



Voluntary Carbon Standard 2007

Validation Report

19 November 2007

Validation Report: 2009 IQ ME 154

Name of Verification company:	Date of the issue:
RINA SpA	18 th November, 2009
Report Title:	Approved by:
Final Validation Report of "50 MW Sipansihaporas Hydro Power Plant, North Sumatra"	Certification and Services Division Director  Roberto Cavanna
Client:	Project Title:
Pt. PLN (Persero)	"50 MW Sipansihaporas Hydro Power Plant, North Sumatra"

Summary:

RINA is performing a validation of the VCS(2007.1) project activity "50 MW Sipansihaporas Hydro Power Plant, North Sumatra" [/1/](#) on the basis of the Voluntary Carbon Standard 2007.1 (VCS 2007.1), [/44/](#) the VCS Program Guidelines 2007.1 as well as criteria to provide for consistent project operations, monitoring and reporting.

The validation consists of the following three phases: i) a desk review of the project design documents, ii) follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

Fifteen (15) Corrective Action Requests (CAR's) and Twenty (20) requests for Clarification (CL's) were identified. Upon the satisfactory resolution of these CAR's and CL's presented in this report, it is the validation team's opinion that the project is likely to meet the relevant Voluntary Carbon Standard 2007.1 ((VCS 2007.1) requirements and RINA recommends the project for registration.

Work carried out by:**Number of pages:**

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Appendix A: Validation Protocol

Abbreviation

ADB	Asian Development Bank
BM	Built Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism,
CL	Clarification Request
CM	Combined Margin
CO ₂ EF _i	Carbon dioxide Coefficient
DNA	Designated National Authority
DOE	Designated Operational Entity
FAR	Forward Action Request
GHG	Green house gas
GPS	Global positioning system
GWh	Giga Watt Hour
IDR	Indonesian Rupiah
IRR	Internal Rate of Return
kW	Kilo Watt
MEP	Monthly Electricity Protocol
MoV	Means of verification
MW	Mega Watt
MWh	Mega Watt Hour
NCV	Net Calorific Value
OM	Operating Margin
PLN	Perusahaan Listrik Negara
PP	Project Proponent
PPA	Power Purchase Agreement
PD	Project Design
QA/QC	Quality Assurance/Quality Control
RINA	RINA S.p.A
UNFCCC	United Nations Framework Conventions on Climate Changes
USD	United States Dollar
VCS	Voluntary Carbon Standard
VCUs	Voluntary Carbon Units
WACC	Weighted Average Cost of Capital

1 Introduction

The client has commissioned RINA to perform a validation of the "50 MW Sipansihaporas Hydro Power Plant, North Sumatra" [/1/](#). This report summarizes the findings of the validation of the project, performed on the basis of Voluntary Carbon Standard- Specification for the project level quantification, monitoring and reporting as well as validation and verification of green house gas emission reductions or removals, Voluntary Carbon Standard program guidelines (VCS 2007.1) [/43/](#), the subsequent decisions by the VCS board and the Host country criteria.

The validation was performed by the following team:

Role/Qualification	Last Name	First Name	Country
Team leader, VCS validator	Raghavan Nair	Reghu Kumar	India
VCS validator	Sharma	Shivraj	India
Observer	Mondal	Soumya Subhra	India

The draft validation report, including the initial validation findings, underwent a technical review before being submitted to the project participants. The technical review was performed by Rekha Menon qualified in accordance with RINA's qualification scheme for CDM/VCS validation and verification.

1.1 Objective

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

1.2 Scope and Criteria

The validation scope is defined as an independent and objective review of the VCS PD. The VCS PD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, Voluntary Carbon Standard program guidelines (VCS 2007.1), the CDM modalities and procedures as agreed

in the Marrakech Accords and the approved baseline and monitoring methodology (ACM0002, i.e. "Consolidated methodology for grid-connected electricity generation from renewable resources" - Version 10, EB 47 (valid from 11 June 2009 onwards) [/5/](#). The validation team has, based on the recommendations in the Validation and Verification Manual [/9/](#) employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of VCUs.

The validation is not meant to provide any consulting towards the project participants. However, stated Clarifications and/or Corrective Actions Requests may have provided input for improvement of the project design.

1.3 VCS project Description

The project is a 50 MW capacity [/16/](#), grid connected, run off river type hydro electric power generating unit. It is located in North Sumatra Province at about 344 km south of Medan city as the capital city of North Sumatra province and 12 km east of Sibolga, Tapanuli Tengah district, Sumatra, Indonesia. The principal structures of the Sipansihaporas project such as the main dam and waterway are situated in the downstream of the confluence of the three tributaries upstream of the Sipansihaporas River, which are Sarumanggita river, Natolbak river and Bargot river.

The total installed capacity of the Project is 50 MW, which comprised of a 33 MW and a 17 MW turbine [/16/](#), with annual energy generation of 214,800 MWh. The electricity generated by the project activity is transmitted to the Sumatra grid through the Sibolga PLN substations. The project is expected to reduce CO₂ emissions to the extent of 159,596 tCO₂e/year over the fixed crediting period of 10 years, with an expected operational life time of 30 years. [/1/ /2//4//16//19/](#)

1.4 Level of assurance

The level of assurance of validation report is reasonable which is based on documents and evidences submitted to the validation team. The same were verified by the validation team and based on review of them along with opinion of experts, the assurance is found reasonable.

2 Methodology

The validation consists of the following three phases:

- i) A desk review of the project design documentation
- ii) Follow-up interviews with project stakeholders
- iii) The resolution of outstanding issues and the issuance of the final validation report and opinion.

In order to ensure transparency, a validation protocol was customized for the project, according to the Validation and Verification Manual [/5/](#). The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

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

The validation protocol consists of two tables. The different columns in these tables are described in Figure 1.

The completed validation protocol is enclosed in Appendix A to this report.

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

- mistakes have been made with a direct influence on project results;
- validation protocol requirements have not been met; or
- There is a risk that the project would not be accepted as a VCS project or that emission reductions will not be certified.

The validation team may also use the term Clarification Request (CL), where:

- Additional information is needed to fully clarify an issue.

The validation team may also use the term Forward Action Request (FAR), where

- During the validation the highlight issues related to project implementation that require review during first verification of the project activity.

Validation Protocol Table 1: Requirement checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
<i>The checklist is organized in eight different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</i>	<i>This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). Clarification is used when the validation team has identified a need for further clarification.</i>

Validation Protocol Table 2: Resolution of Corrective Action and Clarification Requests			
Draft report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
<i>If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 1, where the Corrective Action Request or Clarification Request is explained.</i>	<i>The responses given by the Client or other project participants during the communications with the validation team should be summarized in this section.</i>	<i>This section should summaries the validation team's responses and final conclusions. The conclusions should also be included in Table 1, under "Final Conclusion".</i>

Figure 1 Validation protocol tables

2.1 Review of Document

The VCS PD of version 03, dated 10th November 2009 submitted by Pt. PLN (Persero) [/1/](#) and additional background documents ([/2/](#) to [/43/](#)) related to the project design and baseline were assessed by RINA.

2.2 Follow-up Interviews

On 31st October 2009, RINA performed interviews with project stakeholders ([/44/](#) to [/50/](#)) to confirm selected information and to resolve issues identified in the document review. Representatives of PT. PLN (Persero) and South Pole Carbon Asset Management Ltd. were interviewed. The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization(s)	Interview topics
PT. PLN (Persero), and South Pole Carbon Asset Management Ltd.	• Clarifications on establishment of baseline, monitoring plan and emission reduction calculations • Resources, training needs and procedures for operation and maintenance • Monitoring Plan / Records (backups) • Maintenance program (calibration) • Project boundaries • Baseline and project emissions • Emissions reductions calculations

2.3 Resolution of any material discrepancy

The objective of this phase of the validation is to resolve any outstanding issues, which needs to be clarified for RINA's positive conclusion on the project design.

The initial validation of the Project resulted in Fifteen (15) Corrective Action Requests and Twenty (20) Clarification Requests. Project participants were invited to respond to RINA's Clarification and Corrective Action Requests and include their response in Table 2 of the validation protocol, in Appendix A to which the project participant replied and resolved successfully.

To guarantee the transparency of the validation process, the concerns raised are summarized in chapter 3 below and documented in more detail in the validation protocol in Appendix A.

3 Validation Findings

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

The final validation findings will relate to the project design as documented and described based on the revised and resubmitted project design, VCS-PD, version 03 Dated 10th November 2009.

3.1 Project Design

The proposed project utilizes a run-off-river for generating electricity which would have been generated through power plants connected to the grid, that are mostly fossil fuel based power plants. In run off river hydro power generation, kinetic energy of water stream is converted into mechanical energy and subsequently into electrical energy. Water is taken from the intake structure, and then enters into the turbine through the high-pressure and non-pressure pipeline to produce electricity by driving the generators.

The water is taken from the Sibuluan River and another three lateral tributaries and is fed to turbines through the high pressure pipeline and it is then coupled to a generator thereby producing electricity.

The total installed capacity of the Project is 50 MW, which comprised of two units: first unit is of 33 MW (commissioned on 14 December 2004 /[12//13/](#)) and the second unit is of 17 MW capacity (commissioned on 21 October 2002 /[12//13/](#)), with annual energy generation of 214,800 MWh. [/16/](#) The project is located at North Sumatra Province at about 12 km east of Sibolga, Tapanuli Tengah, Sumatra, Indonesia. The project activity will generate electricity and export it to the Sumatra grid through the Sibolga PLN substations.

As per the VCS 2007.1 standard, 10 years crediting period is selected. The start date of the project activity is 21/10/2002(based on the earliest commissioning date of Units) [/12//13/](#) with an expected operational lifetime of 30 years. The project involves power generation in cascading as both units are in series.

The project is expected to reduce CO₂ emissions to the extent of 159,596 tCO₂e / year average over the 10 years crediting period. The start date of the crediting period is 1st April 2006.

The proposed project is not a grouped project. The project participants are PT. PLN (Persero). (as public entity) at Jakarta, Indonesia and South Pole Carbon Asset Management Ltd. (as private entity) at Zurich, Switzerland would be the coordinating entity on behalf of the project participants and VCS Manager of PT. PLN (Persero) is the Person in-charge, who holds the responsibility of Overall project monitoring and Project execution.

To guarantee the transparency of the validation process, the key issues raised are summarized in the chapter 3 and documented in more detail in the validation protocol in Appendix A.

The title of the project activity is "50 MW Sipansihaporas Hydro Power Plant, North Sumatra". The same has been verified through the Emission Reduction Purchase Agreement between PT PLN (Persero) and South Pole Carbon Asset Management Ltd. as proof of title for this project activity. [/18/](#)

The project has not participated in any other emission trading program nor applied for any other environmental credits, which has been verified during the validation and since the project has not applied for any other environmental credits, there is no question of getting rejected under other GHG programme. A letter of undertaking on this regard has been submitted addressing to the VCS registry stating that PP has not gone for any other form of environmental credits other than VCS, by Edward Batubara, sector manager of PT PLN (Persero) Sektor Pembangkitan Pandan. [/42/](#)

The proposed project has been validated against all the requirements of VSC 2007.1 and is found to be eligible under the VCS. [/43/](#)

3.2 Baseline

The project correctly applies the approved simplified baseline and monitoring methodologies ACM0002 - "Consolidated baseline methodology for grid connected electricity generation from renewable sources", (version 10, 11th June 2009, EB 47) [/5/](#)

The project activity satisfies the applicability criteria indicated in the methodology as mentioned below:

- The project activity is a new run of river type hydro power plant which is connected to a grid. The same was verified during the site visit by the validation team and through assessment of land agreement with department of forest [/24//25/](#)
- No capacity additions, retrofits or replacements involved in this project activity. The same was

verified through the loan sanction letter [/28/](#), contract agreement for turbines & generators [/10//11/](#) and through approved EIA copy [/23/](#) and found appropriate.

- The project activity is not a reservoir based hydro power plant. [/23/](#)
- This project activity is a new hydro power plant wherein no retrofit, replacement or capacity measures are applicable. The same was verified during the site visit and subsequent assessment of land agreement [/25/](#), approved EIA [/23/](#), feasibility study report [/16/](#), project and commissioning certificate [/12//13/](#).

