient description about the technology.	The description has been revised in sufficient manner.	CL-7 PDD guidelines (version 07) /65/
IRR Calculation In Section B.5	IRR without CER = 7.98%	IRR without CER = 5.64%, calculated without Diesel Saving	CL-9-6 VVM Para 111 /61/
Common Practice Analysis in Section B.5	Insufficient and non-convincing description has been provided in terms of distinctive features of the proposed project.	The common Practice Analysis has been revised according to the latest version of the additionality tool.	CL-11 & CL-11-2 Tool for the demonstration and assessment of additionality (Version 06) /63/
Monitoring plan in section B.7.2	Insufficient description of Monitoring Plan including the monitoring organization.	The description has been revised in sufficient manner.	CL-12 & CL-13 PDD guidelines (version 07) /65/

5. Follow-up actions (e.g., Onsite Visit, Interviews with Project Stakeholders)

The on-site visit and interviews with project stakeholder were held from 7 to 10 March 2011 at the project site in Viti Levu Island, Fiji, by Junji YOSHIZAWA, Team Leader and CDM Auditor. The detailed information on the follow-up actions is summarized in the Summary of the On-site Assessment /20/.

The names of interviewees are listed below.

List of interviewees /20/

Ref. No.	Date	Organization/ Attendance	Topics
/20/	2011/ 03/07 03/08 03/10	**Fiji Electricity Authority (FEA)** (Project participant): Mr. Fatiaki Gibson, Project Director Mr. Jone Feresi , Environment Engineer Mr. Bobby Chandra Naimawi, Assistant Chief Financial Officer (CDM Consultant & PDD Author): (Not available due to health reason)	➢ Outline of the company ➢ Business scheme & characteristics of the Project ➢ The project history/milestones & the construction status (including the site survey) ➢ Serious Consideration of the CDM Project ➢ CDM Decision Making ➢ Evidences of the investment costs and the input values for IRR ➢ Grid Connection Agreement ➢ Power Purchase Agreement ➢ Consulting process for stakeholders' comments and taken due account including migration issues ➢ Management/Education/Training of operation, maintenance and monitoring ➢ Socio-economic environment around the project site ➢ Specifications of main equipment and monitoring meters
/20/	2011/ 03/07	**MWH New Zealand Ltd** (Design Institute): Mr. Greg Brown, Construction Manager as Owner's Engineer	➢ History and Status of Design Report ➢ Electricity to the Grid ➢ Calculation of the flooded area and power density ➢ Data availability of water flow of the River
/20/	2011/ 03/08	**Local Stakeholders** (Local Residents) Refer to the list in the text for names of interviewees.	➢ How and when they were informed of the Project ➢ Positive and/or negative influence on the living conditions ➢ Environmental or ecological issues during the construction work and after the completion ➢ Evaluation on the compensation scheme/amount for the residents affected by the Project ➢ Future concerns
/20/	2011/ 03/09	**Fiji Department of Environment** (DNA & EIA Approval): Mr. Jope Davetanivalu, Director of Environment- (DNA)	➢ Effects of the Project on the sustainable development ➢ Social impacts and future concerns of the Project ➢ Criteria and Regulation for EIA approval ➢ Records/documents regarding the project approval, and the conditions for approval ➢ Stakeholders comment invitation & Countermeasures/Compensation ➢ Compensation scheme for the local residents

			and the national compensation standards ➢ Required monitoring items of the Project during and after construction ➢ Positive and/or negative concerns for the Project from the environmental point of view

IV. VALIDATION FINDINGS

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

Findings issued through the validation

JCI issued four (4) CARs and twenty-seven (27) CLs (the last number of CLs is 18, but the total number of 27 includes the relevant/additional CLs in CL-9, CL-10 and CL11) as shown in the Validation Protocol, Appendix A of this report. All the five CARs and eighteen CLs were resolved and then closed as shown in the Table 2 of the Appendix A. No FAR has been issued.

Major issues and its resolution process through the CARs and CLs are described in following items according to VVM /61/.

1. Approval

JCI received the copy of the LoA /32/ issued on 01 December 2011by the DNA (The Ministry of Local Government, Urban Development, Housing and Environment) of The Republic of Fiji Islands through the project participant (FEA).

JCI also has confirmed the following:

1. The LoA /32/ confirms that the Republic of Fiji Islands is a party to the Kyoto Protocol.
2. With the LoA, the Ministry of Local Government, Housing, Squatter Settlement and Environment, the DNA of The Republic of Fiji Islands, approved the Fiji Nadarivatu Hydropower Project and authorized Fiji Electricity Authority (FEA) as a voluntary participant to the project, and addressed its assistance to sustainable development in the host country.

No evidence has been found during the validation process that the project uses any official development assistance funding for the Republic of Fiji Islands.

JCI concluded that the LoA is credible, authentic and fully complies with the CDM requirements.

2. Participation

JCI confirmed that the project participant is Fiji Electricity Authority (FEA) of the Republic of Fiji Islands as being listed in tabular form in section A.3 of the PDD /2/, and also confirmed that this information is consistent with the contact details provided in Annex 1 of the PDD /2/. It is also confirmed that no entities other than FEA is included in these sections of the PDD /2/.

As described above, the project participant is authorized with the LoA issued by the relevant DNA as a voluntary participant to the project activity.

3. Project Design Document

Through desk reviews and Q&A sessions with the PDD author, JCI confirmed that the PDD/2/ is described based on and referring to the following relevant tools, guidance, guidelines, and manual:

(1) CDM VVM (Version 01.2) /61/

(2) Tool to calculate the emission factor for an electricity system (Version 02.2.1) /64/

(3) Tool for the demonstration and assessment of additionality (Version 06) /63/

(4) Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM) (Version 07) /65/

(5) Guidelines on the Assessment of Investment Analysis (Version 05) /67/

(6) Guidelines on the Demonstration and Assessment of Prior Consideration of the CDM (Version 01-Version 04) /68/

(7) Guidelines for the Reporting and Validation of Plant Load Factors (Version 01) /70/

(8) Glossary of CDM terms (Version 05) /69/

The project design was described using the latest PROJECT DESIGN DOCUMENT FORM (CDM PDD) - Version 03.1 as shown in the PDD /2/, which was confirmed through comparison with the template listed on the UNFCCC website.

As described above, JCI judged that the PDD /2/ is compiled with use of the appropriate format and is described based on appropriate tools, guidelines, manual and guidance which are specified and requested by the CDM procedures.

4. Project Description

The context of the PDD /2/ was checked during the on-site assessment conducted from 7 to 10 March 2011 with the following measures:

1) Observation of the project site including the visual confirmation of the project location
2) Cross-check of the construction work with relevant drawings provided by the project participant /55/, /56/, /57/, /58/,/59/.
3) Interviews with the project participant, relevant organizations/entities, and local stakeholders shown in Table (List of interviewees) of section III-5 above /20/.

As the result of the above steps, JCI judges that the descriptions of the PDD /2/ are correct and its context is sufficient, and well outlines the nature and technical aspects of the project activity.

The major features of the project activity as observed during the site visit and described in the PDD /2/ are summarized below.

- Project Location : The dam is located at the junction of the Qaliwana and Nukunuku Rivers, at Nadarivatu Plateau, Nadarivatu District in Viti Levu Island, the Republic of the Fiji Islands, and the power house is located on the banks of the Ba River at the same plateau. The coordinates of the power house are 17˚44´60˝ South and 177˚58´43˝ East.
- Installed capacity : 44MW (22 MW x 2 units)
- Hydro Power Station Type : Dam (31m Height x 60m Width), Water Tunnel (2km) and Penstock (1.4km)
- Power Generation : 101GWh
- Connecting grid : Fiji Power Grid (FEA GRID)
- Power density : 488.88 W/m2 (=44,000,000 W/90,000 m2: reservoir surface area at the full water level)
- Project Starting Date : September 01, 2008 (The date of construction contract)
- Operation Start : May 2012
- CO2 Emission Reduction : 47,361t-CO2e/y
- Project Operational Lifetime : 40 years
- 1st crediting period : 7 years (a total of 21 years: 7 years x 3)

5. Baseline and monitoring methodology

5.1. Applicability of selected methodology to the project activity

JCI judges that application of ACM0002 version 12.1.0 "Consolidated methodology for grid-connected electricity generation from renewable sources" /62/ to the project activity is appropriate.

The project is a grid-connected renewable power generation project activity that installs a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity, and meets the following conditions for the application of the methodology ACM0002 version 12.1.0 /62/:

1) The project activity is the installation of a new hydropower plant with an accumulation reservoir
2) The project activity results in a new reservoir and its power density is 488.88 W/m^2, greater than the threshold 4 W/m^2
3) As illustrated clearly in "Figure B.1. Project Activity Boundary" in the PDD /2/, the project boundary is connected with FEA Grid and information on their characteristics are available; FEA releases onto its Annual Report /77/ and its website /76/ the basic data on FEA Grid and they are updated every year
4) The project activity does not involve switching from fossil fuels to renewable energy at the site of the project activity.
5) The project activity is not a biomass fired plant
6) The project activity meets the applicability conditions of the Tool to calculate the emission factor for an electricity system (version 02.2.1) /64/ and the Tool for the demonstration and assessment of additionality (version 06) /63/.

As shown in the Table below (section 5.2), "System Boundary and Emissions", the project emissions are zero as emissions from the reservoir can be neglected (the power density is 488.88 W/m^2 and greater than the threshold 10 W/m^2), according to the methodology ACM0002 version 12.1.0 /62/.

The aforesaid was checked and validated during the validation site visit (7 to 10 March 2011). The desk review of project related documents, in particular DESIGN REPORT /4/ and EIA Report /5/, and the subsequent follow-up interviews /20/ have provided JCI with sufficient evidence to confirm that project activity meets all the applicability criteria of the methodology in accordance with the CDM requirements.

JCI also confirmed that there are no sources of emissions involved in the project activity that contribute to more than 1% of the total annual emission reductions by the project activity and are not being addressed by the methodology applied /62/.

5.2. Project boundary

The PDD /2/ defines the system boundary to include FEA Grid, as illustrated in the "Figure B.1. Project Activity Boundary" which was delineated according to the PDD guidelines (Version 07) /65/. Electricity generated by the project activity is to be transmitted to FEA Grid.

JCI judges that the definition of the system boundary is appropriate; during the on-site visit for assessment, it was confirmed that the project activity was to construct a new hydropower plant with a reservoir and that generated power is transmitted to FEA Grid.

JCI thus confirmed that the project boundary and the selected sources and gases of emissions are justified for the project activity.

The system boundary and associated emissions are summarized in the Table below, according to the selected methodology ACM0002 version 12.1.0 /62/.

System Boundary and Emissions

Emissions	GHGs involved	Description
Baseline emissions	CO_2	Emissions from power generation of FEA Grid
Project emissions	None	Emissions from the reservoir can be neglected as the power density of the project activity is 488.88 W/m^2 , greater than the threshold of $10W/m^2$
Leakage	None	As the project activity is to construct a new hydropower plant, no leakage estimated

As shown in the above Table, the proposed CDM project activity dose not discharge emissions within the project boundary as a result of implementation of the project activity.

5.3. Baseline identification

The methodology /62/ states that in case the project activity is the installation of a new grid-connected renewable plant, the baseline scenario is "electricity delivered to the grid 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, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

The project participant has identified alternatives to electricity generation in absence of the project activity, i.e. the scenarios for baseline CO_2 emissions has been analyzed as described in section 6.2 of the report.

Therefore, JCI validated and concluded that the PDD /2/ appropriately identified "Continuation of the current situation, i.e. electricity will continue to be generated by the existing generation mix operating in the grid" as the credible and feasible baseline scenario to the project activity, complying with the selected methodology /62/ and the relevant tool /64/.

5.4. Algorithms and/or formulae used to determine emission reductions

The algorithms and/or formulae are validated with the following steps:

1. Application of baseline and monitoring methodology

JCI confirmed that the PDD /2/ fully complies with the methodology ACM0002 version 12.1.0 /62/ and the relevant tool /64/ based on the baseline scenario selected. The calculations are conducted first to work out the baseline emissions, project emissions and leakage based on the methodology /62/ and then to work out the emission reductions with the 7-step method specified by the tool /64/.

JCI judges that the data and parameters used in the calculations for emission reductions are correctly interpreted and applied, through cross-checks with comparison of the data provided by FEA /77/, main parameters for the component are summarized in the table "Baseline Information" at Annex 3 of the PDD /2/

2. Project emissions (PE_y)

1) The PDD /2/ calculates the power density (PD) of the project activity, according to the equation specified in the methodology ACM0002 version 12.1.0 /62/.

2) The PD (Power Density) is calculated using the area of the reservoir measured on the surface of the water after the implementation of the project activity, when the reservoir is full, which is 90,000 m2, as a denominator [A_{PJ}-A_{BL}]. This calculation method results in a conservative manner.

3) As the PD has been worked out to be 488.88 W/m^2, the PE_y is regarded as zero (0), according to the definition by the methodology ACM0002 version 12.1.0 /62/.

JCI judges through cross-checks with the methodology ACM0002 version 12.1.0 /62/ and the DESIGN REPORT /4/ that the PD has been correctly calculated based on the methodology /62/ using appropriate data, and that the calculation result is also correctly applied to the PE_y calculation.

3. Baseline emission factor (BE_y)

1) FEA Grid has been appropriately identified in section B.3 of the PDD /2/ as the Grid included in the project boundary.

JCI confirmed that the reason of the identification is clearly demonstrated in section B.3 of the PDD /2/.

2) JCI confirmed that OM emission factor ($EF_{Grid,OMsimple,y}$) is calculated correctly as described below:

A) As the low-cost/must-run resources of FEA Grid in the average of the last five years from year 2005 through 2009 constitutes 61.2 % of total grid generation based on data derived from FEA Electricity Generation Data /77/, the simple OM is not applicable. The average OM method is appropriately applied satisfying the applicable conditions specified by the relevant tool /64/: the dispatch data from the Grid in Fiji /77/ is publically available.

B) Ex-ante option is selected and then a 3-year generation-weighted average, based on the most recent available data at the time of submission of the PDD /1/ for validation is appropriately worked out using grid data from year 2007 through 2009 derived from FEA Electricity Generation Data /77/, which are considered appropriate as data sources.

C) Option A is properly selected for calculation of the average OM, considering the conditions of the connecting grid (FEA Grid), as:

- Necessary data, such as power generation data on each plant required for selecting either Option A is available in Fiji
- The quantity of electricity supplied to FEA Grid by these sources is known, which can be obtained from the above data sources

D) Calculations are correctly conducted using the Equation of the PDD /2/, which is exactly the same as the Equation specified in the relevant tool /64/. The data and parameters used are appropriately derived from the data sources listed.