The baseline selected is "Electricity delivered to the grid by the project activity that would otherwise have been generated by the operation of grid-connected power plants and by the addition of new generation sources". The combined margin emission factor is used here and is calculated as per the tool to calculate emission factor for an electricity system, version 2. The emission factor for the year 2008 is 0.743tCO₂/MWh as provided by the Indonesian DNA which was verified from the official declaration issued by the State Ministry of Environment on 19 January 2009 [/19/](#), the same has been verified by the validation team and found acceptable. It is selected as it is the most recent data available at the time of submission of PD to the DOE. The grid emission factor has been calculated as the combined margin with the operating margin being calculated ex-ante using a 3 year generation weighted average based on the most recent data available at the time of submission of the PD to the DOE for validation. The data values for the years 2005, 2006 and 2007 are used for calculating the operating margin emission factor and the build margin is based on the power plant capacity addition that comprise 20% of the system generation that have been built recently. The operating margin has been arrived at 0.906tCO₂e/MWh and the build margin at 0.581tCO₂e/MWh and the combined margin emission factor has been confirmed to 0.743tCO₂e/MWh and is fixed ex-ante for the crediting period. RINA has verified all the relevant documents and calculations and found it as appropriate and correct. [/19/](#)

As per the methodology the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the hydro power plant is connected to.

However, in case of identification GHG sources, sinks and / or reservoirs for the baseline scenario and for the

project is as per the table 5 of section 2.3 where CO2 is the emission source in the baseline emission which has been verified from the revised PD. There is no emission source in the project emission source in the project activity.

Additionality

PP has attempted to establish additionality of the project activity as per "Tool for the demonstration and assessment of additionality" (Version 5.2, EB 39) /6/

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

As per the guidance provided in the Validation and Verification Manual /9/ and approved consolidated methodology /5/, the baseline is defined in the methodology itself 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, and as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system", Version 02 /7/

Due to this consideration as per Validation and Verification Manual, Para 103 no further analysis is required on alternatives for alternatives for the proposed project activity.

Step 2: Investment Analysis:

Sub-step 2a: Determine the appropriate analysis method

The project activity will generate financial benefits other than VCS-Related income as it is selling the electricity to the grid. Hence the first option of the simple cost analysis method is not applicable.

The project activity doesn't have other comparable sources for the power generation as alternatives hence the PP chose the benchmark analysis. /5//9/

Sub-step 2b: Option III - Application of Benchmark Analysis

As per the argument made by the PP, the application of benchmark depends upon the likelihood of the development and further operation of the project. The benchmark will be determined by comparing the project IRR with benchmark rates available to a local investor. These could be provided by local banks, or investment bonds in the host country or it could be internally calculated, based on accepted models.

The following reviews were carried out during the assessment

a) Determining the appropriate analysis method

The project developer has chosen to apply the benchmark analysis method and has identified Project IRR as the most suitable financial indicator. Since the project developer is demonstrating the financial unattractiveness of the project, project IRR is appropriate as it is often used by the project developers to make a decision on investing in the project. Besides, the project will generate revenue from the sale of electricity.

Therefore project IRR can be accepted as the most suitable analysis method for this project activity.

b) Determining the suitability of the benchmark applied for the type of financial indicator presented

As per the additionality tool, the financial viability of the project may be demonstrated by comparing the project IRR against the benchmarks available for this type of financial indicators. The most accepted benchmarks are Investment bond rates, Government bond rates or benchmarks computed using internal and external data. One such benchmark may be computed through the Weighted Average Cost of Capital (WACC).

The project developer has chosen to use WACC as the benchmark for the project. The project is partly financed by debt and partly by equity. The loan agreement had been signed only after the decision to invest in the project had been taken. However the PP has chosen to use this rate to demonstrate the conservativeness of the benchmark. The rate mentioned in the feasibility report is 10% for a USD loan and the equity component is funded the government Indonesia in form of an APBN (Anggaran Pendapatan dan Belanja Negara) or government's budget.

To arrive at the correct WACC, the following steps are followed:

Determining the cost of debt

The revenue and costs of operation are in Indonesian Rupiah (IDR) and the investment cost as well as the funding is in USD hence the project is exposed to currency risk arising from the fluctuation of the IDR and USD. The project developer has therefore converted the interest rate on the USD loan into its equivalent IDR using the Interest rate Parity method.

Interest rate parity plays an essential role in foreign exchange markets, linking interest rates, spot exchange rates and foreign exchange rates. Interest rate parity follows the theory that the interest rate differential between two countries is equal to the gap between the forward exchange rate and the spot exchange rate. In

fact, the interest rate parity assumes that the actions of investors trigger corresponding changes in the exchange rates as well. We therefore consider it appropriate to use this method to determine the equivalent IDR rate.

This comprises:

Determine the 1-year IDR/USD Future Spot Rate using Fisher1. This is calculated using the spot IDR/USD exchange rate in 1996 and applying the US and Indonesian inflation rates for 1996. The future spot rate thus calculated is IDR 22.90. The formula used is

$$S_{t+1} = S_t \times \frac{1 + \text{inf}_{IDR}}{1 + \text{inf}_{USD}}$$

Parameters	Description	Value	Base
St	IDR/JPY Spot Rate	21.42	JPY/IDR exchange rate in 1996
St+1	1-year IDR/JPY Future Spot Rate	22.90	Calculated
infIDR	IDR inflation rate	6.996%	IDR Inflation Rate in 1996
InfUSD	JPY inflation rate	.099%	JPY inflation rate in 1996

Using the future spot rate as calculated above, the PP has calculated the cost of debt using Fisher 2. The equivalent interest rate calculated thus is 9.66%. The formula used is

$$S_{t+1} = S_t \times \frac{1 + CD_{IDR}}{1 + CD_{USD}}$$

Parameters	Description	Value	Base
St	IDR/JPY Spot Rate	21.42	JPY/IDR exchange rate in 1996
St+1	1-year IDR/JPY Future Spot Rate	22.90	Calculated
CdJPY	JPY cost of debt	2.6%	Loan interest and capital payment disbursement
CdIDR	IDR equivalent cost of debt	9.66%	Calculated

Determining the cost of equity

In determining the cost of equity, the project participant had two methods to choose from:

The Capital Asset Pricing model which is the most commonly used model to determine expected rate of return from a project. However the model assumes a certain level of maturity in the domestic market. The Indonesian market in 1996 was still very immature and developing hence the market return for 1996 was unavailable.

The Ashwath Damodaran Model [/34/](#) based on country risk premiums. The project proponent has chosen to use this model to compute the cost of equity.

Parameter	Value	Source
Risk free rate	6.71%	Average value in 30 June and 30 December 1996.
Beta	0.83%	lowest beta for electricity generation, distribution, and transmission, integrated in 2003 - 2008; according to Prof. Damodaran.
Equity market risk + country risk	13.33%	Total risk premium Indonesia average 1992 - 1996, calculated using Interest Rate Parity Fisher model based on inflation during the period 1992-1996 and 2000 - 2005 and total risk premium Indonesia during the period 2000-2005.
Expected Cost of Equity	17.37%	Calculated. Cost for investing in Equity

The country risk premium for 1992-96 is unavailable and the Project proponent has calculated the equity risk and country risk premium for 1992-96 by applying the interest parity model to the average risk premium for 2000-05. The average inflation rate for 2000-05 is 8.39% and for 1992-96 it is 8.43%. The difference between the two is

insubstantial and hence it is assumed that the economic conditions prevalent between the two periods are similar. In the absence of other verifiable economic data, the validation team has accepted this point. The interest parity model has then been applied to arrive at the rate of 13.33%.

Determining the Weighted Average cost of capital (WACC)

WACC is defined as the weighted average of the costs of the different components of financing used by the firm. The expected cost of equity is 17.37% and the cost of Debt is 9.66%. Together with a tax rate of 30%, the WACC is works out to 10.72%.

The tax rate of 30% has been verified by us against a report on Indonesian tax system prepared by Deloitte Tax Solutions.¹

The terms of the debt are extracted from the Feasibility Report prepared in 1985. However since that date, the PP has obtained finance in Japanese Yen from Japan Bank of International Co-operation.

After assessing the financial calculation /3/ submitted by the PP along with the loan sanction letter /28/ and contract agreement with equipment suppliers /10//11/, the benchmark was found to be appropriate for this project activity.

c) Parameters and assumptions used and verification of the parameters and assumptions against third party documents:

Three important parameters that are used to compute the cash flow are,

▫ Project cost :This comprises:

- Preparatory works
- Intake dam
- Tributary intake
- Regulating pond
- Waterway
- Penstock line
- Powerhouse and tailrace
- Switch yard
- Generating equipment

¹ <http://www.deloitte.com/dtt/cda/doc/content/Indonesi.pdf>

- Transmission line and
- Other engineering work.

The project cost has been extracted from the Feasibility report prepared by Japan International Co-operation Agency in July 1990.

- The project cost has been extracted from the Feasibility report prepared by Japan International Co-operation Agency in July 1990.
- Estimation of profits and incomes: This comprises
 - Gross electricity revenue
 - Operating and management expenses
 - Depreciation.
 - Tax costs
 - Gross Electricity revenue

This is comprises electricity tariff and the estimated annual electricity generation. The Electricity tariff is obtained from the official transfer price document. The project proponent has calculated the average annual increase in tariff to be .028% based on the average annual increase for the period 1990-1994. The Annual generation is derived from the Feasibility Report prepared by Japan International Co-operation Agency in 1990.

Operating and management expenses

Operating and management expenses are in line with the Completion Report. The Project proponent has assumed an annual increase of 5% of operating costs which is conservative given the inflation levels.

Depreciation

Depreciation has been calculated on a straight line basis over 30 years. The project is expected to have a life of 30 years. The plant and machinery are expected to have a residual value of 5% of the cost.

- d) All costs have been verified against the Feasibility report prepared by Japan International Co-operation Agency in 1990. We have also checked and found correct the formula used in the financial analysis.

The total project IRR based on the above numbers is 3.78%.

e) Sensitivity analysis:

A sensitivity analysis that supports the robustness of the conclusion arrived at by varying the critical

assumption has been carried out. The project developer has identified the following parameters as the most critical parameters:

1. electricity tariff;
2. electricity generation
3. total investment
4. operational cost.

The table showing results on IRR with +/-10 % as per above mentioned parameters:

Scenario	% change	IRR (%)
Original		3.78%
Increase in Tariff	10%	4.53%
Increase in Electricity Generation	10%	4.53%
Reduction in Investment Costs	10%	4.38%
Reduction in Operational Costs	10%	4.01%

The following table shows the changes required to the critical assumptions so that the IRR can cross the benchmark of 12.75%:

Scenario	% change	IRR (%)
Original		3.78%
Increase in Tariff	121%	10.72%
Increase in Electricity Generation	121%	10.72%
Reduction in Investment Costs	62%	10.72%
Reduction in Operational Costs	100%	5.82%

Financial results of the project without carbon finance:

➤ Increase in Tariff/ Electricity Generation:

Based on the tariff increases over the period 1990-94, it seems highly unlikely that the tariff will increase beyond 10% per annum. In order for the IRR to cross the benchmark of 10.72%, the tariff needs to increase by 121% - a highly unlikely scenario.

➤ Reduction in investment costs

Most of the costs of the project has already been incurred hence there is not likely to be any material change in the investment costs incurred. Project costs need to reduce by at least 62% for the IRR to cross the benchmark which will not take place.

➤ Reduction in operational costs

Even if operation and maintenance cost were reduced by 100%, the calculated project IRR would still be under the benchmark. All operations will incur a certain amount of operation costs therefore to envisage a reduction of 100% in operational costs is not practical.

Other financial issues:

The DOE has reviewed the financial statements of PLN for the period 1999 to 2002 and have noted the following:

1. The company has been suffering from operating losses since 1999. The operating loss for 2002 was IDR 8,152 billion.
2. There has been a sharp increase in the values of the fixed assets held in 2002 on account of a revaluation exercise. This is unrealized profit
3. The rate of return on net average asset has been negative throughout this period.

The validation team also examined the report prepared by the Asian Development bank /[38](#)/ in July 2003 and noted the following:

1. PLN has been unable to meet the covenant requirements stated in the loan documents.
2. The financial position of PLN has been affected on account of the Asian financial crisis.
3. The Government's reluctance to increase tariffs has affected PLN's ability to meet its covenants.
4. PLN has over the last few years developed good internal controls which will help its financial position in the long run.