As a result, the OM emission factor is calculated to be 0.24884971 tCO_2e/MWh, as shown in Annex 3 of the PDD /2/, fully complying with the methodology/62/ and the tool /64/.

3) JCI confirmed that BM emission factor ($EF_{Grid,BM,y}$) is calculated correctly as described below:

A) For calculations of the emission factor of new thermal power plants in FEA Grid, the efficiencies provided by the host country are applied according to the relevant tool /64/.

B) The sample group of power units *m* used to calculate the build margin emission factor consists of “The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently”, which is in compliance with the relevant tool /64/.

C) Calculations are correctly conducted using the Equation of the PDD /2/, which is exactly the same as the Equation specified in the relevant tool /64/. The data and parameters used are appropriately derived from the data sources listed.

As a result, $EF_{Grid,BM,y}$ has been correctly worked out to be 0.770071419 tCO_2e/MWh complying with the relevant methodology/62/ and tool/64/ which is shown in Annex 3 of the PDD /2/.

4) JCI confirmed that CM emission factor is calculated to be 0.5095 t CO_2e/MWh with the default weight of 50% applied to both OM and BM emission factors, which correctly follows the equation (14) of the relevant tool /64/. The default weight of 50% is applied to both OM and BM emission factors for calculation of CM emission factor.

5) JCI also confirmed that the above calculations can be replicated based on equations in the PDD /2/ and data listed in the Annex 3 of the PDD /2/ with appropriate data sources.

4. Leakage

JCI confirmed that the PDD /2/ estimated appropriately leakage associated with the project activity as zero, since the applied methodology ACM0002 version 12.1.0 /62/ indicates that project participants do not need to consider emissions from leakage in case of hydropower projects.

5. Emission reductions

The PDD /2/ calculates both the project and leakage emissions to be zero as shown in the above, and then concludes that with Equations in the PDD /2/, the emission reductions are equal to the baseline emissions. The emission reductions of the project activity are calculated to be 47,361 tCO_2e/ year. JCI confirmed the calculations are appropriate and correct.

In conclusion, JCI judges that the emission reductions are appropriately worked out complying with relevant methodology /62/ and tool /64/, and parameters and data for the calculations are sourced from proper data sources and are mentioned in the PDD /2/. The same can be replicated by using values as specified in the PDD /2/.

6. Additionality of project activity

The additionality of the project, as required by ACM0002 (version 12.1.0) /62/, is demonstrated by applying the "Tool for the demonstration and assessment of additionality" version 06.0.0 /63/ and VVM /61/:

6.1 Prior consideration of CDM

The starting date of the proposed project activity is 08 September 2008, which is after 2 August 2008. JCI validated the prior/serious consideration of CDM, the timeline with evidences in accordance with VVM (version 01.2) /61/ and the guideline on CDM prior consideration (version 04) /68/ as summarized as follows.

1. Project starting date definition

The construction contract of the whole hydropower plant was signed on 08 September 2008 /41/, which was identified as the starting date of the project. JCI has verified that this is the earliest commitment to expenditures related to the implementation or related to the construction of the project activity compared to other activities as follows:

- Construction Contract of the Hydropower Plant with Sinohydro Corporation of China on 08 September 2008 /41/;
- Owners Engineer Contract with MWH of New Zealand on 17 February 2009 /42 /;
- CDM Consultancy Contract with IT Power on 25 February 2010 /43/;

That is, in JCI's opinion, the construction contract of the hydropower plant signed on 08 September 2008 is considered as the earliest financial commitment for the project activity.

With the contracts quoted above /41/, /42/, /43/ as the evidences, JCI confirmed the project starting date has been correctly selected and fully complies with the new definition of Glossary of CDM terms (version 05) /69/.

2. Prior consideration of CDM & Activities/events to achieve CDM

Timeline of major milestones relevant to the prior consideration of CDM and activities/events to achieve CDM is tabulated below.

Timeline of major milestones in the project activity for prior consideration of CDM

Year	Date	Milestone	Evidence
2007	October 09	Fiji Nadarivatu Hydro PIN prepared	CDM Project Idea Note (PIN) /9-1/
	November 05	FEA Board approval for processing further CDM (CDM Serious Consideration)	Audit & Finance Sub-Committee MoM FINSC Paper # 64 /9-2/
	November 12	Project Technical Design Finalized.	Project Design Report /4/
2008	April	Consolidated EIA finalized	Consolidated EIA /5/
	July 16 & 17	FEA Board approval for Nadarivatu Hydro Project (CDM Decision Making)	MPSC Paper # 01 /10/, Board Paper #4980 /11/
	September 08	Construction Contract with Sinohydro Corporation of China. **(Starting Date of the Project Activity)**	Construction Contract with Sinohydro Corporation /41/
	October 22	Approval of the Nadarivatu Hydropower Scheme Consolidated EIA	EIA Approval Letter /35/
	December 01	Loan Agreement with ANZ Bank (US $30 million)	Loan Agreement with ANZ /52/
2009	January 19	Loan Agreement with China Development Bank (US $70 million)	Loan Agreement with CDB /53/
	January 30	Letter of Intent to register a CDM project sent to Fiji DNA	Letter from FEA to DNA /7-1/
	February 17	Owners Engineer Contract with MWH of New Zealand	Owners Engineer Contract /42/
	March 24	CDM Project Notification to Fiji DNA	Notification to Fiji DNA /7-2/
	April 15	Devaluation of Fiji dollar by 20% – revised business plan –	The Fiji Times ONLINE /82/
	May	Civil Construction started	
	August 19	Tariff Determination	Tariff Determination by Commerce Commission /37/
	November 26	FEA Board decision to continue with project despite devaluation of Fiji dollar – CDM financing plays important role in decision	FEA Board decision paper #5360 /12/
2010	February 25	Contract with CDM Consultant (IT Power)	Contract with IT Power /43/
	April 16	Submission of the Prior Consideration with the UNFCCC	Prior Consideration Form to UNFCCC /8-1/

	May 07	Public Stakeholder Consultation meeting and presentation	Newspaper Notice /21-1/ Minutes of meeting /21-2/ Questionnaire results /21-3/ Participants List /21-4/
	May 26	Acknowledgement of Prior Consideration received from UNFCCC	Acknowledgement by UNFCCC /8-2/ Prior Consideration Website of UNFCCC
	October	Building of powerhouse starts	
	November 10	Contract with the DOE (JCI)	Contract with JCI /51/
2011	January 24	PDD uploaded for GSC	PDD /1/
	February 03	Application for LoA to Fiji DNA	FEA Application Letter /15/
	December 01	LoA Fiji has been issued.	Fiji LoA /32/

According to "Guidelines on the demonstration and assessment of prior consideration of the CDM" (version 04) /68/, for this project activity which has the start date as 08 September 2008 (which is after 02 August 2008), the notification of the commencement of the project activity and of their intention to seek CDM status has been sent to Fiji DNA by the project participant on 30 January and 24 March 2009. The date which the notification to Fiji DNA is within six months of the project start date. Thus, it is justified that CDM was seriously considered in the decision to proceed with the project activity in accordance with the guidelines /68/.

In addition, after the revision (version 02) of Guidelines on the Demonstration and Assessment of Prior Consideration of the CDM /68/, the notification to UNFCCC secretariat /8-1/ was sent on 16 April 2010 and was confirmed by UNFCCC secretariat on 26 May 2010 /8-2/.

The PDD was made publicly available on the UNFCCC's website from 24 January 2011, i.e. less than two years after the initial notification to Fiji DNA and after the additional notification to the UNFCCC secretariat, and hence the project participant shall not need to inform the UNFCCC secretariat of the progress of the project activity, which is in compliance with the guidelines /68/ at the time of the starting date of the project.

It is JCI's opinion that the proposed CDM project activity complies with the requirements of the latest version of the guidance on prior consideration of CDM /68/.

6.2 Identification of alternative

JCI judges that the PDD /2/ appropriately identified the proposed project activity as not the only alternative consistent with Fiji current laws and regulations, complying with the selected methodology /62/ and the relevant tool /63/.

As appropriately described in the above section "5.3 Baseline identification", the PDD /2/ of the proposed project activity identified the following four (4) potential alternatives appropriately and then selected the most suitable scenario as the baseline scenario.

1) Alternative 1: The proposed project activity undertaken without being registered as a CDM project activity, i.e. to build a new hydropower plant with an installed capacity of 44 MW without CDM incentive.

2) Alternative 2: Construction of a diesel power plant with equivalent installed capacity or annual electricity generation.

3) Alternative 3: Construction of a power plant using other renewable energy with equivalent installed capacity or annual electricity generation.

4) Alternative 4: Continuation of the current situation: current electricity service provided by the FEA Grid on Viti Levu

The above identification processes are described in more details in section B.5.of the PDD /2/ with lists of relevant evidence (documents, law), which JCI confirmed appropriate and sufficient in supporting the above arguments.

The project activity is renewable (hydropower) electricity generation at a site where no other renewable (wind, solar or biomass) electricity was being generated prior to the implementation of the project activity, which eliminated alternative 3). JCI also checked the FEA's portfolio on diesel power plants in FEA's Annual Reports /77 /, which eliminated alternative 2) as the most plausible baseline scenario in absence of the project activity.

Alternative 1) was not the most attractive option in absence of the project activity as analysed in section 6.3 below. The assumptions and approach used to demonstrate the same has been crosschecked and validated as appropriate by JCI, as mentioned in section 6.3 below. Thus Alternative 1) was not considered as a plausible alternative.

JCI judges that the outcome of the step provided in the PDD /2/ (alternative 4) above) is consistent with the baseline scenario specified by the selected methodology ACM0002 version 12.1.0 /62/ as "Electricity delivered to the grid 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", as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system" /64/.

6.3 Investment analysis

JCI issued CAR-3, CL-4, CL-9 (including CL-9-1to CL 9-7), CL-10 and CL-10-1 to correct and clarify the investment analysis, and then the investment analysis is corrected and clarified in the PDD /2/ and the IRR calculation /3/ after JCI's confirmation of the input values.

1. Benchmark Analysis

Benchmark analysis is applied and the project IRR after tax (hereafter IRR) was calculated to be 5.64% without CERs revenue, and 5.90% with CERs revenue. It is, therefore, concluded that the project activity is not financially attractive. The calculation processes are validated with the following steps:

1) Application of benchmark analysis

The PDD /2/ selected the benchmark analysis method for investment analysis of the project activity with the following justifications:

A) Tool for the demonstration and assessment of additionality (Version 06) /63/ provides 3 Options for the methods of investment analysis. Options I and II, however, are not applicable, since the project activity aims to obtain revenue from electricity sale in addition to revenue from CERs, and the realistic alternative of the project activity is equivalent electricity supply from the FEA Grid and not an investment project. Only Option III, benchmark analysis, therefore can be applied to the project activity.

B) In Fiji there is no benchmark IRR publically available. However, Guidelines on the Assessment of Investment Analysis (Version 05) EB 62 Annex 5 /67/ allows for internal company benchmarks to be applied in cases where there is only one possible project developer. This is the case for the proposed activity, where FEA are the only possible developer of the proposed project. The FEA IRR benchmark of 8% (based on the internal Weighted Average Capital Cost) is used as standard by FEA to evaluate its investment decisions for all FEA projects. This WACC was evaluated by Beca Valuations Ltd, New Zealand, in its report "FEA DCF Valuations 2005" issued on 12/10/2005 /17/, the contents of which has been confirmed appropriate by JCI. The application of this standard to other

projects in FEA such as SEL joint venture project in 2005 and Heavy Fuel Oil project at Kiyoya in 2007 has been confirmed with the records, which is also in compliance with the Guideline /67/.

JCI reviewed the alternatives identification of the PDD /2/, cross-checked the benchmark with the Guideline /67/, the relevant evidence/information /11/, /12/, /77/, and judges that the selection of benchmark analysis for investment analysis is appropriate and fully complies with the relevant tool /63/ and CDM VVM /61/.

2) **Conformance with the requirement by CDM VVM paragraph 113 ;**

A) The DESIGN REPORT /4/ was finalized in November 2007 by MWH New Zealand Ltd , which has been ranked at the top class in International Design Firms Ranking according to Engineering News Record July 2009 /24/. Based on this document, the FEA Paper MPSC 01 /10/ was prepared by the FEA Major Projects Sub-Committee, and the Board Meeting (Board Paper 4980) /11/ decided to carry out the project as a CDM project on 16 & 17 July 2008. The period of time between the finalization of these documents /4/, /10/ and the investment decision by the Board Meeting /11/ was only eight months, which was considered to be sufficiently so short that the input values couldn't have materially changed .

B) Board Paper 4980 of 17 July 2008 /11/ reports the first decision of FEA Board to carry out the project as a CDM project with given the conditions at the time. With the devaluation of the Fiji dollar in 2009, however, the Board Paper 4980 had to be revised, and some of the parameters changed (as it can be seen in the table below). This revision was conducted and discussed by FEA Board and they decided to take the project forward once again – Board Paper 5360 of 26 November 2009 /12/.

C) From the following Table comparing input values between the FEA Board Papers /11/ /12/ and the PDD /2/, JCI judged that all the input values used in the PDD /2/ are sufficiently consistent with those of the referenced documents /11/, /12/. Regarding the Tariff, the approved tariff by the Commerce Committee of Fiji on 18 November 2009 /37/ was applied in Board Paper 5360 of 26 November 2009 /12/.

Comparison of input value of investment analysis

Document		FEA Board Paper no. 4980 /11/ (Investment Decision)	FEA Board Paper no. 5360 /12/ (Investment Decision after devaluation)	PDD Version 6 /2/
Year/Month		2008/07	2009/11	2012/09
Installed capacity	MW	44 (22 x 2)	44 (22 x 2)	44 (22 x 2)
Annual power generation	GWh/y	101	101	101
Annual power supply to the Grid	GWh/y	92.957	92.957	92.957
Annual operation hour	Hour/y	2,295	2,295	2,295
Total static investment	MM FJD	227 (before devaluation in April 2009)	300 (after devaluation in April 2009)	300 (after devaluation in April 2009)

Fixed O&M Cost	FJD/MW/y	5,000	5,000	5,000
Variable O&M Cost	% of Gross Revenue	10%	3%-2011 10% thereafter	3%-2011 10% thereafter
Electricity Tariff	FJD cents /kWh	22 and increases by 4% in 2012, and 4% every fifth year thereafter	24.5 from September 2009, increasing by 4% in 2012, and 4% every fifth year thereafter	24.5 from September 2009, increasing by 4% in 2012, and 4% every fifth year thereafter
Income Tax (Note 1)	%	31	28	28
Operational Lifetime (Economic Model)	Year	40	40	40
Depreciation	Year	**7**	**7**	**7**
Residual Value Factor (Note 2)	Times	10	12	12
Inflation Rate	%	3	3	3
Exchange Rate	FJD/US$	0.7	0.5	0.5
Benchmark (Discount rate/ WACC)	%	8.0	8.0	8.0

(Note 1) Fiji Tax Authority Decision (FIRCA Incentives Brochure 2001-2011) /80/

(Note 2) The Residual Value Factor is assumed as 1/discount rate and the residual value is calculated as the free cash flow of the last year multiplied by the residual factor, which is highly conservative.