Step 4: Common Practice Analysis

As per the government data, the potential for hydro power in Indonesia is 75000 MW wherein only 3200 MW has been utilized /32/. These figures include project activities developed by captive generation by private entities and by the project proponent.

For this project activity, Northern Sumatra has been taken as the region where in four hydro projects are being implemented, since at the time of decision taking two separate grids were in existence in Sumatra island.

Sub-step 4a: Analyze other activities similar to the proposed activity:

As per the 1997 data which was available for Northern Sumatra grid, Out of 12,84,940 kW installed capacity these hydro power plants consisted of 7,500 kW capacity which is 0.58 % of the total capacity. The same has been verified from the spread sheet for emission factor calculation from the Indonesian DNA.

Sub-step 4a: Analyze other activities similar to the proposed activity:

Hydro power plant located in the northern Sumatra region which are mentioned in the table below:

Hydro Power Plant in Southern Sumatra	Total Installed capacity (kW)	Year of commissioning
PLTM-1 BATANG GADIS	450	1994
PLTM-2 BATANG GADIS	450	1994
PLTM-1 BOHO	200	1989
PLTM-1 AEK RAISAN	750	1989
PLTM-2 KOMBIH	750	1988
PLTM-2 TONDUHAN	200	1988
PLTM-4 KOMBIH	750	1988
PLTM-1 AEK SILANG	750	1988
PLTM-1 TONDUHAN	200	1987
PLTM-1 KOMBIH	750	1987
PLTM-3 KOMBIH	750	1987
PLTM-2 AEK RAISAN	750	1987
PLTM-1 AEK SIBUNDONG	750	1987
PLTA ASAHAN	603,000	1983

As per the declaration of the Ministry of Environment, Government of Indonesia, No. 17/2001, all hydroelectric power plants with a dam height of ≥ 15 meters, or flooded area of ≥ 200 ha, or installed capacity of ≥ 50 MW need

to undertake an Environmental Impact Assessment (EIA). Projects with an installed capacity of less than 50MW were thus excluded from the analysis, considering this declaration it is not possible to obtain information about small scale hydro projects.

Asahan hydro power project is a reservoir based hydropower plant constructed and operated by private developer in joint venture. Asahan hydro power project is not connected to the Northern Sumatra grid. Besides Asahan hydro power plant is a joint venture between the government of Indonesia and a consortium of 12 Japanese companies. Owing to this it did not face any difficulties to obtain finance for the project. The project activity is the only run-off-river hydropower project in the region on large scale which is connected to the northern Sumatra grid and therefore it can't be compared with Asahan hydro power plant.

Hence considering all arguments above and subsequent verification of all relevant evidences supporting these arguments, it was concluded that the project is additional and VCS revenue enable PLN to improve the financial viability of this project activity.

3.3 Monitoring Plan

The project applies the approved monitoring methodology ACM 0002 "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources", version 10, 11 June 2009. [/5/](#)

The project activity essentially consists of generating power from hydro potential, a renewable resource, and feeding it to the Sumatra grid. The installed capacity of the project is 50 MW. Accordingly, the methodology requirement of "Metering the Electricity Generated" is in place for the project activity.

Monitoring plan consists of parameters required for monitoring during the crediting period for estimation of emission reduction. Such parameters are,

- the amount of amount of electricity exported to the grid,
- the amount of electricity imported from the grid,
- captive consumption and diesel consumption by the project activity.

Measurement of electricity supplied will be done continuously, which will also be recorded continuously. As the meters are installed at the switchyard near to the generation point the Transmission and Distribution losses are negligible. Metering is done separately for the net

electricity exported to the grid accounting for the captive consumption. Electricity exported to the grid can be verified by the readings of a check meter. The meters installed are of standard quality and the calibration of the meters is governed by recommendations from equipment manufacturer. However the same will be carried out annually. Meters for monitoring of energy generated, consumed and exported to grid are of 0.2s accuracy class to ensure accurate measurement. Monthly readings of power exported to the grid are jointly signed through Monthly Electricity Protocol (MEP) by the official representatives of PLN Renun generating unit and PLN transmission unit that may be counter verified by monthly invoices raised, the same has been verified through the standard operating procedures and the method mention in the monitoring plan. [/1//39/](#)

As discussed in the section 3.4 of the report, the project emission through the usage of Diesel based Generator Set comes to less than 1% of the total emission of reduction. However, the PP has chosen to monitor the amount of fuel used to ensure transparency and conservative approach which is found acceptable. Recording of the same will be done through the log book which will be maintained throughout the crediting period and two years after the end of the crediting period. [/22/](#)

The emission factor is based on the data published by Indonesian DNA and is applied on an ex-ante basis and fixed for the crediting period. [/4/](#) [/19/](#) All data, including the Emission Factor data of grid emissions, will be archived in paper and electronic format until two years further to the crediting period.

As per the monitoring plan in order to ensure quality assurance on effectiveness adjustment will be made in the event of: any seal securing the metering system is broken, the system fails to register, or the measurement result is found (upon testing) to vary more than the allowable error from the standard meter used in the test. If the accuracy is failing to meet the rated 0.2s level(It is the allowable error limit), the production meter and own consumption meter which are also located at generation site, will be used as cross-check meters, measuring the quantity of electricity exported from the project. These meters also would be subject to annual calibration schedule and records would be maintained by the PP. The difference between electricity produced and consumed on-site shall be valid for claiming carbon credits. In the special case of total failure of all meters no credits will be claimed during such period. This approach is conservative and hence accepted. [/21/](#)

3.4 Calculation of GHG Emissions

Baseline emission is calculated as the product of net electricity supplied to the grid that is 214800 MWh //. The project is expected to reduce CO₂ emissions to the extent of 159,596 tCO₂e / year average over the 10 years crediting period. The combined margin emission factor of the grid which is calculated as per the tool to calculate emission factor of an electricity system, version 2, EB 50. As discussed in the section 3.2, CM emission factor for Sumatra grid is selected as 0.743tCO₂e/MWh. The same has been verified from the emission factor calculation spreadsheet provided by Indonesian DNA. [/4/](#) [/19/](#)

The project activity doesn't result in new reservoir or increase of existing reservoir and the power density of the project activity (281W/m²) is well above 10W/m². So emission due to water reservoir of hydro power plant is considered zero for this project activity.

According to the approved consolidated methodology ACM 0002, Version 10, emission due to leakage is not applicable for this project activity.

A diesel generator is used as a backup in this project activity. The maximum quantity of diesel consumed is found to 720litres in a year. The value for the Diesel consumption has been taken from the plant record and it was verified during the site visit by the validation team. The value of 108 litres has been taken out of the highest consumption value for the year (2008) [/29/](#). The emission calculated due to this is found to be 0.28t CO₂/year. The same has been carried out as per "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion" [/8/](#). Since the value is too small(less than 1%) compared to the baseline emission, this can be neglected. Hence the project emission is taken to be Zero. However, the PP will monitor the amount of Diesel consumed annually which is appropriate and conservative.

3.5 Environmental Impact

According to the Decree of the Ministry of Environment No. 17/2001, all hydroelectric power plants with a dam height of ≥ 15 meters, or flooded area of ≥ 200 ha or installed capacity of ≥ 50 MW need to undertake an Environmental Impact Assessment (EIA) [/23/](#) The installed capacity of Sipansihaporas Hydroelectric Power Plant is 50 MW and dam height is 38 meter. So the PP i.e PT PLN (Persero) has undertaken Environmental Impact Assessment for the project activity. RINA had checked the copy of the same and was found appropriate. Certain impacts that may affect the environment during the pre construction phase, construction phase and operation phase were found

and the mitigation measures were suggested and defined. Project also supports the sustainable development.

With all these mitigation measures and contribution to the sustainable development, project has a positive impact on the local and global environment.

3.6 Comments by stakeholders

A stakeholder consultation meeting was held on September 17th, 2004. The persons who attended the meeting included the village chief, local leaders, people from local organisation, NGO and those who live nearby the hydro power plant. RINA has checked the attendance list, pictures and verified the same and found that no negative comments were received from the stakeholders during the meeting which is prime requirement for any project developer to obtain the land deed agreement with the Department of Forestry. RINA has verified the land deed agreement issued by the Department of Forestry and has concluded that the stake holder consultation was completed as per the requirement. The validation team is of the opinion that there was fair representation and opportunity given to the stakeholders and also noticed that no negative comments were received from the stakeholders during the meeting. /30/

4 Validation conclusion

RINA has performed the validation of the "50 MW Sipansihaporas Hydro Power Plant, North Sumatra" at Sibolga, Indonesia, on the basis of Voluntary Carbon Standard program guidelines (VCS 2007.1), the subsequent decisions by the VCS Board and the Host Country criteria as well as criteria given to provide for consistent project operations, monitoring and reporting.

The project activity involves hydro power as a source of energy to generate and clean electricity clean heat energy. The project activity exports clean electricity, produced from the renewable energy source (Hydro Source) to the national grid, thus reduces greenhouse gas emissions by displacing fossil-fuel electricity from the grid.

In the course of the draft validation 15 CAR and 20 CL were raised and the same were closed upon appropriate justification/explanation and correction by the project proponent. The review of the project description and additional documents related to baseline and monitoring methodology, subsequent background investigation, follow-up interviews and review of comments by parties, local stakeholders, and consultant has provided RINA with sufficient evidence to validate the fulfillment of stated criteria.

As per VCS standard 2007.1, the project is not a grouped project activity and aims to reduce 159,596 tCO₂e per year with 10 years crediting period. The emission reductions achieved due to the project activity are real, measurable and give long term benefits and that are additional to what would have occurred in the absence of project.

The validation has confirmed that the project correctly applies the baseline and monitoring methodology as per approved consolidated methodology ACM 0002, i.e. "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", Version 10, dated 11/07/2009. The determination of baseline was elaborate, transparent and sufficiently supported with facts. The selected baseline scenario is reasonable and appropriate for the chosen crediting period. Moreover, an analysis of barriers facing the project demonstrates that project is not a likely baseline scenario and hence additional.

The monitoring plan is complying with requirement of the methodology. The monitoring plan includes all relevant parameters. Responsibilities and authorities for project

management, monitoring and QA/QC procedures have also been stated in the final version of VCS PD (version 3, dated 10th November, 2009). A local stakeholder consultation has been carried out by the project participant.

In detail, RINA's opinion can be summarized as follows:

1. The project meets all relevant VCS 2007.1 requirements and all relevant host country criteria (Indonesia)
2. It correctly applies approved consolidated methodology ACM 0002 – "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", Version 10, dated 11/07/2009.
3. The project additionality is sufficiently justified in VCS PD.
4. Monitoring plan is transparent and adequate.
5. Calculations of project emission reductions are carried out in transparent manner. The calculated emission reductions are 159,596 tCO₂e per year for 10 years crediting period.

Hence, RINA recommends and requests the registration of "50 MW Sipansihaporas Hydro Power Plant, North Sumatra" as a VCS project activity.