3) Cross check of the input values to the investment analysis

Static investment, electricity tariff and annual operation cost used in the PDD /2/ were validated through the cross-check.

A) Static investment

(Credibility of the estimation)

The total static investment for the project (300 million FJD) adopted in the PDD /2/ is based on the FEA Board Paper no. 5360 /12/ (Investment Decision after devaluation), which was prepared by the FEA Major Projects and Financial Sub-committees based on the quotation from the Contractor, and the value can be considered credible.

(Comparison with the actual cost)

As one of cross-checks, the difference between the estimated static cost in the Board Decision Paper 5360 /12/ by FEA and the actual static cost has been analyzed. According to the data provided by FEA, the total static investment cost reached 300.4million FJD (Fiji Dollar) /19/. This figure consists of the actual expense of 280.4million FJD and the forecast for the remaining of 20 million FJD, which can be considered as the actual total static investment cost.

The actual total static cost for the Project is almost the same as the estimated cost stated in the Board Decision Paper 5360 (Decision Making Paper) and it can be said that the estimated cost for the Project was fairly reasonable and properly controlled.

Therefore, it can be concluded that the estimated cost when the investment decision was made and which was used for financial calculation was applicable and reasonable.

In addition, according to the sensitivity analysis of the proposed project, the total static investment cost should be reduced to reach benchmark, which is absolutely impossible because the actual cost was almost the same as the estimated cost (the input for IRR calculation) as shown above. So the IRR could never reach 8% benchmark with the variation of investment cost.

In conclusion, the total static investment cost in the FEA Board Paper 5360 /12/ is reasonable and applicable for the financial calculation, and the Project IRR could never reach benchmark with realistic variation of total investment cost.

Based on the above, JCI judges that the static investment of PDD /2/ is appropriate and reasonable.

B) Electricity tariff

The PDD /2/ adopts 0.245 FJD /kWh from September 2009, increasing by 4% in 2012, and 4% every fifth year thereafter, which is FEA's conservative assumption based on the Tariff Determination /37/ issued by Fiji Commerce Committee on 18 August 2009.

In the IRR calculation, the variable value of 0.245 FJD /kWh with 4% increase every fifth year has been applied through the operational lifetime of the proposed project, which can be understood as conservative assumption, because the tariff for the past 15 years had increased at a rate of 3.4% every 5 years according to the tariff trend in Fiji /37/. Furthermore it should be noted that the tariff would be lowered rather than increased considering the Fiji Government policy of poverty reduction and its negative impacts on overall economical development in the country.

JCI judges that the use of the variable value of 0.245 FJD /kWh with 4% increase every fifth year in the investment analysis of the PDD /2/ is appropriate and conservative.

C) Annual operation cost

The annual operation cost used in PDD /2/ is Fixed Cost of 0.22 million FJD/y (5,000FJD/MW) and Variable O&M Cost of 2.28 million FJD for the first full year (10% of the Gross Revenue), and the Variable O&M Cost average annual operation cost will be increased proportionally to the Gross Revenue which is increased according to the inflation rate. These operation costs were estimated based on FEA's experience in hydropower operation in Fiji.

This operation cost (total 2.5million FJD/y) is 0.83% to the static investment and 11% to the Gross Revenue. Compositions of the Fixed Cost are the repair & maintenance cost (41%), the labour & welfare cost (39 %), the administration & training cost (12%), and others (8%).

As there is no similar projects registered in Fiji, this operation cost has been cross-checked by the figures of the 33 CDM registered projects in Sichuan Province, China, having the +/- 50% capacity (22-66MW) of the proposed project installed capacity (44MW). These data can be considered appropriate for comparison, because these data had been internationally accepted in similar hydropower projects. The ratios of the average operation cost of the quoted CDM registered projects to the static investment and to the Gross Revenue are 2.24% (max.: 3.76 %, min.: 1.58%) and 19.5% (max.: 37%, min.: 9.9%) respectively, which shows the annual operating cost of the proposed project can be considered appropriate and conservative because it is far less than that of similar projects in Sichuan Province, China.

JCI judges that the use of the annual average O&M costs of 2.5million FJD/y for the full year with considering the appropriate inflation factor thereafter in the investment analysis of the PDD /2/ is appropriate and conservative.

D) Annual net power supply to the grid and operation hours

The annual power generation is 101,040MWh in the PDD /2/, which has been calculated in the DESIGN REPORT /4/ based on the flow data of the past 96 years (1910-2006) provided by the Fiji Meteorological Services under the Fiji Government and can be judged as credible and appropriate. The annual net power supply to the grid in the PDD /2/ is estimated as 92,957MWh, which is derived from the following equation, where the losses due to the internal consumption are estimated 0 (zero) and the transmission loss are estimated at 8% in total based on FEA's experience and standard practice. The 8% losses can be considered rather conservative even if compared with the CDM registered hydropower projects in other countries. In addition, even if the transmission loss is assumed to be 0 (zero), the Project IRR without CER is calculated to be 6.19%, which is still lower the benchmark.

Annual electricity to the Grid = Electricity generation
x (1 - internal consumption) x (1 - transmission loss)
= (101,040MWh) x (1-0) x (1-0.08)
= 92,957MWh/y

JCI, therefore, judges that the annual net power supply to the grid has been appropriately worked out to be 92,957MWh/y based on the above factors correctly and conservatively estimated.

E) Other parameters

JCI checked the calculation process in the IRR calculation sheet, and verified the appropriateness of the applied parameters such as the related taxes and inflation rate.

In terms of the suitability of tax rate, JCI confirmed the taxation scheme in Fiji was appropriately applied to the financial analysis as assessed below:

JCI verified the Income Tax (31% & 28%) against Fiji Tax Authority Decision /80/, and confirmed that the tax is in accordance with the Regulation at the time of the investment decision and the decision to continue the project after the devaluation.

JCI verified the Inflation Rate (3%) against the Consumer Price Index - 2005 to 2011 by Fiji Islands Bureau of Statistics - March 2011 /72/, which shows 2.5%-7.7% price increase every year, and confirmed that 3% is appropriate at the time of the investment decision and the decision to continue the project after the devaluation.

As the conclusion, JCI judges that the IRRs are calculated appropriately in a conservative manner complying with VVM paragraph 113 /61/, the relevant guidelines /67/ and tool /63/; and the project activity cannot be considered financially attractive.

2. Sensitivity analysis

A sensitivity analysis has been conducted with variations of the four parameters: 1) Capital Expenditure (total static investment), 2) Annual O&M Cost, 3) Electricity Tariff and 4) Electricity supplied to the Grid with relevant guidelines /67/ and tool /63/.

An analysis was conducted to check the likelihood of the three parameters to reach the benchmark 8% with variations, which is shown in the Table below.

Parameter changes when project IRR is equal to the benchmark

	Capital Expenditure	Annual O&M Cost	Electricity Tariff	Electricity supplied to the Grid
Project IRR =Benchmark	-28%	More than –100%	+43.2% (Note 1)	+39%

(Note 1) In IRR calculation, Electricity Tariff is assumed to increase 4% every 5 years. The Project IRR will be equal to the benchmark when 43.2% increase on electricity prices every 5 years is assumed.

To reach the benchmark 8%, the Capital Expenditure needs to decrease by 28% or the Electricity Tariff to increase by 43.2% or Electricity supplied to the Grid to increase 39%. In terms of the Annual O&M Cost, even if there are no O&M costs the breakeven point is not achievable.

JCI validated such cases are unlikely as shown below:

1) The decrease in investment is absolutely impossible because the actual construction cost proved to be almost the same as the estimated cost (the input for IRR calculation) as shown in the above section of "1.Benchmark Analysis". So the IRR can never reach 8% benchmark with the variation of investment cost.
2) Regarding the O&M costs, the original cost is estimated and calculated based on the experience in FEA, and the material and labour cost is increasing by 2.5%-7.7% every year as shown in Consumer Price Index - 2005 to 2011 by Fiji Islands Bureau of Statistics - March 2011 /72/. Therefore, it is highly unlikely that the operation cost would be decreased in the future.
3) In terms of the electricity tariff, 0.245 FJD/kWh with the escalation of 4% every 5 years after 2012 has already been applied in the IRR calculation as described in the above section. The increase of 4% every 5 years is 15% higher than the historical increase (3.4% increase every 5 years for the past 15 years). Therefore, a further 43.2% increase in the electricity tariff is highly unrealistic.
4) In terms of the electricity supplied to the Grid, as validated in the above section of "1. Benchmark Analysis, D) Annual net power supply to the grid and operation hours", the estimated electricity generated and the electricity supplied to the Grid can be judged as credible and appropriate. Therefore, a further 39% increase in the electricity supplied to the Grid is highly unrealistic.

JCI validates that the above arguments clearly demonstrate that it is unlikely that the project IRR may exceed the benchmark within reasonable variations of financial parameters. JCI, therefore, concludes that the result of the above investment analysis with use of the benchmark analysis is robust and then the project activity is financially unattractive.

6.4 Barrier analysis

With the above arguments, it is concluded that the proposed project activity is unlikely financially attractive, the Barrier Analysis has been skipped according to "Tool for the demonstration and assessment of additionality (Version 06) /63/".

6.5 Common practice analysis

Although the common practice analysis in the PDD /1/ was demonstrated based on the old Additionality Tool, it has been revised according to the new Additionality Tool /63 /.

6.5.1. Definitions

The new Additionality Tool /63 / require the following definitions:

1) Applicable geographical area:
2) Measure:
3) Output:
4) Different technologies:

To comply with these requirements, the PDD /2/ clarified the above definitions as follows:

1) Applicable geographical area: Fiji (The Republic of Fiji Islands)
The entire host country has been applied as a default. It is reasonable and appropriate that Fiji is defined as an applicable geographical area.

2) Measure: Hydropower generation
Hydropower generation corresponds to (b) fuel and feedstock switch with and without energy source (including energy efficiency improvement) and JCI has judged this measure reasonable.

3) Output: Electricity generated by hydropower station
It is clearly judged from the nature of the proposed project that the output is electricity generated by hydropower station

4) Different technologies:
Different technologies are those that deliver the same output and differ by at least one of the following (as appropriate in the context of the measure applied in the proposed project and applicable geographical area):
(i) Energy source/fuel: Hydropower
(ii) Feed stock: Not applicable
(iii) Size of installation: 44 MW of the proposed project
(iv) Investment climate in the date of the investment decision:
-Subsidies or other financial flows: No government supports
(v) Other features; Not applicable

JCI has validated and concluded that the definitions above have been specified appropriately in conformance with the relevant Tool /63/.

6.5.2. Stepwise approach for Common Practice

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

   The proposed project is a new hydropower generation plant, and the electricity generation capacity of 44 MW is selected as the design capacity. Therefore, the range from 22 MW to 66 MW is considered as applicable output.

2) 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. Note their number N_{all}. Registered CDM project activities shall not be included in this step:

   According to FEA data /77/, there are no hydropower plants within the applicable range, which JCI has confirmed as appropriate.

   Therefore, N_{all} is 0.

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 N_{diff} :

It is clear that N_{diff} is 0 as well.

4) 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.
Based on the above argument, the factor F = 1 – 0/0 = 0

5) Conclusions: 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:

For the proposed project, the factor F is 0 < 0.2 as calculated above and N_{all}-N_{diff} is calculated as N_{all}-N_{diff} =0-0=0 < 3. The factor F doesn't meet the common practice criteria, and N_{all}-N_{diff} doesn't meet, either. Therefore, the proposed project doesn't meet the common practice criteria within a sector in the applicable geographical area and can be judged "not a common practice".

JCI has concluded according to the new Additionality Tool /63 / that the proposed project is not a "common practice" as demonstrated above.

6.6 Conclusion of assessment of additionality

JCI validated and concludes that the PDD /2/ clearly demonstrates as shown in the above that the proposed project is additional, not financially attractive and therefore, would not be implemented without CDM revenue provision. Serious consideration of CDM prior to the project decision by the project participant is clearly and sufficiently demonstrated; appropriate actions were taken and events were held by the project participant to achieve CDM within a reasonable timeframe; and investment and sensitivity analyses clearly show the project activity is not financially viable without CDM revenue. The proposed project is not a common practice and not regarded as business-as-usual in Fiji.

7. Monitoring plan

JCI issued the findings of CL-12, CL-13 and CL-14 to clarify the roles and responsibilities of each member, the detailed monitoring specification, the procedure such as training and maintenance etc., and then they are closed as being resolved.

1) Parameters to be monitored ex-post

The PDD /2/, in section B.7.1.Data and parameters monitored, specifies the following parameters to be monitored ex-post:

A) Electricity delivered to the FEA Grid by the proposed project ($EG_{facility,y}$)

B) Installed capacity of the proposed project (Cap_{PJ})

C) Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (A_{PJ})

JCI cross-checked these parameters with the relevant methodology /62/ and tool /64/, and confirmed that these parameters fully comply with them required to this kind of project activities.

A) Monitoring of $EG_{facility,y}$

The implementation plan of monitoring of the parameter, ($EG_{facility,y}$), described in the PDD /2/, was validated as follows:

As described in sections B.7.1 and B.7.2 of the PDD /2/, a bidirectional ammeter with accuracy of less than 0.25% is to be installed to measure both export and import electricity of the project activity. This arrangement is considered sufficient to monitor the planned parameter $EG_{facility,y.}$

B) & C) Monitoring of Cap_{PJ} and A_{PJ}

The monitoring of A_{PJ} is planned to be conducted every year when the reservoir becomes full. Also the monitoring of Cap_{PJ} is planned to be conducted every year after the implementation of the project activity by checking the nameplates. These programs fully comply with the relevant methodology /62/.

2) Monitoring Organization/Manual/Training

A) Monitoring Organization

The project participant plans to set up a monitoring organization to cover entire processes of the monitoring: from daily data readings through internal audits of monitoring reports. This organization is considered appropriate in implementing the proposed monitoring plan.

B) Monitoring Manual

The CDM management/monitoring manual for the project necessary to implement the monitoring task including calibration and maintenance of the equipment has been made and provided to JCI.

C) Training on Monitoring

Under the responsibility of Project Director, it is planned to provide training to relevant people before the credit start date of the proposed project under instruction of the resource personnel such as the Training Department staff, the Unit Leader Renewable Generation and External Specialists as needed, and the training program has been prepared. Furthermore, according to the interview with the project participant, the CDM training is going to be organized at regular intervals during the crediting period.

As a summary of the above arguments, JCI concluded that the monitoring plan described in the PDD /2/ fully complies with relevant methodology /62/ and tool /64/, and is sufficient to ensure the achievement of emission reductions by the project activity.

8. Sustainable development

JCI confirmed that the LoA issued by the DNA of the host Party, the Republic of Fiji Islands /32/ confirms the contribution of the proposed CDM project activity to the sustainable development of the host Party, which has been already described in Section 1 Approval.

9. Local stakeholder consultation

JCI issued the finding of CL-15 to clarify the outline of questionnaires, meetings, migration, etc., and then it was closed as being resolved.

The project participant carried out the public consultation for the social, economic and environmental effects of the project before its implementation by means of meetings and questionnaires, which can be confirmed with Chapter 12 Consultation Process of EIA Report /5/ and the interview with the FEA during the on-site assessment /20/

In addition to the public consultation during EIA study, the Public Stakeholder Consultation meeting was held on 7 May 2010, where the questionnaire on the CDM project was distributed to the government organizations and local residents /21-1/, /21-2/, /21-3/, /21-4/. There was no objection to the project, nor any requests, and the details are summarized in the PDD /2/

Through the interviews with the interviews with the Fiji Department of Environment on 09 March 2011 /20/, JCI confirmed the following:

- There is no migration issue, because there was no residential area around the project site.

- The compensation for land lease has been properly conducted through the Native Land Trust Board (NLTB, registered under the Law) and there exists a compensation agreement where the affected people signed. The land lease compensation has been made for (1) Development Lease during construction and (2) Permanent Lease for 99 years.
- In addition to the stakeholders' consultation process during the EIA Report preparation, the Project Owner held community meetings in each village to explain the Project to the local residents. There was no objection to the Project.
- The Project Owner considers that they have carried out their social responsibility in response to the stakeholders' feedback, through such infrastructures as the road construction, employment of locals and the electricity supply to surrounding villages.

Through the interviews with 5 local residents listed below on 08 March 2011 /20/, JCI confirmed the following:

- Five local residents (three farmers, one worker and one human resources manager, all of them were male, age: 44--63) around the project site were invited for the interview. They live in the affected villages by the weir site or the power house.
- They knew the construction of the hydropower station 2006 or 2007 at the community meeting held by the Project Owner, where 20-30% of the total residents attended.
- None of them were forced to migrate due to the flooding of his house. All of them provided their cultivated land for the construction of the Project, but the compensation agreements have already been settled through the Native Land Trust Board. They are satisfied with the compensation agreements.
- They have no complaints about the project, and they have rather positive opinions to the Project because they can get benefits such better transportation as the road in good condition, increasing of job opportunities and a stable electricity supply. They believe the Project will contribute to the development of the local economy and the improvement of their living standard, especially the future generation will get the benefit from the Project through the annual payments for the 99 Year Lease Agreement.
- Some of them insisted that the roads should be repaired and maintained cleanly even after construction. The other said that the job opportunity should be equally allocated to each village. The PO promised to take appropriate actions to these issues.
- The interviewees are listed below.

  Mr. Ilisoni Ravula, Farmer (Marou Village)
  Mr. Kaliova Nabaro, Worker (Buyabuya Village)
  Mr. Iskeli Toutou, Farmer (Lewe Village)
  Mr. Josua Malata, Farmer (Drala Village)
  Mr. Jowasa Leieine Yacasau, Human Resources Manager (Lagatagata Village)

The Project participant also considers that they have carried out their social responsibility in response to the stakeholders' feedback, through the road construction, the installation of electric light, the improvement of water conditions etc.

Based on the above, JCI judges that the project activity, supported by local stakeholders, gives no adverse impacts on local environment, and contributes to the development of local economy and infrastructure.

10. Environmental impacts

JCI issued the findings of CL-15, CL-16 and CL-17 to clarify the regulations, resettlement, etc., and then they were closed as being resolved.

An Environmental Impact Assessment (EIA) was conducted by Sinclair Knight Merz (SKM) to ensure that the project complies with Fiji's national, regional and local regulations. SKZ is a leading projects firm, with global capability in strategic consulting, engineering and project delivery based in Sydney, Australia, can be considered a qualified firm for conducting the EIA, judging from its Website information //. The Consolidated EIA Report /5/ was finalized and issued in April 2008, and then approved by the Department of Environment, Ministry of Local Government, Urban Development, Housing and Environment, the Republic of Fiji Islands, on 22 October 2008 /35/.

The Consolidated EIA report /5/ refers to anticipated environmental impacts by the project activity both during the construction period and after the operation start with suggestions of mitigation measures against pollution of water and air, noise, solid waste, and soil/water erosion. No significant ecological impact on the local area was anticipated as there is no inundation of houses, settlements, farms or other productive land uses and there is no requirement to relocate families or communities.

Through the interviews with the Fiji Department of Environment on 09 March 2011 /20/, the interviews with local residents on 08 March 2011 /20/ and the observation during the on-site assessment /20/, when the plant was under construction, JCI confirmed that appropriate mitigation measures had been taken and no serious issues were observed.

11. Comments by Parties, Stakeholder through the consultation process

The PDD version 2.6 dated 23 January 2011 was made publicly available on UNFCCC CDM website and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 24 January 2011 to 22 February 2011.

No comments were received.

APPENDIX A: CDM VALIDATION PROTOCOL (REV.07)

Fiji Nadarivatu Hydropower Project

1. INTRODUCTION

This document is prepared as the Validation Protocol on **Fiji Nadarivatu Hydropower Project**.
The validation protocol is prepared for the following purposes:

- To ensure that, in accordance with the Validation Verification Manual version 01.2 (Annex 1, CDM-EB55, "VVM"), and CDM requirements, these rules are complied with for any project activities requesting registration as a proposed CDM project activity.
- To ensure a thorough, independent assessment of proposed project activities submitted for registration as a proposed CDM project activity against the applicable CDM requirements.
- To assess whether the project design of the proposed CDM project activity meets the CDM requirements, using objective evidence, and to assess the completeness and accuracy of the claims and conservativeness of the assumptions made in the project design document.

The validation protocol is consisted of the following two types of tables, which are effective for the purposes of validation above.

TABLE-1 contains the checklist with questions along with the thematic chapter of VVM.
TABLE-2 shows the corrective actions or clarifications which are requested to be taken in **TABLE-1** and the response from the PP.

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2. CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS AND FORWARD ACTION REQUESTS

If, during the validation of a project activity, issues are identified that need to be further elaborated upon, researched or added to in order to confirm that the project activity meets the CDM requirements and can achieve credible emission reductions, these issues shall be ensured that are correctly identified, discussed and concluded in the validation report.

- **CAR** : a corrective action request (**CAR**) is raised, if one of the following occurs:
  (a) The PPs 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.
- **CL** : a clarification request (**CL**) is raised,
  if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.
- **FAR** : 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.

The CARs and CLs are resolved or "closed out" only if the project participants modify the project design, rectify the PDD or provide adequate additional explanations or evidences that satisfy the requirements. If this is not done, the project activity will not be recommended for registration to the CDM EB.

All CARs, CLs and FARs will be reported on in its validation report. This reporting shall be undertaken in a transparent and unambiguous manner that allows the reader to understand the nature of the issue raised, the nature of the responses provided by the project participants, the means of validation of such responses and clear reference to any resulting changes in the PDD or supporting annexes.

TABLE-1 REQUIREMENTS CHECKLIST (OK/No/NA/Tbv)

No.	Requirement	Refer. Para. VVM 01.2	Check Comment	ID. No.
1.	**Approval**	Para.44-50 VVM	--	--
	<Requirement to be validated> All Parties involved shall approve the project activity.	Para.44 VVM	--	--
	The LoA (Letter of Approval) s of all parties involved shall be provided together with its information source and route.			
1.1	The LoA shall confirm that: (a) The Party is a Party to the Kyoto Protocol (b) Participation is voluntary (c) The proposed CDM project activity contributes to the sustainable development of the country (d) It refers to the precise proposed CDM project activity title in the PDD being submitted for registration	Para.45 VVM	No LoAs of each Party	CAR -1
2.	**Participation**	Para.51-54 VVM	--	--
	<Requirement to be validated> All project participants shall be listed in a consistent manner in the project documentation, and their participation in the project activity shall be approved by a Party to the Kyoto Protocol.	Para.51 VVM	--	--
2.1 1)	The project participants shall be listed in tabular form in section A.3 of the PDD, and this information shall be consistent with the contact details provided in annex 1 of the PDD.	Para.52 VVM	OK	
2)	The participation of each project participant shall be approved by at least one Party involved, either in a letter of approval or in a separate letter specifically to approve participation.	ditto	No To be confirmed by LOA	CAR -1
3)	No entities other than those approved as project participants shall be included in these sections of the PDD.	ditto	OK	
2.2	The approval of participation shall be issued from the relevant DNA.	Para.53 VVM	No To be confirmed by LOA	CAR -1
3.	**Project Design Document**	Para.55-57 VVM	--	--
	<Requirement to be validated> 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. **http://cdm.unfccc.int/Reference/PDDs_Forms/PDDs/index.html**	Para.55 VVM PDDs Forms	--	--
3.1	The PDD shall be in accordance with the applicable CDM requirements for completing PDDs. <http://cdm.unfccc.int/Reference/Guidclarif/pdd/index.html>	Para.56 VVM	No. Specific comments will be raised in the relevant part.	
3.2 1)	PDD template shall not be altered, that is, shall be completed using the same font without modifying its format, headings or logo. Tables and their columns shall not be modified or deleted. Rows may be added, as needed. If sections of the CDM-PDD are not applicable, it shall be explicitly	PDD Guidelines	OK	

TABLE-1 REQUIREMENTS CHECKLIST (OK/No/NA/Tbv)

No.	Requirement	Refer. Para. VVM 01.2	Check Comment	ID. No.
	stated that the section is left blank on purpose.			
2)	The presentation of values in the PDD should be international standard format.	ditto	OK	
4.	**Project Description**	Para.58-64 VVM	--	--
	<Requirement to be validated> The PDD shall 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.	Para.58 VVM	--	--
4.1	Project description in section A.2 of the PDD (Max 1 page) shall be a brief summary of that in A.4.3 and B.3. This shall include: ● The purpose of the project activity ● The view of the project participants of the contribution of the project activity to sustainable development. and explain ● How the proposed project activity reduces GHG emissions.	PDD Guidelines	No Confirmation of the installed capacity is requested.	CAR-2 CL-1
4.2	In section A.4.3 of the PDD, a description of how environmentally safe and sound technology and know-how to be used is transferred to the host Party(ies) shall be included. It should also further explain the purpose of the project. ● The scenario existing prior to the start of the project, with equipment list and systems in operation ● The scope of project, with equipment list and systems ● The baseline scenario, with equipment list and systems If the baseline scenario is the same as the scenario existing prior to the start of the project, there is no need to repeat, but only state that both are the same. The description of the scenario should include; ● A list and arrangement of the main manufacturing technologies, systems and equipment ● The emission sources and the GHG, and existing and forecast energy and mass flows and balances of the systems and equipment ● The types and levels of services	ditto	No The adequate explanation and evidences shall be provided	CAR-2 CL-2 CL-3 CL-4 CL-5 CL-6 CL-7
4.3	In section A.4.4 of the PDD, ● The chosen crediting period shall be indicated. ● The total estimation of emission reductions as well as annual estimates for the chosen crediting period shall be provided. ● Information on the emission reductions shall be indicated using the decided tabular format. ● International standard format for values shall be used.	ditto	OK	
4.4	If the DOE does not undertake a physical site inspection, it shall be appropriately justified.	Para.62 VVM	N/A	
4.5	If the proposed CDM project activity involves the alteration of an existing installation or process, Does the project description clearly state the differences resulting from the project activity compared to the pre-project situation?	Para.63 VVM	N/A	
5.	**Baseline and monitoring methodology**	Para.65-93 VVM	--	--

TABLE-1 REQUIREMENTS CHECKLIST (OK/No/NA/Tbv)

No.	Requirement	Refer. Para. VVM 01.2	Check Comment	ID. No.
(a)	**General requirement**	Para.65-67 VVM	--	--
	The baseline and monitoring methodologies selected by the project participants shall comply with the methodologies previously approved by the CDM Executive Board.	Para.65 VVM	--	--
	To ensure that the project activity meets this general requirement, the followings shall be confirmed. (a) The selected methodology is applicable to the project activity; (b) The PP has correctly applied the selected methodology.	Para.66 VVM	--	--
	It shall also be ensured that the selected methodology is applicable to the project activity and has been correctly applied with respect to the followings: (a) Project boundary (b) Baseline identification (c) Algorithms and/or formulae used to determine emission reductions (d) Additionality (e) Monitoring methodology	Para.67 VVM	--	--
5.	**Baseline and monitoring methodology**	Para.65-93 VVM	--	--
(b)	**Applicability of the selected methodology to the project activity**	Para.68-77 VVM	--	--
	<Requirement to be validated> The selected baseline and monitoring methodology previously approved by the CDM Executive Board shall be validated to be applicable to the project activity, including that the used version is valid. Specific guidance provided by the CDM Executive Board in respect to any approved methodology shall be applied.	Para.68 VVM Para.69 VVM	--	--
5.1	The methodology shall be ensured to be correctly quoted and applied by comparing it with the actual text of the applicable version of the methodology available on the UNFCCC CDM website. Referring to the UNFCCC CDM web site for the title and reference list as well as the details of approved baseline methodologies, the following contents shall be indicated in section B.1 of the PDD. ● the approved methodology ● the version of the methodology that is used ● any methodologies or tools which the approved methodology draws upon and their version	Para.70 VVM	OK	
5.2 1)	The choice of methodology shall be justified and the project participants shall 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 in section B.2 of the PDD.	Para.71 VVM	No	CL-5
2)	The documentation referred to in the PDD and its content shall be correctly quoted and interpreted in the PDD.	ditto	No	CL-5
5.	**Baseline and monitoring methodology**	Para.65-93 VVM	--	--
(c)	**Project boundary**	Para.78-80 VM	--	--