5 References

Category 1 Documents:

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

/1/	VCS PD of "50 MW Sipansihaporas Hydro Power Plant, North Sumatra", version 03, dated 10 November 2009.
/2/	"090923_ER Calculation Sipansihaporas_hh_ph rev"- Emission reduction calculation sheet.
/3/	"091006_Financial Analysis Sipansihaporas_Initial Design_hh_pfh_ph_30yrs3"- IRR calculation sheet.
/4/	"Updating Baseline EF Sumatera 2008 Final" - Combined Margin Calculation Sheet done by Indonesian DNA.
/5/	"CDM Executive Board: ACM0002 "Consolidated baseline methodology for grid connected electricity generation from renewable sources" - Version 10, EB 47 (dated 11 July 2009 onwards).
/6/	"Tool for demonstration and assessment of additionality", version 05.2
/7/	"Tool to calculate emission factor for an electricity system", version 02
/8/	"Tool to calculate project or leakage CO2 emissions from fossil fuel consumption", version 02
/9/	Clean Development Mechanism Validation and Verification Manual, Version 01, Annex-3, EB-44. http://cdm.unfccc.int/EB/044/eb44_repan03.pdf
/10/	Copy of Contract agreement for generator and 150kV transmission line for Sipansihaporas Hydroelectric Power Project Between PT PLN (Persero) and Sumitomo Corporation. Contract No. 307.PJ/063/DIRUT/1998
/11/	Copy of Contract agreement for Turbine for Sipansihaporas Hydroelectric Power Project Between PT PLN (Persero) and Sumitomo Corporation. Contract No. 025.PJP/922/1998/M
/12/	Copy of Commissioning Certificate of Unit 1 issued by PT PLN(Persero) JASA SERTIFIKASI on 14 th December 2004. Certificate No. 111/011A.04 SKT-JS.2004
/13/	Copy Commissioning Certificate of Unit 2 issued by PT PLN(Persero) JASA TEKNIK KELISTRIKAN on 21 st October, 2002 Certificate No. 105/056D-02/UIT.JKT/2002
/14/	Copy of Sipansihaporas_Confirmation of PLN Cerfication Body Letter No. 292.K/010/DIR/2003
/15/	Copy of Letter of confirmation stating that PS and Unit are same, provided by PT PLN (Persero) Pembangkitan Sumatera Bagian Utara Sektor Pandan, dated 17the September 2009.
/16/	Feasibiltiy Study Report on Sipansihaporas Hydroelectric Power Development Project provided by Japan International Co-operation Agency, dated July 1990.

VCS 2007 Validation Report Template

/17/	Interest rates from 1986 to 1997, source Bank Indonesia, Ministry of Finance, Republic of Indonesia. Budget 1997/1998.
/18/	Emission Reduction Purchase Agreement signed between PT PLN (Persero) and South Pole Carbon Asset Management Ltd. Dated 18 th November 2008.
/19/	Letter provided by the State Ministry of Environment, Government of Indonesia for the emission factor in Sumatra grid dated 19 January 2009
/20/	Calibration certificates for main meter of Unit I (SL. No. 36027177) and main meter of Unit II (SL. No. 36027137)
/21/	Copy of letter of confirmation provided by Edward Batubara, sector manager of PT PLN. Dated 17 th September 2009. Regarding meter malfunctioning.
/22/	Copy of Log Book of diesel consumption for the period of 2006 to 2009.
/23/	Copy of Environmental Impact Assessment report
/24/	Copy of clearance provided by the Ministry of Forestry of Indonesia.
/25/	Copy of Land deed agreement between KANTOOR WILAYAH DEPARTEMEN KEHUTANAN DAN PERKEBUNAN PROPINSI SUMATERA UTARA and PT PLN. Dated May, 2000.
/26/	Copy of the layout plan of Sipansihaporas Hydro Power Plant.
/27/	Copy of list of employees who had undergone training
/28/	Copy of Loan Agreement, dated 4 th December.
/29/	Supporting Evidence of Diesel Density provided by PT PLN (Persero)
/30/	Copy of Stakeholders Consultation Report, dated September, 2004.
/31/	Copy of Confirmation Letter from PT PLN regarding signing authority.
/32/	Report on Indonesian power sector by EU
/33/	Paper published on Global Finance by Maximo V. Eng, Frances A. Lees, Laurence J. Mauer.
/34/	A textbook on Security Analysis for Investment and Corporate Finance by Aswath Damodaran.
/35/	Evidence for the Indonesian Inflation rate.
/36/	A book on Banking Disintermediation and its Implication for Monetary policy: The case of Indonesia.
/37/	Literature on Estimating Equity Risk Premiums by Aswath Damodaran
/38/	Report on Impact Evaluation Study of ADB Assistance to the power sector in Indonesia
/39/	Copies of Standard Operation Procedures for calibration, monitoring, metering and emergency preparedness.
/40/	Technical Specification of turbine
/41/	Technical Specification of generator
/42/	Undertaking letter from PT PLN.
/43/	VCS 2007.1 Guideline

Persons interviewed:

List persons interviewed during the validation, or persons contributed with other information that are not included in the documents listed above.

/44/	Mr. Henricus Hutabarat, CDM Development Manager - Indonesia, South Pole Carbon Asset Management Ltd
/45/	Yubel Sitompul, PT PLN
/46/	Randy Z, PT PLN
/47/	Herbert Manurung, PT PLN
/48/	Abd. Rashid, PT PLN
/49/	M. Khoikul.H, PT PLN
/50/	P. Eitorus

APPENDIX A

VCS 2007.1 VALIDATION PROTOCOL

This document contains a generic Validation Protocol for VCS projects, which must be seen in conjunction with the Validation and Verification Manual and the Validation Report Template. The entries in the protocol should be adjusted and amended as appropriate to prepare for the validation of a particular project.

This validation protocol serves the following purposes:

- *It organizes, details and clarifies the requirements a VCS project is expected to meet; and*
- *It ensures a transparent validation process by inducing the Validator to document how a particular requirement has been validated and which conclusions have been reached;*

This protocol contains two tables with generic requirements for validation projects. Table 1 consists of a checklist with validation questions. The checklist questions may not be applicable for all investors, and should not be viewed as mandatory for all projects. Where a finding is issued, a corrective action request or clarification request are stated. The resolution and final conclusions of these requests should be described in Table 2 of this protocol.

Before this generic validation protocol can be applied to validate a specific project, the Validator must review and adjust/amend the protocol to make it applicable to individual project characteristics and circumstances as well as individual investor criteria. The application of the validator's professional judgment and technical expertise should ensure that checklist amendments cover all necessary specific project requirements that have impact on project performance and acceptance of the project. Given the above, the checklist part of the protocol is neither exhaustive nor prescriptive.