TABLE-1 REQUIREMENTS CHECKLIST (OK/No/NA/Tbv)

No.	Requirement	Refer. Para. VVM 01.2	Check Comment	ID. No.
	<Requirement to be validated> The PDD shall correctly describe the project boundary, including the physical delineation of the proposed CDM project activity included within the project boundary for the purpose of calculating project and baseline emissions for the proposed CDM project activity.	Para.78 VVM	--	--
5.7 1)	The delineation in the PDD of the project boundary shall be correct and meet the requirements of the selected baseline methodology, which shall also be demonstrated by documented evidence and corroborated by a site visit.	Para.79 VVM	Tbv.	
2)	All emission sources and GHGs required by the methodology shall be included within the project boundary for the purpose of calculating project emissions and baseline emissions, using the standardized table.	ditto	OK	
3)	If the methodology allows project participants to choose whether a source or gas is to be included within the project boundary, the project participants shall justify the choice by supporting documented evidences.	ditto	NA	
4)	In section B.3 of the PDD, a flow diagram of the project boundary shall be described including all the equipment, systems, flows of mass and energy, the emission sources/gases and the monitoring variables.	PDD Guidelines	OK.	
5.	**Baseline and monitoring methodology**	Para.65-93 VVM	--	--
(d)	**Baseline identification**	Para.81-88 VVM	--	--
	<Requirement to be validated> The PDD shall identify the baseline for the proposed CDM project activity, defined as the scenario that reasonably represents the anthropogenic emissions by sources of GHGs that would occur in the absence of the proposed CDM project activity.	Para.81 VVM	--	--
	Any procedure contained in the methodology to identify the most reasonable baseline scenario, shall be correctly applied. If the selected methodology requires use of tools (such as the "Tool for the demonstration and assessment of additionality" and the "Combined tool to identify the baseline scenario and demonstrate additionality") to establish the baseline scenario, the methodology on the application of these tools shall be confirmed. In such cases, the guidance in the methodology shall supersede the tool. The each step in the procedure described in the PDD against the requirements of the methodology shall be checked.	Para.82 VVM	--	--
5.8	If the methodology requires several alternative scenarios to be considered in the identification of the most reasonable baseline scenario, it shall be determined whether all scenarios that are considered by the project participants and are supplementary to those required by the methodology, are reasonable in the context of the proposed CDM project activity and that no reasonable alternative scenario has been excluded.	Para.83 VVM	NA	
5.9	It shall be determined whether the baseline scenario identified is reasonable by validating the assumptions, calculations and rationales used, as described in the PDD.	Para.84 VVM	OK	

TABLE-1 REQUIREMENTS CHECKLIST (OK/No/NA/Tbv)

No.	Requirement	Refer. Para. VVM 01.2	Check Comment	ID. No.
	The documents and sources referred to in the PDD shall be correctly quoted and interpreted. All data used to determine the baseline scenario shall be illustrated in a transparent manner, preferably in a table form.	ditto	OK	
5.10	All applicable CDM requirements shall be taken into account in the identification of the baseline scenario for the proposed CDM project activity, including "relevant national and/or sectoral policies and circumstances." (See decision 3/CMP.1, annex, paragraph 45, currently located at <htto://cdmunfccc.int/Reference/COPMOP/08a01.pdf#page=6>, and EB22, annex 3, "Clarificationson the consideration of national and/or sectoral policies and circumstances in baseline scenarios", currently located at <htto://cdm.unfccc.int/EB/022/eb22_repan3.pdf>.)	Para.85 VVM Para.45 CDM/M&P Annex 3 EB22	OK	
5.11	The PDD shall provide a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed CDM project activity.	Para.86 VVM	OK	
5.	**Baseline and monitoring methodology**	Para.65-93 VVM	--	--
(e)	**Algorithms and/or formulae used to determine emission reductions**	Para.89-93 VVM	--	--
	<Requirement to be validated> The steps taken and equations applied to calculate project emissions, baseline emissions, leakage and emission reductions shall comply with the requirements of the selected baseline and monitoring methodology.	Para.89 VVM	--	--
5.12	The equations and parameters in the PDD shall be correctly applied by comparing them to those in the selected approved methodology.	Para.90 VVM	OK	
	If the methodology provides for selection between different options for equations or parameters, adequate justification shall be provided (based on the choice of the baseline scenario, context of the project activity and other evidence) and the correct equations and parameters shall be used, in accordance with the methodology selected.	ditto	OK	
5.13	The justification shall be given in the PDD for the choice of data and parameters used in the equations.	Para.91 VVM	OK Tbv	CL-18
	If data and parameters will not be monitored throughout the crediting period of the proposed CDM project activity but have already been determined and will remain fixed throughout the crediting period, it shall be demonstrated that all data sources and assumptions are appropriate and calculations are correct, applicable to the proposed CDM project activity and will result in a conservative estimate of the emission reductions.	ditto	OK	
	If data and parameters will be monitored on implementation and hence become available only after validation of the project activity, it shall be demonstrated that the estimates provided in the PDD for these data and parameters are reasonable.	ditto	OK	
5.14	In section B.6.2 of the PDD, Where time series of data is used, where several measurements are undertaken or where surveys have been conducted, detail information shall be provided in **Annex 3** of the PDD. The choice for the source of data shall be explained and justified. Clear and transparent references or additional documentation shall be provided in **Annex 3** of the PDD.. Where values have been measured, a description of the measurement methods shall be included. More detail information can	PDD Guidelines	OK	

TABLE-1 REQUIREMENTS CHECKLIST (OK/No/NA/Tbv)

No.	Requirement	Refer. Para. VVM 01.2	Check Comment	ID. No.
	be provided in **Annex 3**.			
5.15	In section B.6.3 of the PDD, a transparent ex-ante calculation of project emissions, baseline emissions and leakage emissions expected during the crediting period and applied all relevant equations in the approved methodology shall be provided and how each equation is applied shall be documented in a manner that enables the reader to reproduce the calculation.	ditto	OK	
5.16	In section B.6.4 of the PDD, the results of the ex-ante estimation shall be summarized using the standardized table.	ditto	OK,	
6.	**Additionality of a project activity**	Para.94-121 VVM	--	--
	<Requirement to be validated> The PDD shall describe how a proposed CDM project activity is additional. In accordance with decision 3/CMP.1,annex, paragraph 43 "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" (see decision 5/CMP.1, annex paragraph 18). While specific elements of the assessment of additionality are discussed in further detail in paragraphs 98-121 in VVM, not all elements discussed below will be applicable to all proposed CDM project activities.	Para.94 VVM Para.43 CDM/M&P	--	--
6.	**Additionality of a project activity**	Para.94-121VVM	--	--
(a)	**Prior consideration of the clean development mechanism** While specific elements of the assessment of additionality are discussed in further detail in Section 6.3 –6.15 below, not all elements discussed below will be applicable to all proposed CDM project activities	Para.98-104 VVM	--	--
	<Requirement to be validated> If the project activity start date is prior to the date of publication of the PDD for stakeholder comments it shall be demonstrated that the CDM benefits were considered necessary in the decision to undertake the project as a proposed CDM project activity.	Para.98 VVM	--	--
6.3	The start date of the project activity, reported in the PDD, shall be in accordance with the "Glossary of CDM terms". http://cdm.unfccc.int/Reference/Guidclarif/glos_CDM_v03.pdf Glossary of CDM terms Version 05	Para.99 VVM	Tbv	CL-8
	The starting date of a CDM project activity is the date on which the implementation or construction or real action of a project activity begins. In section C.1 of the PDD, the description should contain not only the date, but also a description of how this start date has been determined, and a description of the evidence available to support this start date.	ditto	Tbv	CL-8
	In particular, for project activities that require construction, retrofit or other modifications, the date of commissioning cannot be considered the project activity start date.	ditto	OK	
6.4	It shall be identified whether it is a new project activity (a project activity with a start date on or after 02 August 2008) in accordance with the guidance from the CDM Executive Board, or an existing project activity (a project activity with a start date before 02 August 2008) (See Annex 22 of EB 49 report : Guidelines on the Demonstration and Assessment of Prior Consideration of the CDM)	Para.100 VVM Annex 22 EB49	Tbv	CL-8

TABLE-1 REQUIREMENTS CHECKLIST (OK/No/NA/Tbv)

No.	Requirement	Refer. Para. VVM 01.2	Check Comment	ID. No.
6.5	For a new project activity, for which PDD has not been published for global stakeholder consultation or a new methodology proposed to the CDM Executive Board before the project activity start date, the DOE shall ensure by means of confirmation from the UNFCCC secretariat that PPs had informed the host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status. If such a notification has not been provided by the project participants within six months of the project activity start date, the DOE shall determine that the CDM was not seriously considered in the decision to implement the project activity. (See EB 48, annex 62, .Prior consideration of the CDM form, currently located at <https://cdm.unfccc.int/EB/048/eb48_repan62.pdf>, for the standardized form.	Para.101 VVM	N/A	
6.6	For an existing project activity, for which the start date is prior to the date of publication of the PDD for global stakeholder consultation, the project participant's prior consideration of the CDM shall be demonstrated by providing the following evidence (preferably official, legal and/or other corporate). In such cases the PP shall provide an implementation timeline of the project in section B.5 of the PDD.	Para.102 VVM	Tbv	CL-8
(a)	Evidence to indicate awareness of the CDM prior to the project activity start date, and evidence to indicate that the benefits of the CDM were a decisive factor in the decision to proceed with the project shall be provided.	ditto	Tbv	CL-8
	Evidence to support this would include, inter alia, minutes and/or notes related to the consideration of the decision by the Board of Directors, or equivalent, of the project participant, to undertake the project as a proposed CDM project activity.	ditto	Tbv	CL-8
(b)	Reliable evidence that must indicate that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation.	ditto	Tbv	CL-8
	Evidence to support this should include, inter alia, • contracts with consultants for CDM/PDD/methodology services, • Emission Reduction Purchase Agreements or other documentation related to the sale of the potential CERs (including correspondence with multilateral financial institutions or carbon funds), • Evidence of agreements or negotiations with a DOE for validation services, • Submission of a new methodology to the CDM Executive Board, • Publication in newspaper, • Interviews with DNA, • Earlier correspondence on the project with the DNA or the UNFCCC secretariat.	ditto	Tbv	CL-8
6.	**Additionality of a project activity**	Para.94-121 VVM	--	--
(b)	**Identification of alternatives**	Para.105-107 VVM	--	--
	<Requirement to be validated> The PDD shall identify credible alternatives to the project activity in order to determine the most realistic baseline scenario, unless the approved methodology that is selected by the proposed CDM project activity prescribes the baseline scenario and no further analysis is required.	Para.105 VVM	--	--
6.8	The list of alternatives shall includes as one of the options that the project activity is undertaken without being registered as a proposed	Para.106 VVM	OK	

TABLE-1 REQUIREMENTS CHECKLIST (OK/No/NA/Tbv)

No.	Requirement	Refer. Para. VVM 01.2	Check Comment	ID. No.
(a)	CDM project activity;			
(b)	The list shall contains all plausible alternatives that are considered, on the basis of local and sectoral knowledge, to be viable means of supplying the outputs or services that are to be supplied by the proposed CDM project activity.	ditto	OK	
(c)	The alternatives shall comply with all applicable and enforced legislation.	ditto	OK	
6.	**Additionality of a project activity**	Para.94-121 VVM	--	--
(c)	**Investment analysis**	Para.108-114 VVM	--	--
6.9	**<Requirement to be validated>** If investment analysis has been used to demonstrate the additionality of the proposed CDM project activity, the PDD shall provide evidence that the proposed CDM project activity would not be: The most economically or financially attractive alternative; or Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).	Para.108 VVM	--	--
6.10	Project participants can show this through one of the following approaches, by demonstrating that:	Para.109 VVM	--	--
(a)	Demonstrate that the proposed CDM project activity would produce no financial or economic benefits other than CDM-related income. Document the costs associated with the proposed CDM project activity and the alternatives identified and demonstrate that there is at least one alternative which is less costly than the proposed CDM project activity;	ditto	Tbv by IRR Spreadsheet	CAR -3
(b)	The proposed CDM project activity is less economically or financially attractive than at least one other credible and realistic alternative;	ditto	Ditto	CAR -3
(c)	Financial returns of the proposed CDM project activity would be insufficient to justify the required investment.	ditto	Ditto	CAR -3
6.11	The DOE shall comply with the latest version of the "Guidelines on the Assessment of Investment Analysis" as provided by the CDM Executive Board and with other relevant guidance including the latest guidelines on plant load factors "guidelines for the reporting and validation of plant load factors" (See EB 51 report, annex 58 currently located at <http://cdm.unfccc.int/Reference/Guidclarif/reg/reg-guid03.pdf >.)	Para.110 VVM Annex 58 EB51	Tbv by the evidences	CL-9
	Project participants should provide spreadsheet versions of all investment analysis. All formulas used in this analysis be readable and all relevant cells be viewable and unprotected.	Annex 58 EB51	No The sheet shall be submitted	CAR -3
	The evidences on which input values in the investment analysis are based shall be provided.	ditto	No The evidence shall be submitted	CL-9
6.12 (a)	All parameters and assumptions used in calculating the relevant financial indicator shall be validated thoroughly, and the accuracy and suitability of these parameters shall be verified using the available evidence and expertise in relevant accounting practices.	Para.111 VVM	No The evidences shall be submitted	CL-9
	Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant.	Annex 58 EB51	Tbv	CL-9

TABLE-1 REQUIREMENTS CHECKLIST (OK/No/NA/Tbv)

No.	Requirement	Refer. Para. VVM 01.2	Check Comment	ID. No.
	The cost of financing expenditures (i.e. loan repayments and interest) should not be included in the calculation of project IRR.	ditto	Tbv	CL-9
	In the case of project activities for which implementation ceases after the commencement and where implementation is recommenced due to consideration of the CDM the investment analysis should reflect the economic decision making context at point of the decision to recommence the project. Therefore capital costs incurred prior to the revised project activity start date can be reflected as the recoverable value of the assets, which are limited to the potential reuse/resale of tangible assets.	ditto	NA	
	Only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation (all parameters varied need not necessarily be subjected to both negative and positive variations of the same magnitude), and the results of this variation should be presented in the PDD and be reproducible in the associated spreadsheets.. Where a variable which constitute less than 20% has a material impact on the analysis, this variable shall be included in the sensitivity analysis. As a general point of departure variations in the sensitivity analysis should at least cover a range of +10% and –10%, unless this is not deemed appropriate in the context of the specific project circumstances.	ditto	Tbv	CAR -3
	Such evidence for the evaluation of investment analysis as invoices, receipts, price indices, feasibility reports, public announcements, audited actual project cost and annual financial reports shall be provided upon request of the DOE.	ditto	Tbv	CL-9
6.13	The suitability of any benchmark applied in the investment analysis:	Para.112 VVM	--	--
(a)	In cases where a benchmark approach is used the applied benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR. Required/expected returns on equity are appropriate benchmarks for an equity IRR. Benchmarks supplied by relevant national authorities are also appropriate if the DOE can validate that they are applicable to the project activity and the type of IRR calculation presented.	Annex 58 EB51	No	CL-10
	If the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services, a benchmark analysis is not appropriate and an investment comparison analysis shall be used. If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate.	ditto	NA	
(b)	The effectiveness of the applied benchmark shall be demonstrated with appropriate evidence.	ditto	No	CL-10
(c)	The PPs shall demonstrate that it is reasonable to assume that no investment would be made at a rate of return lower than the benchmark by, for example, showing previous investment decisions by themslves involved and demonstrating that the same benchmark has been applied, or if there are verifiable circumstances that have led to a change in the benchmark.	Para.112 VVM	No	CL-10

TABLE-1 REQUIREMENTS CHECKLIST (OK/No/NA/Tbv)

No.	Requirement	Refer. Para. VVM 01.2	Check Comment	ID. No.
6.14	The CDM Executive Board clarified that in cases where project participants rely on values from Feasibility Study Reports (FSR) that are approved by national authorities for proposed CDM project activities, it is required to ensure that: **(See** the EB 38 report, paragraph 54, currently located at <http://cdm.unfccc.int/EB/038/eb38rep.pdf>.	Para.113 VVM Para.54 EB38	--	--
(a)	The period of time between the finalization of the FSR and the investment decision shall be sufficiently short for the DOE to confirm that it is unlikely in the context of the underlying project activity that the input values would have materially changed;	ditto	Tbv The evidences shall be provided	CL-10-2
(b)	The values used in the PDD and associated annexes shall be fully consistent with the FSR, and where inconsistencies occur the appropriateness of the values shall be explained.	ditto	Tbv The evidences shall be provided	CL-9
(c)	It shall be confirmed that the input values from the FSR are valid and applicable at the time of the investment decision.	ditto	Tbv The evidences shall be provided	CL-9 CL-10-2
6.	**Additionality of a project activity**	Para.94-121 VVM	--	--
(d)	**Barrier analysis** Barriers are issues in project implementation that could prevent a potential investor from pursuing the implementation of the proposed project activity. The identified barriers are only sufficient grounds for demonstration of additionality if they would prevent potential project proponents from carrying out the proposed project activity undertaken without being registered as a CDM project activity.	Para.115-118 VVM	--	--
6.15	**<Requirement to be validated>** If barrier analysis has been used to demonstrate the additionality of the proposed CDM project activity, the PDD shall demonstrate that the proposed CDM project activity faces barriers as below**.**	Para.115 VVM	--	--
	(a) Prevent the implementation of this type of proposed CDM project activity; (See EB 50, annex 13 .guidelines for objective demonstration and assessment of barriers., currently located at <http://cdm.unfccc.int/EB/050/eb50_repan13.pdf>. (b) Do not prevent the implementation of at least one of the alternatives**.**	Para.115 VVM	N/A	
6.16	Issues that have a clear direct impact on the financial returns of the project activity cannot be considered barriers and shall be assessed by investment analysis. This does not refer to either (a) Risk related barriers, for example risk of technical failure, that could have negative effects on financial performance, or (b) Barriers related to the unavailability of sources of finance for the project activity.	Para.116 VVM	N/A	
6.17	The available evidence shall be provided and/or interviews with relevant individuals (including members of industry associations, government officials or local experts if necessary) shall be arranged to demonstrate that the barriers listed in the PDD exist.	Para.117 VVM	NA	
	The existence of barriers shall be substantiated by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics.	ditto	NA	

TABLE-1 REQUIREMENTS CHECKLIST (OK/No/NA/Tbv)

No.	Requirement	Refer. Para. VVM 01.2	Check Comment	ID. No.
6.	**Additionality of a project activity**	Para.94-121 VVM	--	--
(e)	**Common practice analysis**	Para.119-121 VVM	--	--
	<Requirement to be validated> For proposed large-scale CDM project activities, unless the proposed project type is first-of-its kind, common practice analysis shall be carried out as a credibility check of the other available evidence used by the project participants to demonstrate additionality. This is to confirm that the project activity is not widely observed and commonly carried out in the region..	Para.119 VVM	--	--
6.18	The project participants shall clearly define "activities that are similar to the proposed project activity" in terms of technology and scale and justify the definition in CDM-PDD.	Additional Tool	OK	
	Screening (selection) criteria for common practice analysis shall be demonstrated with appropriate evidences and justification.	ditto	OK	
	The relevant geographical area for undertaking the common practice analysis should in principle be the host country of the proposed CDM project activity. A region within the country could be the relevant geographical area if the framework conditions vary significantly within the country.	ditto	OK	
	All the data used in the implementation of common practice analysis and reported in the PDD shall be supported by documentation and the PDD shall clearly state the complete reference of such documentation to enable access to it by a third party.	ditto	Tbv	CL-11
	Where documented information may be difficult to access or unavailable, local expert analysis on a common practice shall be provided.	ditto	Tbv	CL-11
7.	**Monitoring plan**	Para.122-124 VVM	--	--
	<Requirement to be validated> The PDD shall include a monitoring plan. This monitoring plan shall be based on the approved monitoring methodology applied to the proposed CDM project activity.	Para.122 VVM	--	--
7.1 (a)	***Compliance of the monitoring plan with the approved methodology*** (i) The list of parameters required by the selected approved methodology shall be identified.	Para.123 VVM	OK	
	(ii) The monitoring plan shall contain all necessary parameters, and the means of monitoring described in the plan shall complie with the requirements of the methodology;	ditto	No	CAR-4
	For each parameter, the following information shall be explicitly described in the standardized table in the PDD. ● Source of data ● Value of data applied ● Description of measurement methods and procedures ● QA/QC procedures ● Any comment, if any (Note): Data monitored and required for verification and issuance are to be kept for two (2) years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.	PDD Guidelines	No. Not sufficient	CAR-4 CL-13

TABLE-1 REQUIREMENTS CHECKLIST (OK/No/NA/Tbv)

No.	Requirement	Refer. Para. VVM 01.2	Check Comment	ID. No.
(b)	The operational and management structure that the project operator will implement in order to monitor emission reductions and leakage effects generated by the project activity shall be clearly described in the PDD (section 7.2) including the responsibilities for and institutional arrangements for data collection and archiving.	ditto	No Not sufficient.	CL-12
	Implementation of the plan (i) The monitoring arrangements described in the monitoring plan shall be feasible within the project design;	Para.123 VVM	OK	
	(ii) The means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures, shall be sufficient to ensure that the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified.	ditto	No The relevant documents shall be provided.	CAR-4 CL-13 CL-14
7.2	Relevant furthur background information, if any, shall be provided in Annex 4 of the PDD.	PDD Guidelines	OK	
8.	**Sustainable development**	Para.125-127 VVM	--	--
	<Requirement to be validated> CDM project activities shall assist Parties not included in Annex I to the Convention in achieving sustainable development.	Para.125 VVM	--	--
8.1	The letter of approval by the DNA of the host Party shall confirm the contribution of the proposed CDM project activity to the sustainable development of the host Party.	Para.126 VVM	To be confirmed by LOA	CAR -1
9.	**Local stakeholder consultation**	Para.128-130 VVM	--	--
	<Requirement to be validated> Local stakeholders shall be invited by the PPs to comment on the proposed CDM project activity prior to the publication of the PDD on the UNFCCC website. See glossary of CDM terms, currently located at <http://cdm.unfccc.int/Reference/Guidclarif/glos_CDM.pdf>, for definition of stakeholders.	Para.128 VVM Glossary of CDM terms	--	--
9.1 (a)	Comments by local stakeholders that can reasonably be considered relevant for the proposed CDM project activity shall be invited in an open and transparent manner.	Para.129 VVM	Tbv	CL-15
(b)	The summary of the comments received as provided in the PDD shall be complete.	ditto	OK	
(c)	The project participants shall demonstrate that they have taken due account of any comments received and shall describe/explain this process in the PDD.	ditto	Tbv	CL-15
10.	**Environmental impacts**	Para.131-133 VVM	--	--
	<Requirement to be validated> Project participants shall submit documentation to the DOE on the analysis of the environmental impacts of the project activity in accordance with paragraph 37(c) of the CDM modalities and procedures.	Para.131 VVM Para.37(c) CDM/M&P	--	--
10.1	Project participants shall submit documentation to the DOE on the analysis of the environmental impacts of the project activity	Para.131 VVM	Tbv	CL-16
10.2	Project participants shall also provide all references to support documentation of a EIA if required by the host Party	Para.132 VVM	Tbv	CL-17

TABLE-2 Resolution of Corrective Actions and Clarification Requests

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
CAR	**Corrective Action Requests**			
CAR-1	The LoAs (Letter of Approval) of all parties involved shall be provided together with its information source and route.	1.1 2.1 2.2 8.1	The Approval Letter from the Local DNA has been received and has been forwarded to the DOE.	LoA of Fiji DNA dated 09 March 2011 has been provided. However, there is an inconsistency between the LoA and the PDD. The name of the Project written in the LoA ,"Nadarivatu Renewable Energy Project" version 03, is different from that in the PDD, “Fiji Nadarivatu Hydropower Project.” Clarification on the Project Name is requested.
			We will use the name “Nadarivatu Renewable Energy Project” and we have revised the project name in the PDD version 3.3.	The project name has to be consistent among the PDD, the LoA and the UNFCCC Notification. The project name shall not be changed without any justification. The project name in LoA of Fiji DNA shall be revised and the revised LoA shall be provided for confirmation.
			Changed the name in the PDD version 4.0 back to Fiji Nadarivatu Hydropower Project. A new LoA has been provided by the Fiji DNA. The LoA of Fiji DNA is consistent now with the PDD version 4.0 and the UNFCCC Notification.	A new LoA has been provided. However, please provide its information source and route to confirm the authenticity of the signature.

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
			The new LoA is sent with this new protocol response. It has been issued by the Ministry of Local Government, Urban Development, Housing and Environment (REF: EP.8/10/5-III) on the 1st December 2011. It has been signed by Jope Davetanlvalu, Director of Environment (Designated National Authority).	The information source and route of the LoA has been clarified. **The CAR-1 is closed.**
CAR-2	The installed capacity of generators (41.8MW) seems to be mistakenly described. The correct installed capacity of generators must be 44MW (22MW x 2Units).	4.1 4.2	The turbines installed capacity of the generators is 44MW (22MW x 2 Units). However the installed capacity referred in all FEA documents is 41.8MW which is aligned to the performance guarantee offered by the Contractor	"Installed Capacity" and "Performance Guarantee" is a different matter. In the turbine design report provided, Rated Output is described as 21.4MW, which is different from 22MW or 20.9MW. . Submission of the name plate drawings and the name plate photos for both the turbine and the generator is requested.
			Changed in the PDD the installed capacity of the generators to 44MW – see version 3.3 of the PDD. Also changed the value of the power density accordingly. In the generator data provided by the Manufacturer the rated capacity for each turbine is 21.4MW, maximum output capacity is 21.96MW which is approximately 22MW per turbine. Extract of this data has been sent by email (word document) to the DOE. Once the first turbine is installed a photo of the nameplate will be taken and submitted.	Turbine and Generator data have been submitted and confirmed by the DOE. To avoid confusion, however, it is requested to describe "Turbine/Generator" instead of "Turbine" in Table a.1 of the PDD. Waiting for the name plate photos for final confirmation.

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
			Changed in Table A.1 of the PDD version 4.0, "Turbine" to "Turbine/Generator". This was changed in the columns Technology and Description. Also the photo of the Nameplate has been sent on separate email to the DOE.	The model No. of Turbine/Generator shall be also described in the PDD.
			The turbine type and generator type (Turbine type: CJA475-L-170 Generator Type: SF22-14/3600) have been described in the PDD (see Version 5.1) This was inserted in Table .A.1 Project technologies. The name plate is sent along with this Response	The description in the PDD has been confirmed. **The CAR-2 is closed.**
CAR-3	IRR calculation: The active spreadsheet of the IRR calculation shall be provided, including the sensitivity analysis.	6.10 6.11 6.12	The active IRR calculation spreadsheet sent does not include the sensitivity analysis. The IRR calculation spreadsheet with the sensitivity analysis will be provided to the DOE by the PO.	The active IRR calculation spreadsheet without sensitivity analysis has been provided. A full package of the active IRR calculation spreadsheet including the sensitivity analysis shall be provided.
			This has been provided by the PO on a separate excel spreadsheet document with an operation start date of January 2012.	A full package of the active IRR calculation spreadsheet has been provided. **The CAR-3 is closed.**
CAR-4	In Data/Parameter Table in B.7, the description about CAP_{PJ} shall be described correctly.	7.1	The description of CAP_{PJ} should read: "*Installed capacity of the hydro power plant after the implementation of the project activity*". That will be changed in the PDD.	The revised PDD shall be provided to confirm the description. In the description, the term of "measurement" or "measured" is used, but the term of "determine" or "monitor" might be appropriate in case of the installed capacity. In addition to the description, Value

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
				(41,800,000W) shall be reviewed in relation to CAR-2.
			The description or the CAP_{PJ} in Table 7 was changed from "*Determine the installed capacity of the hydro power plant after the implementation of the project activity*" to "*Installed capacity of the hydro power plant after the implementation of the project activity*" The word *"measured"* was changed to *"monitored"* The Value 41,800,000W was revised and changed to 44,000,000W, in line with CAR2– See PDD version 3.3.	The correct description has been confirmed in the revised PDD. **The CAR-4 is closed.**
CL	**Clarification Requests**			
CL-1	The annual power generation, the operating hours and the construction/operation schedule, which are important for readers to understand the whole context of the project activity, shall be described as well in Section A.2 & A.4.3 of the PDD.	4.1	The annual power generation (101GWh/year), the operating hours on average 8 hours per day and the construction/operation schedule (construction started in May 2009, it is planned to be finished in December 2011. Operation phase will start in January 2012) will be added to Sections A.2 & A.4.3 of the PDD. – Source: EPC Project Description 2009 and EPC design report.	The revised PDD shall be provided to confirm the description.
			Added in version 3.3 of the PDD in both sections A2 & A.4.3.	The description has been confirmed in the revised PDD. **The CL-1 is closed.**
CL-2	Feasibility Study Report (or "Project Technical Design") which is the technical basis of the Project shall be provided with the conditions (opinions, if any) for approval.	4.2	These have been provided to the DOE by the PDD Author. The approval for the Project including various options were done by the PO Board of Directors	The Project Technical Design has been provided with the relevant supplementary documents. **The CL-2 is closed.**