Requirement Checklist

Table-1

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
1. General Description of Project Activity. <i>The project design is assessed.</i>					
1.1. Title of the project activity.					
1.1.1. Is the title of the project activity, version number and date of document (VCS PD) clearly mentioned?	<u>/1/</u>	603,000	The title of the project is “50 MW Sipansihaporas Hydro Power Plant, North Sumatra” version 01.		OK
1.2. Type/Category of the project.					
1.2.1. Is the project category part of a VCS Boardapproved GHG Program?	<u>/1/</u>	DR	Project is categorized under sectoral scope 1, Energy Industries (renewable/ non renewable resources).. Clarification Request: Provide the copy of feasibility study report.	CL-1	OK
1.2.2. Is the project activity a grouped project?	<u>/1/</u>	DR	The project activity is not a grouped project.		OK
1.3. Estimated amount of emission reductions over the crediting period including project size.					
1.3.1. Is the project a micro project, project or a mega project? • micro projects: under 5,000 tCO ₂ e per year; • projects: 5,000 - 1,000,000 tCO ₂ e per year; and • mega projects: greater than 1,000,000 tCO ₂ e per year	<u>/1/</u>	DR	Clarification Request: 1. The number of turbines installed in the project activity is not clear in this section.	CL-2	OK
1.3.2. Are the total and annual estimated emission reductions defined?	<u>/1/</u>	DR	The total amount of estimated emission reduction is 1,595,960 tCO ₂ . Annual average of the estimated reductions over the crediting		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			period is 1,59,596 tCO ₂ .		
1.4. A brief description of the project.					
1.4.1. Has the project been properly described?	<u>/1/</u>	DR/I	The project is a run-off river hydropower plant in North Sumatra Province in Indonesia. It utilizes the hydrological resources of the Sibuluan River along with three other lateral tributaries to generate zero emission electricity. The total capacity of the project is 50 MW which is generated with the help of one 33 MW turbine and one 17 MW turbine. The electricity generated by the project activity is transmitted to Sumatra Grid through the Sibolga PLN substations. Clarification Request: “According to the national energy policy, the potential capacity of hydro resources in Indonesia is 75,000 MW of which only 4,200 MW has so far been used to generate electricity (including captive power and private entities)” – The statement is not matching with the reference provided.	CL3	OK
1.5. Project location including geographic and physical information allowing the unique identification and delineation of the specific extent of the project					
1.5.1. Is the location of the project activity	<u>/1/</u>	DR	Project activity is located in North Sumatra		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
clearly defined, including details of the physical location and information that allows its unique identification and delineation of the specific extent of the project? <i>GPS -boundaries- coordinates included?</i>			province, Indonesia. The exact location mentioned is 01° 44' North and 98° 51' East. Clarification Request: Provide evidence for unique physical identification of the project site.	CL-4	
1.6. Project activity and crediting period Start dates.					
1.6.1. Is the project start date (<i>the date the project activity began reducing or removing GHG emissions</i>) correctly mentioned?	<u>/1/</u>	DR	Clarification Request: 1. Though the commissioning dates are given, the start date of the project activity is not transparently given in PD. 2. Inconsistency noticed in the Commissioning Certificate in case of Unit name and Signing Authority who has issued the commissioning certificate.	CAR-1	OK
1.6.2. Is the project crediting period start date (<i>the date on which the first monitoring period commences</i>) correctly mentioned? <i>The earliest Project Crediting Period Start Date under the VCS 2007.1 shall be 28 March 2006 for non-AFOLU projects and 1 January 2002 for AFOLU projects.</i>	<u>/1/</u>	DR	The starting date of the crediting period is 1 st April, 2006.		OK
1.6.3. Is the project crediting period clearly mentioned? <i>For non-AFOLU projects and ALM projects focusing exclusively on emissions reductions of N₂O, CH₄ and/or fossil-derived CO₂, a maximum of 10 years which may be renewed at</i>	<u>/1/</u>	DR	Yes, the crediting period is clearly mentioned.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
<i>most two times. For AFOLU projects other than such ALM projects, a minimum of 20 years up to a maximum of 100 years.</i>					
1.7. Conditions prior to project initiation.					
1.7.1. Are the conditions prior to the initiation of the project clearly mentioned?	<u>/1/</u>	DR	Clarification Request: Conditions prior to the project activity are not clearly mentioned.	CL-5	OK
1.8. A description of how the project will achieve GHG emission reductions and/or removal enhancements.					
1.8.1. Is it explained how the project activity reduces GHG emissions, i.e. technology, measures?	<u>/1/</u>	DR	The project activity utilizes a run-off-river to generate emission free electricity which otherwise would have been generated through power plants connected to the Sumatra grid (mostly fossil-fuel-based power plants).		OK
1.9. Project technologies, products, services and the expected level of activity.					
1.9.1. Is the technical description of the project clearly stated?	<u>/1/</u>	DR	Yes. The technical description of the project is clearly mentioned. Corrective Action Request: Technical specification of all equipments, installed at the project site, is not transparent Clarification Request: 1. Provide copy of project's site layout plan. 2. Provide copy of the purchase orders of	CAR-2 CL-6	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			all equipments installed at the project site. 3. Equipments have been procured from another country. Provide justification for that and also the name of the technology provider. 4. Provide for all the data specified in Table 2 of section 1.9.		
1.9.2. Are the products, services and expected level of activity clearly mentioned?	<u>/1/</u>	DR	Yes. The products, services and expected level of activity is mentioned.		OK
1.9.3. Does the project involve transfer of technology?	<u>/1/</u>	DR	Clarification Request: Whether transfer of technology is involved in the project activity or not is not clear.	CL-6	OK
1.9.4. Is the technology used environmentally safe and sound?	<u>/1/</u>		The project activity utilizes a run-off-river to generate emission free electricity which otherwise would have been generated through power plants connected to the Sumatra grid (mostly fossil-fuel-based power plants). So the technology used in this project activity is environmentally safe and sound.		OK
1.9.5. Does the project require extensive initial training and maintenance efforts in order to be carried out as scheduled during the project period?	<u>/1/</u>	DR	Prior to the project commissioning, a series of training was organized for the employees by the project participant. The purpose of the training is to enable the local staff to perform regular and safe operation and maintenance. Clarification Request:	CL-6	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
			Provide documents on training procedures provided to the employees.		
1.10. Compliance with relevant local laws and regulations related to the project.					
1.10.1. Does the project comply with laws and regulations of the Host Country?	<u>/1/</u>	DR	Clarification Request: Provide copy of construction permit, EIA report and other regulatory clearances which are applicable in this project activity.	CL-7	OK
1.11. Identification of risks that may substantially affect the project's GHG emission reductions or removal enhancements.					
1.11.1. Are the risks that may affect the project's GHG emission reductions or removal enhancements been identified?	<u>/1/</u>	DR	Corrective Action Request: Identified risks need to be elaborated.	CAR-3	OK
1.12. Demonstration to confirm that the project was not implemented to create GHG emissions primarily for the purpose of subsequent removal or destruction.					
1.12.1. Does the project clearly state that it was not implemented to create GHG emissions primarily for the purpose of subsequent removal or destruction?	<u>/1/</u>	DR	Clarification Request: Justify why this section is not applicable for this project.	CL-8	OK
1.13. Demonstration to confirm that the project has not created another form of environmental credit (for example renewable energy certificates)					
1.13.1. Has the project created any form of	<u>/1/</u>	DR	The project has not created any form of		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
environmental credit?			environmental credits.		
1.13.2. Has supporting documents been provided to prove the above statement?		DR	Clarification Request: PP has to provide an undertaking letter addressed to the VCS registry stating that they have not will not go for any other form of environmental credits other than VCS.	CL-9	OK
1.14. Project rejected under other GHG programs (if applicable).					
1.14.1. Has this project being rejected by other GHG programs due to procedural or eligibility requirements?	/1/	DR	Refer to section 1.13.2	CL-9	OK
1.14.1.1. If it was rejected, it is mentioned the reason for the rejection in the VCS PD? <i>Such information shall not be deemed commercially sensitive information.</i>	/1/	DR	Refer to section 1.13.2	CL-9	OK
1.14.1.2. Was (were) the actual rejection document(s) provided to the VCS Program Validator/Verifier?	/1/	DR	Refer to section 1.13.2	CL-9	OK
1.14.1.3. Is the project validated against the VCS2007.1 program requirements?	/1/	DR	Refer to section 1.13.2	CL-9	OK
1.15. Project proponents' roles and responsibilities, including contact information of the project proponent(s), other participants.					
1.15.1. Are the roles and responsibilities of the project proponent and other participants incorporated?	/1/	DR	The roles and responsibilities of the project proponent and other participants are clearly mentioned. PT. PLN(Persero) is the project	OK	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
			owner and operator and South Pole Carbon Asset Management Ltd. is the Carbon Credit buyer.		
1.15.2. Does the contact information of the project proponent and other participants mentioned?	/1/	DR	Yes. The contact information of the project proponent and other participants mentioned. The project participants involved in this project activity are PT. PLN (Persero). (as public entity) and South Pole Carbon Asset Management Ltd. (as private entity)		OK
1.16. Any information relevant for the eligibility of the project and qualification of emission reductions or removal enhancements, including legislative, technical, economical, sectoral, social, environmental, geographic, site-specific and temporal information.					
1.16.1. Does the VCS PD provides any information regarding the eligibility and qualification of emission reductions or removal enhancements, including legislative, technical economical, sectoral, social, environmental , geographic, site-specific and temporal information?	/1/	DR	Clarification Request: 1. Please elaborate how the project is going to contribute to the development of the region by increasing community development and corporate social responsibility of PT. PLN (Persero). 2. The term “grid frequency” is not clear. 3. How the project is going to generate employment opportunity in the local area is not clear.	CL-10	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
1.17. List of commercially sensitive information (if applicable).					
1.17.1. Has the project proponent listed any commercially sensitive information that has been excluded from the public version of VCS PD which will be displayed on the VCS project database?	<u>/1/</u>	DR	Not applicable.		OK
2. Project Baseline Application (methodologies). <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
2.1. Baseline Methodology. <i>It is assessed whether the project applies an appropriate baseline methodology (number, title and version).Explanation of methodology choices.</i>					
2.1.1. Is the selected methodology previously approved by the VCS Registry and in line with the relevant project category? <i>(correctly quoted and interpreted?)</i>	<u>/1/</u>	DR	Methodology used in this project activity is ACM0002 - "Consolidated methodology for grid connected electricity generation from renewable sources", version 10 which is approved by the VCS registry.		OK
2.1.2. Is the methodology applicable to the project being considered?	<u>/1/</u>	DR	Yes, the methodology is applicable to the project activity.		OK
2.1.3. Does the project provide information on methodology deviations or methodology	<u>/1/</u>	DR	Clarification Request: PP needs to provide information/Reference on	CL-11	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
revisions?			methodology deviations/methodology revisions		
2.1.4. Are other methodologies or tools drawn up by the approved methodology mentioned? (correctly quoted and interpreted?)	<u>/1/</u>	DR	Yes. All the tools used in this project activity are correctly mentioned. 1. “Tool for demonstration and assessment of additionality”, version 05.2 is used to demonstrate additionality. 2. “Tool to calculate the emission factor for an electricity system”, version 01.1. is used to determine the emission factor.		OK
2.2. Justification of the choice of the methodology and why it is applicable to the project activity.					
2.2.1. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	<u>/1/</u>	DR	Corrective Action Request: Justifications provided for Applicability criteria 2, 3, 4 are not proper and not addressing to the applicability condition.	CAR-4	OK
2.3. Identifying GHG sources, sinks and / or reservoirs for the baseline scenario and for the project.					
2.3.1. Has the GHG sources, sinks and / or reservoirs identified for the baseline scenario and for the project?	<u>/1/</u>	DR	Corrective Action Request: Table 4 in section 2.3 is not as per the methodology.	CAR-5	OK
2.3.2. Has the justification for the emission in baseline scenario and the project done correctly?	<u>/1/</u>	DR	See section 2.3.2.	CAR-5	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
2.4. Description of how baseline scenario is identified and description of the identified baseline scenario. <i>The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.</i>					
2.4.1. Is the application of the methodology and the discussion and determination of the chosen baseline scenario transparent?	<u>/1/</u>	DR	Corrective Action Request: The description of how the baseline scenario is identified and the description of identified baseline scenario are insufficient.	CAR-6	OK
2.4.2. Has the baseline been determined using conservative assumptions where possible? <i>(confirm that any procedure contained in the methodology to identify the most reasonable baseline scenario, has been correctly applied)</i>	<u>/1/</u>	DR	See section 2.4.1	CAR-6	OK
2.4.3. Has the baseline been established on a project-specific basis?	<u>/1/</u>	DR	See section 2.4.1.	CAR-6	OK
2.4.4. Is the baseline determination compatible with the available data?	<u>/1/</u>	DR	See section 2.4.1	CAR-6	OK
2.4.5. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	<u>/1/</u>	DR	There is only one possible baseline scenario for this project activity.		OK
2.4.6. Have the major risks to the baseline been identified? <i>(Are uncertainties in the GHG emission estimates properly addressed in the documentation?)</i>	<u>/1/</u>	DR	The project activity is a Greenfield project. As the baseline has been selected according to ACM – 0002. So no major risks are associated		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			with the baseline.		
2.4.7. Is all literature and sources clearly referenced?	/1/	DR	Clarification Request: Kindly provide all literatures and sources referenced to determine the baseline.	CL 12	OK
2.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered VCS project activity (<i>Assessment and demonstration of additionality</i>).					
2.5.1. Does the VCS PD follow all the steps required in the methodology to determine the additionality? (<i>Is an approved additionality tool required / used? - Note: the guidance in the methodology shall supersede the tool</i>)	/1/	DR	PP has attempted to establish additionality of the project activity as per “Tool for the demonstration and assessment of additionality” (Version 5.2, EB 39) Project activity additionality is emphasized on investment barrier. As per the validation and verification manual, point number 103, the PP may choose the baseline as prescribed by the methodology. Hence the applicability of the tool can be taken up from step 2. Step 2: Investment Analysis: Sub-step 2a: Determine the appropriate analysis method		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
			The project activity will generate financial benefits other than VCS-Related income as it is selling the electricity to the grid. Hence the first option of the analysis method is not applicable. Since the project activity doesn't have other available alternatives, it was deemed ok to proceed for option III (Application of benchmark analysis) Sub-step 2b: Option III – Application of Benchmark Analysis The comparison between returns from the project activity with local benchmark rates available. Corrective Action Request: 1. The PP needs to be realistic not futuristic while discussing the additionality as it focuses on pre-project scenario. 2. PP also needs to provide records of such comparison between returns from the project activity with local benchmark rates made during the conceptualization stage. The comparison will be based on comparing the project IRR (without carbon) with	CAR-7	

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
			benchmark rates available to a local investor which obtained from local banks or investment bonds in the host country or it could be internally calculated. Clarification Request: 1. The risk free rates and premium risk are obtained from other countries which need to be justified with supporting evidences. 2. When the PP is a government company based in the host country – Indonesia, who is into the power generation sector, PP needs to demonstrate consideration of calculating country risk. 3. The premium risk is provided for the country which is not specific to the project activity; kindly justify the application of the same for this project activity. The benchmark is calculated as per weighted average cost of capital (WACC) which comes to 12.51 %. The returns from the proposed project activity comes to -7.02 % which less than the selected benchmark. Clarification Request:	CL-13	

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
			1. PP needs to provide loan sanction letter and also needs to include the same in the revised PD. 2. PP needs to explain the determination of capacity utilization factor for this project activity with supporting evidences. 3. Biography of Dr. Damodaran is not relevant to this project. 4. Further, it is not clear if the tariff taken is as per feasibility study or loan application? 5. PP to justify the appropriateness of the project type / industrial sector considered when calculating for beta value hence they need to correct the same in the financial calculation/WACC sheet provided to the DOE. 6. PP needs to clarify whether the beta value chosen represents raw/unlevered or levered value. 7. The beta value needs to be taken from similar type of industrial sector i.e. energy generation 8. PP need to provide evidences on equity amount, operational life time of the	CL-13	

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			project activity, fair value for the project at the end of the operational life time. 9. PP needs to explain the determination of industry sector specific risk rate. 10. The PP is requested to provide justification on the appropriateness of the chosen benchmark as per the EB guidance on investment analysis. 11. As per the guidance provided in the tool for demonstration and assessment of additionality version 5.2, guidance point no. 13, the PP needs to demonstrate that there was only one possible project developer and had been using consistently for similar projects with similar risks, developed by the same company. 12. PP to substantiate all arguments made under the poor performance of PLN with supportive evidences for all assumptions/ data provided. 13. Provide a copy of financial statements of the organization. 14. Financial unsoundness is mentioned as one of the reasons for the project not being viable. Highlight this in the		

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			financial statements especially if these are not in English. 15. Provide support for the claims of inability to meet financial covenants. 16. Operating costs in the feasibility report does not agree to the financial analysis. Please provide proper support for the operating costs. 17. The website provided as a reference for the tax rate is not in English. 18. Clarify whether operating cost includes interest cost or not. Sub-step 2c: calculation and comparison of financial indicators: Revenue, O & M cost, tax, depreciation are considered to calculate the cash flow. The expected return rate is -7.02% for this project activity. Clarification Request: 1. PP needs to provide the project IRR after adding revenue resulting from VCS benefits Sub-step 2d: Sensitivity Analysis:	CL-13	

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
			Sensitivity analysis has been performed to check the robustness of the financial model employed for this proposed project activity. The returns would reach the benchmark with increase of 807 % in tariff and electricity generation, decrease of 97 % in total investment cost and decrease of 100 % in the O&M cost. With 100 % decrease in the O & M cost still the returns would be -0.75% The tariff is unlikely to increase more than 10 % which can be witness from the historical data hence the increase of 807 % in the tariff is not possible. The same document has been verified during the site visit by the DOE. Clarification Request: 1. There is no discussion on PLF part in the sensitivity analysis. PP needs to submit the same in revised PD. Reduction of 97% in the investment cost would result in the crossing of the benchmark for this project activity which again not possible since the reduction in investment would result in reduction of the capacity of the project output. That will again lower returns from the project activity.	CL-13	

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
			Corrective Action Request: 1. However, PP needs to provide the same on spreadsheet where the sensitivity analysis can be re-produced as per the guidance provided in the tool for demonstration and assessment of additionality. 2. PP needs to conduct the sensitivity analysis as per the guidance provided in Tool for demonstration assessment of additionality point no. 17 in the annex. 3. PP to justify if the selected PLF is as per the guidance provided by EB, UNFCCC on PLF Step 4: Common Practice Analysis Sub-step 4a: Analyze other activities similar to the proposed activity: As per the government data, the potential for hydro power plant is 75000 MW wherein only 4200 MW has been utilized. Clarification Request: 1. PP is requested to provide the evidence for potential and installed capacities for Hydro Power plants in Indonesia. The project activity is located in northern	CAR-7	

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
			Sumatra hence the PP has considered the northern Sumatra province for common practice analysis. The total installed capacity of the northern Sumatra grid is 12,84,940 kW wherein the hydro power plants contribute 0.58 % with 7,500 kW in the region. Clarification Request: 1. Reference need to be provided for data taken for existing hydropower plants in north Sumatra region. 2. From the table provided for existing projects, it can be observed that all projects are located only at one location. PP needs to clarify on the same. Sub-step 4b: Discuss any similar options that are occurring: Majority of projects mentioned in the sub-step 4a are developed by PLN which is a state owned company. The only large scale project which is developed jointly by Indonesian government & 12 Japanese companies. According to decree of the Ministry of Environment, projects with installed capacity more than or equal to 50 MW need to go for environmental impact assessment. Considering	CL-13 CL-13	

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
			the same rest all projects were excluded from the comparison. Asahan hydro power plant is reservoir based and not connected to the grid, hence it is different from the project activity. Asahan was also financed through the joint venture. Clarification Request: 1. It is not clear from the discussion which is the second project compared with Asahan hydro project. Kindly clarify the same.	CL-13	
2.5.2. Does the project demonstrate to be additional?	/1/	DR	Refer to to 2.5.1	CAR-7 CL-13	OK
2.5.3. Is a complete list of barriers developed that prevents the project activity to occur in step 2 of the implementation barriers?	/1/	DR	Refer to 2.5.1	CAR-7 CL-13	OK
2.5.4. Is the discussion on the additionality clear and have all assumptions been conservative, supported by transparent and documented evidence for all steps?	/1/	DR	Refer to 2.5.1	CAR-7 CL-13	OK
2.5.5. Is it appropriately explained how the approval of the project activity will help to overcome the identified barriers?	/1/	DR	Refer to 2.5.1	CAR-7 CL-13	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
3. Monitoring					
3.1. Monitoring Methodology. <i>It is assessed whether the project applies an appropriate monitoring methodology (number, title and version). Explanation of methodology choices.</i>					
3.1.1. Is the selected methodology approved under the VCS Program and in line with the relevant project category?	<u>/1/</u>	DR	Yes the monitoring methodology is approved by the CDM Methodology panel which is applicable for this project activity.		OK
3.1.2. Have the methodological choices corectly explained?	<u>/1/</u>	DR	Yes, methodological choices have been explained correctly. Clarification Request: 1. “the power density of the project is more than 10W/m ² .” – Provide supporting evidence for the same or calculation of power density.	CL-14	OK
3.1.3. Is the monitoring methodology the one deemed most applicable for this project and is the appropriateness justified?	<u>/1/</u>	DR	The approved methodology of ACM0002 is chosen and applicable to the proposed project due to the following reasons: ▫ The project activity is the installation of an accumulation run-off-river hydroelectric power plant. ▫ The proposed project is not an activity that involves switching from fossil fuels to renewable energy at the site of the project activity. ▫ The project activity is not a biomass-fired		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
			□ It is connected with a regional power grid, the Sumatra grid; the Sumatra grid is clearly identified and information on the characteristics of this grid is publicly available from PLN Sumatra. □ There is no reservoir for this project therefore the power density of the project is more than 10W/m².		
3.2. Monitoring. (Monitoring procedures content)					
3.2.1. Is the purpose of monitoring properly specified?	<u>1</u>	DR	The purpose of monitoring is to present the reliable and complete data and also to ensure that all actual data would be collected and archived in proper way.		OK
3.2.2. Types of data and information to be reported, including units of measurement, are mentioned?	<u>1</u>	DR	Yes, parameters to be monitored are mentioned below: □ Net electricity generated in MWh □ Electricity imported from the Sumatra grid in MWh □ Amount of diesel fuel used in metric tonnes or liters Corrective Action Request: 1. However, there are inconsistencies in Units used for monitoring parameter.	CAR-8	OK
3.2.3. Is the origin of the data identified?	<u>1</u>	DR	Corrective Action Request: Origin of Electricity imported from the Sumatra grid is missing.	CAR-8	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
3.2.4. Is monitoring, including estimation, modeling, measurement or calculations approaches, properly specified?	<u>1</u>	DR	No modeling or estimation is required to monitor or measure the monitoring parameters.		OK
3.2.5. Monitoring times and periods, considering the needs of the intended users, are properly defined?	<u>1</u>	DR	Monitoring of diesel used will be monitored monthly, electricity generation; export and import will be monitored continuously and summarized daily, monthly or quarterly with regular yearly reports dependent on the monitoring plan for each data parameter for the entire crediting period.		OK
3.2.6. Are the monitoring roles and responsibilities defined?	<u>1</u>	DR	Yes, PP together will be responsible for collecting all monitoring data and information.		OK
3.2.7. Information management systems, including the location and retention of stored data, were identified?	<u>1</u>	DR	Information about management system including the location and retention of stored has been provided in the monitoring plan.		OK
3.3. Monitoring parameters.					
3.3.1. Are the parameters to be monitored properly addressed and identified?	<u>1</u>	DR	Corrective Action Request: 1. There is inconsistency in the figure of Electricity Supplied by the project activity to the grid. 2. Please mention all the monitoring parameters in table 3.3. 3. Values of OM, BM are missing. 4. Transparency is not there in the measurement method of electricity supplied by the project activity to the	CAR-9	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
			grid. Representatives present at the time of monthly meter reading are not mentioned. 5. In section 3.2 measuring method of “Project emissions from fossil fuel consumption” is missing. (Mentioned in table 3.3) 6. The approach which has been used to calculate the emission factor is not mentioned. 7. Justify the inclusion of the parameter GWP_{CH_4}. 8. Reference provided for Diesel Density is not relevant.		
3.4. Description of the monitoring plan.					
3.4.1. Is the authority and responsibility of project management clearly described?	<u>/1/</u>	DR	VCS manager will head the team (VCS Monitoring team) to handle day to day activity, reporting, recording.	OK	OK
3.4.2. Are procedures identified for training of monitoring personnel?	<u>/1/</u>	DR	Prior to project commissioning the project developer has organized a series of training together with the equipment supplier. The training conducted covered mainly the following topics: management of hydropower generation, operation and maintenance of hydro power plant, operation and maintenance of turbine, generator and other equipments.	OK	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
3.4.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	Clarification Request: PP needs to identify procedures for emergency preparedness for cases where emergencies can cause unintended emissions. For example if both the main and back up failed at the same time.	CL-15	OK
3.4.4. Does the monitoring plan reflect good monitoring and reporting practices?	/1/	DR	Monitoring plan consists of procedures on monitoring equipments installation, data recording , data management. PLN is ISO certified for quality management systems hence relevant standard operating procedures for operation of plant, calibration requirements and emergency related procedures were found. Clarification Request: 1. However, the monitoring plan appears futuristic which needs to be changed and made realistic with sufficient evidences to confirm the same. 2. Procedures to identifyif meters arefunctioning ok or faulty in between calibrations and procedures on action to be taken when such readings recorded with faulty meter are found. 3. The permissible deviation between the main meter and check meter, to	CL-15	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			identify the faulty meter is not mentioned. Corrective Action Request: 1. Annex-4 is not included in the PD, where as it is referred at many places in the PD. 2. All monitoring parameters are not addressed in this section. 3. Representatives, present at the time of monthly measurement on which invoice is issued, are not mentioned. 4. Procedures for dealing with data adjustments and uncertainties are not clear. For example, i) accounting of generation in case of meter failures. ii) If both the meters failed at the same time then procedure to be followed to handle the situation. 5. Accuracy class of main and back up meters are missing.	CAR-10	
3.4.5. Is the discussion and selection of all required monitoring parameters and / or data variables (for example, project emissions, project electricity generation, baseline grid / captive power emission factor) of the monitoring plan according to the approved / applied methodology transparent?	<u>1/</u>	DR	Refer to 3.3.1,	CAR-10	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
3.4.6. Is the monitoring methodology previously approved by the VCS Registry?	<u>/1/</u>	DR	Yes. Monitoring methodology is previously approved by the VCS Registry		OK
3.4.7. Is the monitoring methodology the one deemed most applicable for this project and is the appropriateness justified?	<u>/1/</u>	DR	Yes. The monitoring methodology is the one deemed most applicable for this project and is the appropriateness justified.		OK
3.4.8. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	<u>/1/</u>	DR	Refer to 3.3.1, 3.4.3 and 3.4.4.	CAR-10 CL-15	OK
3.4.9. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	<u>/1/</u>	DR	According to the methodology, leakage from related emission sources do not need to be considered.		OK
4. GHG emission reductions. <i>Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.</i>					
4.1. Methodology choice.					
4.1.1. Have the project, baseline and leakage emissions and emission reductions been properly explained and determined using the same appropriate methodology and conservative assumptions?	<u>/1/</u>	DR	Project, baseline and leakage emissions and emission reductions been properly explained and determined using the same appropriate methodology and conservative assumptions. Clarification Request: 1. Abbreviation of emission reduction, baseline emission and project emission are not inline with the equation.	CL-16	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
			2. Justification for rejection of Simple adjusted OM, Dispatch data analysis OM, Average OM is not sufficient. 3. Justification for PE_y = 0 tCO₂e/yr lacks clarity. And also reason behind the omission Project Emission from fossil fuel consumption is missing. Corrective Action Request: 1. The equation used for operating margin is not matching with the equation 1 of the 'Tool to calculate the emission factor for an electricity system'.	CAR-11	
4.1.2. Does the proposed project clearly state which equations for the calculation of emission reductions are used, as given by the approved / applied methodology?	<u>/1/</u>	DR	Yes.The proposed project clearly state which equations for the calculation of emission reductions are used, as given by the approved / applied methodology.		OK
4.1.3. Are the demonstration / justification for the choice of the chosen scenario (for example, in ACM0006) or case, option / method (for example in ACM0002) adequate and sufficient?	<u>/1/</u>	DR	Yes. Demonstration/justification for the chosen scenario is adequate and sufficient.		OK
4.1.4. Are the demonstration / justification for the chosen default values adequate and sufficient?	<u>/1/</u>	DR	Refer to 4.1.1	CL-16 CAR-11	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
4.2. Quantifying GHG emissions for the baseline scenario.					
4.2.1. Have the baseline GHG emissions been properly explained and determined using the same appropriate methodology and conservative assumptions?	<u>/1/</u>	DR	See section 4.1.1.	CAR 11	OK
4.2.2. Are the demonstration / justification for the chosen default values adequate and sufficient?	<u>/1/</u>	DR	Grid emission factor provided by the Indonesia DNA is for the year 2008. Corrective Action Request: 1. However the PP is required to justify that the selected value for emission factor of the grid is in line with the procedures mentioned in the tool. 2. Net electricity generated for the period 2008-2015 is inconsistent.	CAR 12	OK
4.2.3. Does the proposed project clearly state which equations for the calculation of baseline emission are used, as given by the approved / applied methodology?	<u>/1/</u>	DR	Yes. The PP has used the correct equations for the calculation of baseline emission and is as per the approved / applied methodology.		OK
4.2.4. Is the calculation of the expected baseline emissions transparent, conservative, accurate, and documented and as per the approved / applied methodology (equations) of the project activity?	<u>/1/</u>	DR	Refer to 4.2.2	CAR 12	OK
4.3. Quantifying GHG emissions for the project.					
4.3.1. Have the project GHG emissions been	<u>/1/</u>	DR	Project Emission has been calculated by using		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
properly explained and determined using the same appropriate methodology and conservative assumptions?			the “Tool to calculate project or leakage CO₂ emissions form fossil fuel combustion”. Corrective Action Request: 1. “COEF_{i,y} is calculated using option A.” The statement lacks clarity. Calculation of COEF is not clear. 2. Calculation of Project Emission is not clear and transparent. Clarification Request: 1. Provide the exact URL for the reference of NCV of diesel.	CAR-13 CL-17	
4.3.2. Are the demonstration / justification for the chosen default values adequate and sufficient?	<u>1</u>	DR	Refer to 4.3.1	CL-17	OK
4.3.3. Does the proposed project clearly state which equations for the calculation of project emission are used, as given by the approved / applied methodology?	<u>1</u>	DR	Refer to 4.3.1	CL-17	OK
4.3.4. Is the calculation of the project emissions transparent, conservative, accurate, and documented and as per the approved / applied methodology (equations) of the project activity?	<u>1</u>	DR	Refer to 4.3.1	CL-17	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
4.4. Quantifying GHG emission reductions for the project. <i>(between a baseline scenario and the project)</i>					
4.4.1. Have the project GHG emission reductions been properly explained and determined using the same appropriate methodology and conservative assumptions?	<u>1</u>	DR	Corrective Action Request: Figure mentioned for the total emission reduction is inconsistent with the value mentioned for emission reduction per year.	CAR-14	OK
4.4.2. Does the proposed project clearly state which equations for the calculation of project emission reductions are used, as given by the approved / applied methodology?	<u>1</u>	DR	Yes. The equations used for the calculation of the project emission reductions are applicable to this project as per the approved / applied methodology.		OK
4.4.3. Is the calculation of the project emission reductions transparent, conservative, accurate, and documented and as per the approved / applied methodology (equations) of the project activity?	<u>1</u>	DR	Refer to section 4.4.1	CAR-14	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
5. Environmental impacts. <i>If required by the host party, documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the Validator/Verifier.</i>					
5.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	<u>1</u>	DR	As per the Decree of the Ministry of Environment, all hydroelectric power plants with a dam height of $\geq 15\text{m}$ or flooded area of $\geq 200\text{ha}$ or installed capacity of $\geq 50\text{ MW}$ needs to conduct an EIA. Since this project has an installed capacity of 50 MW, an EIA has been conducted by the client. Clarification Request: PP is requested to submit the copy of the EIA for verification.	CL-18	OK
5.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	<u>1</u>	DR	Refer to 5.1	CL-18	OK
5.3. Will the project create any adverse environmental effects?	<u>1</u>	DR	Project is expected to have an overall positive impact on the local and global environment. All the environmental impacts have been identified during the EIA and mitigation measures also have been taken. Hence project does not create any adverse environmental impacts.		OK
5.4. Are transboundary environmental impacts considered in the analysis?	<u>1</u>	DR	There are no adverse transboundary environmental impacts for this project activity.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
5.5. Have identified environmental impacts been addressed in the project document?	<u>/1/</u>	DR	Refer to 5.3		OK
5.6. Does the project comply with the environmental legislation in the host country?	<u>/1/</u>	DR	Yes. Projects complies with environmental legislation in the host country.		OK
6. Stakeholder's comments. <i>The Validator/Verifier should ensure that stakeholders' comments have been invited and that due account has been taken of any comments received.</i>					
6.1. If a stakeholder consultation process is required by regulations / laws in the host country, has the stakeholders' consultation process been carried out in accordance with such regulations / laws?	<u>/1/</u>	DR	Stakeholder consultation is not mandatory according to the regulations/ law in the host country. However relevant stakeholder was identified and meeting was conducted. Clarification Request: PP needs to submit all the documentary evidence for the stakeholder consultation done.	CL 19	OK
6.2. Have relevant stakeholders been consulted / invited for comments?	<u>/1/</u>	DR	Yes. Relevant stake holders been identified and were invited for the meeting. Clarification Request: However the date and venue of meeting, mode of invitation for stakeholder consultation, persons invited, persons present for the stakeholder consultation, contact details and summary of comments received are not transparent in PD. Kindly provide evidences for all the above	CL 19	OK
6.3. Was the stakeholders' consultation process	<u>/1/</u>	DR	Refer to 6.2	CL 19	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
conducted, within a reasonable time for comments submission, in an open and transparent manner to facilitate comments and properly described?					
6.4. Are the stakeholders who made comments identified (addresses provided / available)?	/1/	DR	Refer to 6.2	CL-19	OK
6.5. The summary of the stakeholders' comments received is provided / available?	/1/	DR	Refer to 6.2	CL-19	OK
6.6. Has due account been taken of any stakeholders' comments received?	/1/	DR	Refer to 6.2	CL-19	OK
7. Schedule					
7.1. Has the chronological plan for the date of initiating project activities, date of terminating the project, frequency of monitoring and reporting and the project period, including relevant project activities in each step of GHG project cycle mentioned?	/1/	DR	Refer to 1.6.1. Clarification Request: 1. Also provide the project implementation schedule in detail. 2. Documented evidence for the operational life time of the project has to be submitted.	CL-20	OK
8. Ownership					
8.1. Proof of Title.					
8.1.1. Has they provided a legislative right or a right under local common law for the proof of title? or Has they submitted any evidence for proving the ownership of the plant, equipment and / or process generating the reductions / removals? or	/1/	DR	Corrective Action Request: The title of the project activity is not matching with the documentary evidence provided as a proof of title.	CAR-15	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
Does a contractual arrangement with the owner of the plant, equipment or process that grants all reductions / removals to the proponent shown?					
8.2. Projects that reduce GHG emissions from activities that participate in an emissions trading program (if applicable).					
8.2.1.Does the projects that reduces GHG emissions from activities participate in an emission trading program or take place in a jurisdiction or sector in which binding limits are established on GHG emissions?	/1/	DR	Not applicable		OK
8.2.1.1. Has the project proponent provided any evidence to prove that the reductions or removals generated by the project have or will not be used in the program or jurisdiction for the purpose of demonstrating compliance?	/1/	DR	Refer to 8.2.1		OK
8.2.1.1.1.Has letter from the Program operator or DNA that emission allowances (or other GHG credits used in the program) equivalent to the reductions / removals generated by the project have been cancelled from the program or national cap as applicable been submitted?	/1/	DR	Refer to 8.2.1		OK
8.2.1.1.2.Has purchase and cancellation of GHG allowances equivalent to the reductions	/1/	DR	Refer to 8.2.1		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl
/removals generated by the project related to the program or national cap done?					