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
CL-3	The purchase agreement of Turbine/Generator and other main equipment describing price and specifications shall be provided.	4.2	These have been provided to the DOE during the site visit	The requested documents have been provided. **The CL-3 is closed.**
CL-4	It shall be explained how the values of Installed Capacity / Annual Power Generation / Plant Load Factor (Annual Operating Hours) / Power Efficiency Factor / Internal Electricity Consumption / Transmission Line Loss of the project were determined with relevant evidences.	4.2	The Performance Data Guarantees provided by the Contractor will be extracted from the Contract and sent to the DOE	Not only guarantee values, but also the bases for determination shall be provided with relevant evidences.
			The Performance Data from the Contract has been sent to the DOE on email (word document). The basis of this guarantees stem from the Project FSR/Project Design report where all the parameters such as Hydrology, volumes of catchment and impounded water quantities are used to forecast the scheme's output in terms of both capacity and energy. An optimum size of turbine and generator is modelled along with the corresponding capital cost, cost of not developing an alternative fossil fuel station and the best project is then recommended. The project design report forms the key basis for the key output of the scheme.	It is requested to provide the bases for the determination of key design parameters (how they are determined) with relevant evidences such as calculation sheet and comparison table. If they are clearly described in the FSR/Design Report, please specify the relevant pages. If not, please describe in the left column.
			Section 4 on pages 17 to 42 of the Design Report is for the Hydrology and the methodology of derivation of flows. Includes catchment sizes, data, rating curves and the modelling of flows. Section 5.2 page 45 shows the data on the Impact of the Weir level and the design flow on the scheme energy production which led to the recommended installed capacities and the annual power generation Section 6 on pages 80 to 90 covers the Energy Production, methodology, variations in production including the	The bases for the determination of key design parameters have been confirmed in the Design Report. **The CL-4 is closed.**

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
			reliability of the Energy Production estimates For Plant Load Factor, refer page 88 of Design Report	
CL-5	It shall be clarified how the total surface area and the installed capacity were calculated for the determination of the power density.	4.2 5.2	The total surface area was estimated in the EPC Design Document and was taken from there as well as the installed capacity. These values are also summarised in the EIA and the EPC Project Document. A graph to be provided by PO	The graph of the surface area vs. water level shall be provided with the explanation (description) about the measurement method.
			This graph and table of values have been provided in to the DoE by e-mail (word document). The measurement method adopted has been to use the topography maps from the Fiji Lands Department and some survey data of areas accessible to the catchment and the water inundated area to generate a formula for the relationship between water level and volume. This is then further translated to a corresponding Surface area and the results are as tabulated and in the graph.	The table and graph of "Korolevu Weir Surface Area and Volume" has been provided and confirmed. **The CL-5 is closed.**
CL-6	It is requested to describe how the adopted technology is environmentally safe and sound.	4.2	The adopted technology is safe and sound because: • It is a run-of-river dam, with very small impacts on the environment; • Uses a renewable source of energy; • Will add capacity to FEA grid using "green-energy" instead of diesel based energy	The response is generally applicable to hydropower projects and has already been described in the PDD. Environmentally-friendly features of equipment, if any, shall be described in the PDD.
			Added in section A2 , contribution of the project activity to sustainable development *"(run-of-river dam with very small impacts on the environment)*" – See version 3.3	Confirmed in the revised PDD. **The CL-6 is closed.**

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
CL-7	It is requested to describe about the specification of Generators in Section A.4.3 Table A of the PDD.	4.2	Copies of the Generator specification as per the Contract was submitted to the DOE during the Site Visit.	Generator specification has been certainly provided to the DOE, but the description about the specification of Generators in Section A.4.3 Table A of the PDD is requested.
			A description of the specification of the Generators has been included in the PDD version 3.3. Please see also the description of the generators that has sent to the DoE in response to CAR-2.	It can be understood that the specification of Generators is included in Table A.1. Please refer to the comments in CAR-2.
			Changed in Table A.1 of the PDD version 4.0, "Turbine" to "Turbine/Generator". This was changed in the columns Technology and Description	The model No. of Turbine/Generator shall be also described in the PDD.
			The turbine type and generator type (Turbine type: CJA475-L-170 Generator Type: SF22-14/3600) have been described in the PDD – table A.1. See version 5.1 of the PDD.	The description in the PDD has been confirmed. **The CL-7 is closed.**
CL-8	CDM Consideration & Timeline: 1. It shall be clearly described whether the project is a new project activity or an existing project activity somewhere in the PDD especially in the case of the existing project. 2. It shall be clearly explained why the Starting Date of the project	6.3 6.4 6.6	The project is a : 1 – Nadarivatu Renewable Energy Project is a new project activity. It is referred that the "*proposed project activity aims to construct and operate a run-of-river hydropower project*" (pag.2 of the PDD); "*The project activity is the installation of a new hydropower plant with a run-of-river weir" (page 8 of the PDD)".* *2- the FEA Board decision paper (No 4980) of July 17, 2009 as submitted to the DOE during site visit*	1. "A new project" is a project whose starting date is on and after August 2, 2008 according to the UNFCCC's terminology. Please respond accordingly. 2. The detailed explanation was made by the PO and the Decision Making date has been understood.

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
	activity is earlier than the date of CDM decision making. 3. The evidence for each milestone shall be provided and it shall be explained how CDM consideration has been given until GSC of the PDD. 4. The evidence to indicate that the benefits of the CDM were a decisive factor in the decision to proceed with the project shall be provided. It may include the FEA Board decision paper (No.5360).		*3- this has been demonstrated with various paper submissions during site visit by DOE* 4- FEA Board decision paper (No.5360)	The FEA Board decision paper (No 4980) of July 17, 2008 has confirmed to be the evidence. 3. The prior consideration and the continuing actions for CDM have been confirmed through the provided evidences and the PO's explanation. 4. Not only Paper No. 5360, but also Paper No. 4980 is the indication for CDM decision. Please confirm. **(Items 2 & 3 are closed.)**
			1.Substituted in the new version of the PDD the "*The project activity is the installation of a new hydropower plant with a run-of-river weir*" by "*The project activity is the installation of a new run-of-river hydropower plant*" Added on page 2 the word "new", becoming the following: "*The proposed project activity aims to construct and operate a new run-of-river hydropower project" – See PDD version 3.3* 4. Decision paper 4980 was the first CDM decision and the first decision of FEA board to take the project forward. With the devaluation of the Fiji dollar in 2009, the decision paper 4980 had to be revised. Decision paper 5360, reflects the revision of decision paper 4980, and the final decision of taking the project forward. Please see the timeline in PDD version 3.3.	1. This project is clearly "a new project" according to the definition of the UNFCCC, which is requested to be described in the PDD before or after the timeline table. 4. It was confirmed in the timeline in the revised PDD. **(Item 4 is closed.)**
			The start date of a CDM project activity, according to the UNFCCC consideration, shall be considered to be the date on which the PP has committed to expenditures related to the implementation or related to the construction of the	The description about a new project has been confirmed in the revised PDD.

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
			project activity A new project, is a project whose starting date is on and after August 2, 2008 according to the UNFCCC's terminology. The starting date of the Fiji Nadarivatu Hydropower CDM project is 08 September 2008, when the contract with Sinohydro Corporation was signed. Thus the project is a new project. This was reflected in the PDD version 4.0: • In page 2, the initial description of the project scenario was changed to: "*The proposed project activity is a new project activity (whose started in 08 September 2008, when the civil construction contract with Sinohydro Corporation was signed), which aims to construct and operate a run-of-river hydropower project and it will be an environmentally friendly solution to meeting current and growing energy demand*". • After the timeline table, in page 16, the following sentence was added: *The Fiji Nadarivatu Hydropower Project is a new project according to the UNFCCC terminology as it started in 08 September 2008 (after 2nd August 2008) with the signature of the contract for provision of civil construction works signed between FEA and Sinohydro Corporation.* .	**The CL-8 is closed.**
CL-9	In relation to Table B.5.-3: 1. As described above, Feasibility Study Report (FSR) (or "Project Technical Design") and the FEA	6.11 6.12	1- These studies have been provided as an electronic version. Originals to be shown to the DOE on site; • The Project Technical Design document was prepared by MWH New Zealand	1. Item 1 has been clarified.

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
	Board decision paper (No.5360) shall be provided to the DOE for the confirmation of the values listed in Table B.5.-3. The following are also to be explained to the DOE and described in the PDD where applicable. ● Who prepared FSR and the FEA Board decision paper? ● Who approved FSR? 2. The official document in which the tariff is regulated and approved shall be provided. 3. Detail explanation is requested for the inconsistency, if any, of the key parameters for the investment analysis between FSR, the FEA Board decision paper and the PDD. The comparison table of the key parameters shall be provided. 4. The comparison of Total Investment ("Capital Cost) between before and after devaluation of Fiji Dollar shall be		Limited and approved by P.J. Robison. This is the FSR used by FEA in its evaluation of the project and various options • The FEA Board Decision was prepared by Sunil De Silva (Chief Financial Officer) and Hasmukh Patel (Chief Executive Officer) from FEA • The Project Technical Design document was approved by P.J. Robison 2- Provided the official document with the tariff to the DOE during the site visit 3- There are no differences between the FSR, FEA Board Decision paper and the PDD. 4- Provided to DOE during site visit 5- Provided to DOE during site visit. 6- Provided to DOE during site visit with Web site link	2. The official document has been provided. 3. The comparison table of key parameters shall be provided even if there is no inconsistency. In the PDD, the source of key parameters is Paper No. 5360, but Paper No. 4980 must have been used for CDM Decision Making. Please clarify again. 4. 5. 6. The relevant documents have been provided. **(Items except 3 are closed.)**

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
	provided. 5. The breakdown of "Total Investment ("Capital Cost")" and "Operating costs" shall be provided. 6. Fiji Inflation Data from 2002 to 2010 shall be provided with the forecast from 2011.		3. Added two columns to the table stating the values used in Decision paper 4980 and in the PDD. As it can be seen the values used in the PDD are mostly the same as the ones used in the Decision paper 5360. The differences are: • Capacity generation expected for 2011 – explained by the delay in construction; • Tax – only a 3% difference as there was a change in the tax regime • Exchange rate (FJD/USD) – explained by the devaluation in April 2009 • Capital cost – this is explained by the devaluation in April 2009 • Residual value – an adjustment made by FEA • Diesel savings – explained by lower prices for diesel in 2009 All the other parameters are the same. Decision paper 4980 of 17 July 2008 reports the first decision of FEA board to take the project forward given the conditions at the time. With the devaluation of the Fiji dollar in 2009 the Decision paper 4980 had to be revised, and some of the parameters changed (the ones referenced above, however the key assumptions stayed the same). This revision was conducted and discussed by FEA Board and they decided to take the project forward once again – decision paper 5360. Thus the values considered in the PDD were the ones from the Decision paper 5360. This explanation was added to the PDD version 3.3 has a note to the table.	Instead of comparison table, the detailed explanation has been provided in the response. **The CL-9 is closed.**

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
CL-9-1	Please clarify that the Total Investment (FJ$300million) is the Total Static Investment without the Interest during Construction.		Yes F$300M is the estimated Total Static Investment value for Nadarivatu Hydro. This amount excludes Interest during construction.	It has been clarified. **The CL-9-1 is closed.**
CL-9-2	The Installed Capacity must be 44MW. However, it is 30MW in the Board Paper No. 4980 (Investment decision) and 40MW in the Board Paper No.5360 (decision to continue the Project), both of them are different from that in the PDD. It is requested to clarify these differences.		The initial capacity of 30MW in Board Paper 4980 was due to the insistence of the World Bank that a firm capacity of 30MW was to be taken as part of the Financial analysis. This was subsequently revised in Board paper 5360. The capacity has again been revised after the manufacturer nameplate was received after tender which is 44MW. We confirm that Nadarivatu is a power station with an installed capacity of 44MW.	Confirmed with the nameplate that the installed capacity is 44MW. **The CL-9-2 is closed.**
CL-9-3	Tariff Determination by Commerce Commission has been provided to DOE by FEA. However, we cannot find the description in Table B.3 in the PDD, “22 and increases by 4% in 2012, and 4% every fifth year thereafter” in Board Paper No. 4980 and “24.5 from September 2009, increasing by 4% in 2012, and 4% every fifth year thereafter” in Board Paper No. 5360. The clarification is requested or please provide the source if any.		The tariff increases by 4% in 2012 and 4% every fifth thereafter is only an assumption to determine the price path. The DOE must appreciate that when FEA prepared the financial analysis of this project in 2007, we had to estimate at best how the tariff would increase over the following years. These assumptions are clearly stated to see if the project is viable and surpasses the set commercial hurdles before FEA Directors approve the project back in 2007.	Assumption might be OK, but this must be sourced from some materials. Clarification has to be made on the sources from which the description in the PDD Table B.3, Also please clarify the relation of this description with 20090818 Commerce Commission Tariff Determination.
			The IRR was based on small electricity price increase. However, in 2009 the Commerce Commission approved a big increase (15%). Nevertheless, to assure consistence between the IRR presented in the PDD and the one approved at the Board Decision Paper n. 5360, the PDD used the same base case assumptions for the electricity	Clarification including conservative assumption has been made properly. **The CL-9-3 is closed.**

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
			prices as in the Board Decision Paper n. 5360, which are more conservative than the conditions approved by the *20090818 Commerce Commission Tariff Determination*.	
CL-9-4	It is requested to provide the breakdown of O&M Cost. If it has already been provided, please tell us the name of the document.		FEA uses its current experience to estimate the O&M costs which in the financial analysis is taken as 0.5 to 1% of the capital costs.	It can be considered reasonable that the O&M cost is 0.5 to 1% of the capital costs. It is requested, however, to provide the breakdown of O&M Cost, even if it is estimated by the current experience.For example, maintenance cost, labor cost & welfare, material cost and others.
			Breakdown of O&M costs based on the experience from FEA in other hydropower stations is provided in the IRR calculation spread sheet.	It has been confirmed with the provided document. **The CL-9-4 is closed.**
CL-9-5	It is requested to provide the source of inflation rate of 3%.		Generally the long term average inflation rate in Fiji is around 3%. The source is from the Reserve Bank of Fiji. You can check their website and this has been provided to the DOE during the Site Visit.	It has been confirmed with the provided document. **The CL-9-5 is closed.**
CL-9-6	In the PDD, Emission Factor is 0.5095, but in the IRR Spreadsheet 0.656 is used. Please clarify the inconsistency.		The DOE must understand that the Emission Factor used in the IRR spreadsheet was the figure prevailing from 2006 from the bundled project registration number 089. Since the new work by IT Power in 2010 and with the other renewable energy sources commissioned since then this factor has been revised to 0.5095. The Nadarivatu PDD reflects the new number and this inconsistency is mainly due to the analysis being done in 2007 and the PDD being done in 2011.	The history of the documents can be understood and it has been confirmed the IRR calculation results with CDM for both cases are almost the same, 8.33% with 0.656 and 8.25% with 0.5095. The IRR value with CDM might not be related to the evaluation of the additionality directly, but the consistency between the PDD and the IRR Spreadsheet is required and

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
				it is requested to provide the revised IRR Spreadsheet.
			A new IRR was calculated using the emission factor calculated in the PDD. Thus the IRR with CDM is now 5.90% and the IRR without the CDM is the same as it was before. We also decided to remove the diesel savings and recalculate the IRR as it was too conservative.. The changes of the IRR calculations are reflected in the PDD version 5.1, namely tables: B3 and B4. Also the note under Table B3 and some of the text was changed to reflect the new calculations.	It has been confirmed with the provided document. **The CL-9-6 is closed.**
CL-9-7	Please provide the basis (source) for the residual value of 10%, project lifetime of 40years and their appropriateness.		Again this is an assumption where we anticipate that the residual value of Nadarivatu Hydro after 40 years will be 10%. Generally the accounting life of Hydro Assets range from 40 to 75 years. So the 10% residual factor assumes that there is market value of the Hydro Plant after the 40th year.	Explanation has been made, but the sources or evidences are requested to be provided.
			In the IRR calculations a residual value FACTOR of 12 TIMES was used (not 12%). The modelling was done for 40 years. Hydro assets last 100 years and more. Therefore to model the benefits from years 41 to beyond, we use 40th year cash flow and multiply by a factor which is the RV factor. This factor is typically about 1/discount rate. In this case 12 TIMES. Since the unit of the Residual Value Factor is 12 Times and not 12% the unit in table B3 of the PDD was changed accordingly. Also the name Residual Value was changes to Residual Value Factor. A footnote associated with the	The sources or evidences have been provided. **The CL-9-7 is closed.**

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
			Residual value Factor was added as well: "*The Residual Value Factor is typically 1/discount rate*". All this changes are reflected in PDD V5.1.	
CL-10	Suitability of the benchmark: 1. The evidence of the benchmark shall be provided. 2. The FEA standard" which is the basis for the discount rate shall be provided with the evidence of its effectiveness. 3. The application of the FEA standard to the similar projects shall be demonstrated with the relevant evidences.	6.13	These documents were provided to the DOE during the site visit.	The investment decision making process in FEA is clearly explained during the on-site interviews and the relevant documents have also been provided. However, the decision making process with the applicable benchmark in FEA shall be described briefly in the response column.
			The FEA Benchmark was established in 2005 after an asset revaluation exercise by external consultants. The report recommended a WACC of 7.91%. FEA directors have since adopted a benchmark of 8% and this had been applied for all investment decisions as a key factor in the decision making process for all FEA projects.	The applicable benchmark in FEA was well explained as the response. **The CL-10 is closed.**
CL-10-2	It shall be clarified that the FSR (or "Project Technical Design") data are valid and applicable to the financial assessment at the time of investment decision of the project	6.14	Investment papers provided to DOE during site visit	The clarification has been made during the on-site interviews and the relevant documents have also been provided. However, the response to clarification shall be described briefly.
			The Investment proposals tabled to the FEA Directors had all the key financial parameters and the key assumptions that are included in the economic analysis for the investment. A sensitivity analysis is also carried out to see how robust the investment will be in response to a change	The clarification is on the validity and applicability of the FSR (or "Project Technical Design") data, to comply with the UNFCCC requirement that the period between the FSR

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
			in some of the key parameters or assumptions	completion and the investment decision has to be enough short.
			The project timetable (Table B.2) shows that the Letter of Intent with the World Bank for processing of carbon credits was signed just a month after the Project Technical Design was finalised and the Decision by the Board to proceed with the CDM project was taken 7 months later. The timetable is as follows: - The Final Project Design Report by MWH was submitted 12th November 2007 - FEA Audit Finance Sub-Committee of the Board approved for signing of Letter of Intent with World Bank for the processing of Carbon Credits under the CDM process on 6th December 2007 - The FEA Board Approval (Board paper no.4989 was given on 17th July 2008 The Final Project Design Report was that used to present the Investment proposal to the FEA Board of Directors for them to make the decision to proceed with the project.	The period between the Design Report completion, the Board approval and the investment decision can be considered enough short as explained in the response. **The CL-10-2 is closed.**
CL-11	To demonstrate the distinctions between the proposed project and the existing projects in more convincing and verifiable manner, the detailed evidence (key parameters of the compared projects) related to common practice analysis shall be provided.	6.18	Investment papers provided to DOE during site visit	The requested documents have been provided. **The CL-11 is closed.**

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
CL-11-2	Regarding the common practice analysis, the new Guidelines was issued at #63EB and *'Tool for the demonstration and assessment of additionality'* was revised at #65EB with taking into consideration the new Guidelines. Please apply EB63 Annex 11 (GUIDELINES ON COMMON PRACTICE (Version 01.0)) or EB65 Annex 21 Additionality Tool (Version 06.0.0).	6.18	The EB EB65 Annex 21 Additionality Tool (Version 06.0.0) was the one applied in the PDD Version 5.1.	Common Practice Analysis has been revised according to the latest Tool. **The CL-11-2 is closed.**
CL-12	It is requested to describe "Monitoring Organization Chart" corresponding to the description of roles and responsibilities.	7.1	The Monitoring Organisational Chart shall be included in the PDD. At the moment Tables B.9 and B.10 show up the composition of the CDM monitoring team and the responsibilities. The chart to be added will look like:	The proposed chart could be easy to understand, which shall be confirmed in the revised PDD.

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
			Project Director Responsible for the :Collation of metered data from the project activity; collation of confirmation records from Fiji Electricity Authority Monthly and cross-check of confirmation records against metered data **Site Supervisor** Responsible for: ensuring monitoring activities take place; initial check for anomalies (e.g. significant changes against previous readings or expected values); site record management; communication of meter readings to the Project Director; and attendance at annual verification **Operational Staff** Responsible for: ensuring that meter readings are captured in standard format. Report to the site supervisor The CDM consultant will be only responsible for external audit of the CDM monitoring procedure.	
			Added to the PDD Version 3.3.	The Monitoring Organisational Chart has been added in the revised PDD as appropriate. **The CL-12 is closed.**

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
CL-13-	To confirm the consistency of the monitoring plan, Grid Connection Agreement and Power Purchase Agreement shall be provided.	7.1	Not applicable as explained to the DOE during the site visit that the PO is also the operator of the Grid and is the retailer. Thus there is no need for these Agreements	The relationship of the PO with the Grid Operator became clear through the on-site interviews. It was also explained, however, that the monitoring plan would be finalized later. The final monitoring plan shall be submitted and reflected in the PDD.
			The final monitoring plan has been reflected in the PDD version 3.3 FEA is undergoing privatization and it is possible that the Grid may be separated from the Generating sources. We would demarcate this separation after meters M2 and M3 as shown in the design in the PDD. This is one of the main reasons for the meters M2 and M3 being placed in the positions as shown as the substation would not be part of the generation source.	To identify the role of each meter, it should be avoided to use the same ID Numbers for different meters.(For example, there are two “M2”.) In the description of the monitoring plan, the ID No. of the meter shall be referred for easy understanding.
			The figure on the monitoring plan was changed so that the meters have different names. The meters associated with turbine/generator 1 now are called M1 G1, M2 G1 and M3 G1; and the meters associated with turbine/generator 2 are called M1 G2, M2 G2 and M3 G2. This is included in version 4.0 of the PDD.	The response would be very good for identification of meters. According to the revised PDD, however, M1 G1 is described as M1 T1, for example. It is requested to change M1 T1 to M1 G1. (“G” would be better.) Again, “Governors” might be “generator”.
			Figure changed. (See PDD Version 5.1)	The description has been changed properly. **The CL-13 is closed.**

<table>
<tr><th>No. CAR, CL</th><th>Clarifications and corrective action requests by validation team</th><th>Sec. No. in TABLE-1</th><th>Summary of project owner response</th><th>Validation team Conclusion</th></tr>
<tr><td rowspan="3">CL-14</td><td rowspan="3">The CDM Monitoring Manual and the Training Plan/Manual shall be provided.
If these documents are under preparation, FAR will be issued.</td><td rowspan="3">7.1 (b)</td><td>These Documents are under preparation.</td><td>The document names to be prepared and the documents preparation schedule shall be provided.</td></tr>
<tr><td>The document names have been provided by e-mail (word document) including the schedule for their preparation. Two training presentations have been provided.</td><td>The detailed contents and the schedule shall be described in the response column as a record.

Depending on the case, FAR might be issued.</td></tr>
<tr><td>CDM Monitoring Manual and Training Plan
The CDM Monitoring Manual and Training Plan for the Nadarivatu Renewable Energy Project are under preparation.
The documents to be prepared and timetable for preparation are as follows:
<table>
<tr><th>Document</th><th>Preparation schedule</th></tr>
<tr><td>Introduction to CDM Monitoring for Hydro</td><td>July 2011</td></tr>
<tr><td>Meter testing Procedure</td><td>August 2011</td></tr>
<tr><td>Meter exchange Procedure</td><td>August 2011</td></tr>
<tr><td>Meter reading procedure</td><td>August 2011</td></tr>
<tr><td>Standby meter procedure</td><td>August 2011</td></tr>
<tr><td>Energy estimation procedure</td><td>October 2011</td></tr>
<tr><td>CDM Monitoring Manual</td><td>December 2011</td></tr>
</table></td><td>The schedule for the CDM Monitoring Manual and Training Plan has been well understood and the presentations used for the Introduction to CDM Monitoring have been provided.
According to the preparation schedule, almost all the documents seem to have already been prepared and it is requested to provide those documents together with the training records.
Then FAR will not be issued.</td></tr>
</table>

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
			<table><tr><td>Staff training needs appraisal</td><td>November – December 2011</td></tr><tr><td>Training Plan</td><td>December 2011</td></tr></table> The first training session on Introduction to CDM Monitoring for Hydro Power Stations was carried out on 18th July 2011. The presentations used for the Introduction to CDM Monitoring have also been sent to the DOE. The training of staff on the full CDM Monitoring Manual and monitoring procedures for the Nadarivatu Hydropower Project will be carried out in December 2011.	
			The name of some of the documents above referenced were changed. All those documents have already been developed and will be sent to the DoE along with this Protocol answer: 1.- Introduction to CDM Monitoring for Hydro (PPT) 2. Meter Testing Procedure (fea_nrep-0003) 3. Meter Exchange Procedure (fea_nrep-0004 & fea_nrep-0004a) 4. Meter Reading & Recording Procedure (fea_nrep-0002 & fea_nrep-0002a) 5. Standby Meter Procedure (fea_nrep-0005) 6. Energy Estimation Procedure (fea_nrep-0001) 7. Training Plan (Training Programme for CDM & Hydro Monitoring) 8. CDM Monitoring Manual (Nadarivatu Hydropower CDM Project Monitoring Manual_version1) – this will be completed after validation of the PDD.	All of the documents prepared have been provided. **The CL-14 is closed.**

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion
CL-15	1. Minutes of Stakeholder Meeting and the Newspaper article for advertising shall be provided to confirm the contents of Section E of the PDD.. 2. No Resettlement shall be confirmed with the interview with the relevant Governmental Office during the site visit.	9.1	1. Attached is the version 2.1 of the newspaper advertisement for the PDD stakeholder's consultation, minutes of meeting and results of the questionnaire. 2. No resettlement was confirmed by the DNA during interview with the DOE	1. All of the requested documents regarding the stakeholders' consultation have been provided. 2. No resettlement was confirmed by the interview with the DNA and the PO. **The CL-15 is closed.**
CL-16	The EIA report and the approval letter with requirements/opinions (if any) by the relevant authority shall be provided.	10.1	Provided to DOE during site visit	The relevant documents have been provided. **The CL-16 is closed.**
CL-17	The regulation standards relating to the environmental protection applied to the project shall be quoted where applicable as reference note in the PDD.	10.1	Provided to DOE with web site link and will be referenced in the PDD	The website link has been provided, but the revised PDD shall be provided to confirm the description.
			The revised PDD version 3.3 has been updated. Two documents (Pdf) have also been sent to the DOE by e-mail.	HEALTH AND SAFETY AT WORK ACT 1996 and Environment Management Act – 2005 have been provided and the quotation of these documents has been confirmed in the revised PDD. **The CL-17 is closed.**
CL-18	The officially publicized data for Emission Factor calculation shall be provide.	5.13	The data used was provided by FEA and submitted to DOE during site visit including Annual Report which is a public document.	The relevant documents have been provided. **The CL-18 is closed.**

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE-1	Summary of project owner response	Validation team Conclusion

FAR	Forward Action Requests			
FAR-1				

APPENDIX B

Certificate of Appointment of Validation Team

Project Title	Fiji Nadarivatu Hydropower Project
Applied Methodology	ACM0002-Ver.12.0.0
	Sectoral Scope 1

Date: November 10, 2010

Designated Operational Entity: Japan Consulting Institute (JCI)

Reflecting the competence criteria of JCI in accordance with the latest "CDM Accreditation Standard for Operational Entities", this is to certify the appointment of validation team of JCI specified below for the CDM project activity above, as per CDM Project Activity Registration Form, and Validation Procedure established by JCI CDM Center.

Signature

Akio Yoshida,
Executive Director, JCI CDM Center

Date: November 10, 2010

Client: Fiji Electricity Authority

Reflecting the curricula vitae provided, this is to agree the validation team of JCI specified below for the CDM project activity above, as per Validation Procedure established by JCI CDM Center.

It is also agreed that Mr. Mutsuo KATO of JCI participates in the validation activities of the said project for the quality issues under its quality management scheme.

Signature

(Name) FATIAKI GIBSON
(Title) PROJECT DIRECTOR - NREP.

Validation Team

Validation Team	Name	Qualified Technical Areas related to the Project
Leader	Junji YOSHIZAWA	Hydropower (TA 1.2)
Member	Mutsuo KATO	Hydropower (TA 1.2)

Technical Reviewer	Takayuki ABE	Hydropower (TA 1.2)