Table 2: Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
CAR 1 1. Though the commissioning dates are given, the start date of the project activity is not transparently given in PD. 3. Inconsistency noticed in the Commissioning Certificate in case of Unit name and Signing Authority who has issued the commissioning certificate.	1.6.1	1. Start date of the project activity is on 21 October 2002 and clearly stated in PD section 1.6 and section 7. 2. Regarding inconsistency of unit name, PO has confirmed that Unit 1 and PS1 or Unit 2 and PS 2 are the same meaning. Confirmation letter regarding this has been provided by PO (Sipansihaporas_Confirmation PS and Unit). Regarding signing authority who has issued the commissioning certificate, PO has confirmed that both certificates for Unit 1 and 2 issued by the same body, only change in name. Before 2004 the certification body named Jasa Teknik Kelistrikan and after 2004 named Jasa Sertifikasi. Change of the name according to Decree of PLN Director No 292.K/010/Dir/2003 (Sipansihaporas_Confirmation of PLN Certification Body).	1. The start date of the project activity is mentioned in section 1.6 and sectioned which is cross verified with the commissioning certificate (Ref no: 105/56D-02/UITJKT/2002 dated 21stOctober, 2002) of unit 2. Closed. 2. The PP has confirmed that Unit 1 and PS1 or Unit 2 and PS 2 are the same. Confirmation letter has been provided by Edward Batubara, sector manager of P.T PLN (Persero) Sektor Pembangkitan Pandan. Closed. 3. Signing authority who has issued the commissioning certificates was different for Unit I and II. So PP has provided confirmation letter from PT PLN (Persero) where it is mentioned that both the authorities are same. The letter of confirmation is issued on 17th September 2009. Closed.

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
CAR 2 Technical specification of all equipments, installed at the project site, is not transparent.	1.9.1	Technical specification of all equipments installed at the project site has been added in PD section 1.9.	The technical specification turbine and generators has been included in the revised PD. Turbines were supplied by Meidan and generators were supplied by Toshiba. Both the companies are from Japan and same has been verified during the site visit. Closed
CAR 3 Identified risks need to be elaborated.	1.11.1	Identified major risks have been elaborated in PD section 1.11.	The PP has identified three major risks which are going to affect the project's GHG emissions reductions.: i. Supply of water ii. Natural disaster iii. Unexpected machine breakdown These risks are elaborated properly in the revised PD. Closed
CAR 4 Justifications provided for Applicability criteria 2, 3, 4 are not proper and not addressing to the applicability condition.	2.2.1	Justification of applicability criteria 2, 3 and 4 has been revised in PD section 2.2 to address the applicability condition. Criteria 5 and 6 has been revised in PD section 2.2	As the project activity is a run-off river type hydro power project, applicability criteria 5 & 6 is not applicable for the project activity and proper justification is provided in the revised PD. Closed.

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
CAR 5 Table 4 in section 2.3 is not as per the methodology.	2.3.1 2.3.2	Table 4 in section 2.3 has been revised according to the methodology.	PP has revised the table 5 of section 2.3 as per the baselinemethodology ACM – 0002. Closed
CAR 6 The description of how the baseline scenario is identified and the description of identified baseline scenario are insufficient.	2.4.1 2.4.2 2.4.3 2.4.4	Description of how the baseline scenario is identified and the description of identified baseline scenario has been elaborated more in PD section 2.4 Description of identified baseline scenario has been revised in PD section 2.4. Description how to calculate combine margin (CM) is elaborated in PD section 4.1.	Description of identified baseline scenario is provided in section 4.1. Closed.
CAR 7 1. The PP needs to be realistic not futuristic while discussing the additionality as it focuses on pre-project scenario. 2. PP also needs to provide records of such comparison between returns from the project activity with local benchmark rates made during the conceptualization stage. 4. However, PP needs to provide the	2.5.1 2.5.2 2.5.3 2.5.4 2.5.5	1. Discussion of additionality has been clearly explained in PD section 2.5 step 2 investment analysis. Data available at investment decision has been used for IRR calculation. 2. Records of comparison between returns from the project activity with local benchmark (safe deposit bank rate) have been explained in the additionality	PP has taken the values as per the feasibility study report that is in line with guidance provided by the additionality tool. In Indonesia, the financial condition of entire country has not been as healthy as it has been verified through various sources submitted by the PP.

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
same on spreadsheet where the sensitivity analysis can be reproduced as per the guidance provided in the tool for demonstration and assessment of additionality. 5. PP needs to conduct the sensitivity analysis as per the guidance provided in Tool for demonstration assessment of additionality point no. 17 in the annex. 6. PP to justify if the selected PLF is as per the guidance provided by EB, UNFCCC on PLF		section in PD section 2.5 step 2. Supporting documents also made available to DOE as evidence. (Sipansihaporas_Investment Credit by the Bank in 1996). 3. In addition to the realistic variation of sensitive parameters by +/-10% another analysis has been performed where parameters hit the benchmark as comparison. At least +/- 10% variation of parameters is proposed by a guidance of the UNFCCC. 4. Please see the explanation above. 5. PLF is taken from FS which is done by the third party and as per guidance of EB. In general EB guidance's do not have to be considered on the VCS unless specifically mentioned in the applied methodology. The PLF value in the FS is similar to the actual PLF after commissioning. This shows the realistic	In such conditions, the sector specific risk could not be established. However, the PP has come up with risk associated with the project have been calculated through country risk. PP has also taken the lowest beta value from energy sector which is conservative and hence accepted. The same has been submitted to the DOE for verification. PP has conducted the sensitivity analysis as per the guidance provided in Tool for demonstration assessment of additionality point no. 17 in the annex, which is found acceptable and in line with the requirement. The PLF has been calculated as per the values provided in the FS which is a third party and they have derived the PLF of the project activity as per the expected annual generation with maximum annual generation which is in line with requirement.

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
		value applied in the PD.	Car 7 is closed
CAR 8 1. However, there are inconsistencies in Units used for monitoring parameter. 2. Origin of Electricity imported from the Sumatra grid is missing.	3.2.2 3.2.3 3.2.7	1. All units using MWh has been changed to kWh in monitoring parameter. PD has been revised in section 3.2 and 3.3. 2. Origin of electricity imported in monitoring parameter has been added in PD section 3.2.	1. Units used for monitoring parameters are consistent in the revised PD. Closed. 2. Origin of electricity imported has been included in the revised PD. Electricity Transfer Protocol Report is the source of electricity import. Closed
CAR 9 1. There is inconsistency in the figure of Electricity Supplied by the project activity to the grid. 2. Please mention all the monitoring parameters in table 3.3. 3. Values of OM, BM are missing. 4. Transparency is not there in the measurement method of electricity supplied by the project activity to the grid. Representatives present at the time of monthly meter reading are not mentioned. 5. In section 3.2 measuring method of	3.3.1	1. Electricity supplied in the figure is already revised to be consistent. The accuracy class of main meter has been revised to 0.2 in PD section 3.3. table of monitoring parameter. 2. All the monitoring parameters have been mentioned in table 3.3. PD has been revised accordingly in section 3.3. According to the methodology ACM0002, gross generation and captive	1. The figure of net electricity supplied to the grid is supported by proper evidence. Feasibility study report provided by Japan International Corporation Agency has been provided as supporting evidence. Value mentioned in the feasibility report is matching with the value mentioned in the PD. The accuracy class main meter and back up meter mentioned in the PD is 0.5s. But during the site visit it has been observed as 0.2s. The accuracy class of main and back up meter is revised to 0.2s which is verified

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
“Project emissions from fossil fuel consumption” is missing. (Mentioned in table 3.3) 6. The approach which has been used to calculate the emission factor is not mentioned. 7. Justify the inclusion of the parameter GWP_{CH_4}. 8. Reference provided for Diesel Density is not relevant.		consumption no need to monitor. These two meters are monitored as the check-meters to the transaction meter. Those two parameters are clearly explained in PD section 3.4 point 2. 3. As per newest “Tool to calculate the emission factor for an electricity system” for each crediting period the most recent data available at time of submission of the PD to the DOE for validation shall be used. The latest available data at the time is the official emission factor published by the Indonesian DNA using data from the year 2008 concluding an emission factor of 0.743 tCO₂e/MWh. Values of OM, BM are included. Supporting documents from DNA not mentioned how to calculate grid emission factor. The calculation of GEF can be found in the document spreadsheet. Such document has been sent to DOE. 4. PD has been revised in section 3.4 for transparency of the measurement method	during the site visit. Closed. 2. Please clarify how net electricity exported to the Grid is calculated. Net electricity delivered to the grid is the difference between electricity generation and own consumption (electricity generation minus own consumption) and same is verified during the site visit. Closed. 3. In the supporting evidence of grid emission factor, it is not clear whether CM has been used to calculate the grid emission factor or not. Proper calculation of CM has been provided in an excel sheet which is provided by Indonesian DNA. So it is confirmed that to calculate emission factor of Sumatra Grid Combined Margin is used. And the initial supporting evidence was provided by Kementerian Negara Lingkungan Hidup Republik Indonesia. Closed. 4. Measurement method of electricity supplied by the project activity is satisfactory. The joint meter reading taken at

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
		of the electricity supplied to the grid. 5. Project emission in table section 3.3 has been removed as the parameter no need to be monitored. Parameter quantity of diesel consumption has been added in the table section 3.3. 6. The approach to calculate emission factor has been added in section 4.1. Simple OM has been used to calculate OM. 7. Parameter GWP_{CH_4} has been removed from the table section 3.3. 8. Reference has been revised. PD has been revised in footnote section 3.3. Such document has been submitted to DOE (Sipansihaporas_Pertamina Solar Characteristic)	the transaction point is witnessed by the presence of P3B officials as transmission department and the PP representative as generation department. Closed. 5. "Project emissions from fossil fuel consumption" is not monitored directly. Diesel consumption is monitored monthly and depending upon that project emission is calculated. Diesel consumption is recorded monthly in a log book. Diesel consumption log book for the year of 2006 to 2009 has been provided by the PP and for conservativeness maximum among these 4 years has been considered for project emission calculation. Please refer to comment 2 of CAR 13. Closed. 6. Refer to comment 3 of CAR 9. Closed. 7. GWP_{CH_4} has been removed from table 3.3. CH_4 emission due to project activity is not applicable since the project is a run-of-river hydropower plant with a daily regulating pond for temporary storage.

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
			Closed. 8. The value of density of diesel in line with the reference (Sipansihaporas_Pertamina Solar Characteristic) provided by the PP. Closed.
CAR 10 1. Annex-4 is not included in the PD, where as it is referred at many places in the PD. 2. All monitoring parameters are not addressed in this section. 3. Representatives, present at the time of monthly measurement on which invoice is issued, are not mentioned. 4. Procedures for dealing with data adjustments and uncertainties are not clear. For example, i) accounting of generation in case of meter failures. ii) If both the meters failed at the same time then procedure to be followed to handle the situation. 5. Accuracy class of main and back up meters are missing.	3.4.4	1. All word Annex - 4 have been removed in PD. 2. Please see explanation above. 3. Information of representatives has been added in PD section 3.3 and 3.4. 4. Information has been added in PD section 3.4 sub 2. Monitoring equipment and installation. PD has been revised in section 3.4 point 2. Quality Control. Permissible different between main meter and check meter is included in SOP meter and will be provided before the	1. As there is not Annex 4 in the PD. So it is removed from the PD by the PP. Closed. 3. At the time of joint meter reading one representative from P.T PLN Transmission dept. and one person from P.T PLN generationdept. were present and same has been verified during the site visit by interviewing the plant operator. Closed. 4. In section 3.4 under “Metering of Electricity Supplied to the Grid” it is mentioned “The main electricity meter for establishing the electricity delivered to the grid is installed at the Sipansihaporas power plant.”. But under “Quality Control” it is mentioned “The main meter is owned by the project and installed at the transaction point

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
		verification. 5. Accuracy class of main and back up meter is 0.5. It is included in the SOP meter. PD also has been revised in section 3.3.	of the PLN grid.” Please clarify. The main meter i.e the revenue meter is installed at Sipnasiaporas Hydro Power Plant which has been verified during the site visit. So pp has changed the installation point from PLN grid to Sipnasiaporas Hydro Power Plant. In case of total failure of all meters no credits will be claimed during such period which is satisfactory. The permissible difference between main meter and check meter is mentioned in the SOP provided by the PP and same has been verified during validation. Closed. 5. Refer to comment 1 of CAR 9. Closed.
CAR 11 1. The equation used for operating margin is not matching with the equation 1 of the ‘Tool to calculate the emission factor for an electricity system’.	4.1.1 4.1.4 4.2.1	Calculation of $EF_{grid,CM,y}$ of Sumatera grid has been revised in PD section 4.1 as per ‘tool to calculate the emission factor for an electricity system’. Simple OM has been used to calculate OM. In order to apply the simple OM	Please mention the option which has been used to calculate OM. The option used to calculate Simple OM is option A of ‘Tool to calculate the emission factor for an electricity system’ version 2. Closed.

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
		method the low-cost/must run ration of the grid shall be below 50%. The grid connected to the project activity had ratios of 20.95%, 17.28%, 19.52%, 21.99% in the years 2003 to 2007, which are all below the 50% threshold. The calculation of such has been further elaborated in the Indonesian DNA approved emission factor calculation.	
CAR 12 1. However the PP is required to justify that the selected value for emission factor of the grid is in line with the procedures mentioned in the tool. 2. Net electricity generated for the period 2008-2015 is inconsistent.	4.2.2 4.2.4	1. Please see the explanation in CAR 11 above. 2. Net electricity generated in PD section 3.3 has been revised to be consistent during the crediting period based on FS 1990.	1. Refer to comment of CAR 11 and comment 3 of CAR 9. Closed. 2. The figure of net electricity supplied to the grid is supported by proper evidence. Feasibility study report provided by Japan International Corporation Agency has been provided as supporting evidence. Value mentioned in the feasibility report is matching with the value mentioned in the PD. Closed.
CAR 13 1. "COEF _{i,y} is calculated using option A." The statement lacks clarity. Calculation of COEF is not clear.	4.3.1,4.3.2, 4.3.3,4.3.4	1. Calculation of the project emission from diesel fuel consumption has been	1. Calculation of COEF is transparent in the revised PD and which is inline with "Tool to calculate project or leakage CO ₂ emissions

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
2. Calculation of Project Emission is not clear and transparent.		revised in PD section 4.1 and section 4.3 to be more clear and transparent. 2. Please see the explanation above.	from fossil fuel combustion”. Closed. 2. The calculation of project emission is proper in the revised PD and ER calculation sheet. Calculation is in line with with “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”. NCV and emission factor of diesel values are taken from IPCC 2006 guideline and both have been cross checked during validation. The value of Diesel density mentioned in the PD has been cross checked with the reference “Sipansihaporas_Pertamina Solar Characteristic” during validation. Project emission due to this project activity is .28 tCO₂/yr which much less than 1% of emission reduction per year. So the emission due to the project activity can be neglected.. Closed.
CAR 14 Figure mentioned for the total emission reduction is inconsistent with the value mentioned for emission reduction per year.	4.4.1 4.4.3	PD has been revised in section 4.4. Total emission in section 4.4 has been revised to 1,595,960 tCO₂ and is consistent for the whole document.	The total emission reduction mentioned section 4.4 is 15,95,964 tCO₂ in 10 years but per year emission reduction mentioned is 1,59,596 tCO₂ which is inconsistent. PP has revised figure of total emission

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
			reduction in section 4.4. It is changed to 15,95,964 tCO ₂ to 15,95,964 tCO ₂ . Closed.
CAR 15 The title of the project activity is not matching with the documentary evidence provided as a proof of title.	8.1.1	The title of the project activity is already matching with the documentary VERPA between PP and South Pole.	ERPA signed between PT PLN(Persero) and South Pole has been provided by the PP. Title of the project activity is matching with the ERPA. Closed.
CL 1 Provide the copy of feasibility study report.	1.2.1	Copy of feasibility study has been submitted to DOE (Sipansihaporas_FS).	1. The figure of net electricity supplied to the grid is supported by proper evidence. Feasibility study report provided by Japan International Corporation Agency has been provided as supporting evidence. Value mentioned in the feasibilityreport is matching with the value mentioned in the PD. Closed.
CL 2 The number of turbines installed in the project activity is not clear in this section.	1.3.1	Information number of turbines has been added in the PD section 1.9. Sentence is rephrased in section 1.3 about the number of turbine to be more clear.	Still the number of turbines installed is not clear in section 1.3. The number of turbines installed is clear in section 1.3 In the revised PD. The project activity consists of one 33MW and one 17 MW turbine and the same has been verified during the site visit.

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
			Closed.
CL 3 “According to the national energy policy, the potential capacity of hydro resources in Indonesia is 75,000 MW of which only 4,200 MW has so far been used to generate electricity (including captive power and private entities)” – The statement is not matching with the reference provided.	1.4.1	Statement has been revised in the PD section 1.4 and reference also has been revised (Sipansihaporas_Indonesia Power Sector).	The statement has been revised by the PP in the revised PD and it is inline with the reference provided. Closed.
CL 4 Provide evidence for unique physical identification of the project site.	1.5.1	Evidence for unique physical identification has been submitted to DOE (Sipansihaporas_FS). The evident for this information is taken from EIA (Sipansihaporas_EIA).	Unique physical identification of the project activity is evident in the EIA report provided by Departemen Pertambangan Dan Energi Republik Indonesia. Closed.
CL 5 Conditions prior to the project activity are not clearly mentioned.	1.7.1	Information about prior condition has been added in PD section 1.7.	Conditions prior to the project activity are described properly in the revised PD. As the project activity is a Greenfield project, in the absence of the project activity the electricity supplied to the grid by the project activity would have been generated by the fossil fuel fired power plant connected with the respective grid. Closed

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
CL 6 1. Provide copy of project's site layout plan. 2. Provide the copy of purchase orders of all equipments installed at the project site. 3. Equipments have been procured from another country. Provide justification for that and also the name of the technology provider. 4. Provide for all the data specified in Table 2 of section 1.9. 5. Whether transfer of technology is involved in the project activity or not is not clear. 6. Provide documents on training procedures provided to the employees.	1.9.1 1.9.3 1.9.5	1. Copy of project site layout plan has been submitted to DOE (Sipansihaporas_Project Site Layout). 2. Copy of purchase orders off all equipments have been submitted to DOE (Sipansihaporas_Generator contract and Sipansihaporas_Turbine contract). 3. Justification of equipments procured from another country and the name of the technology provider has been submitted to DOE. - PD has been revised in section 1.9 in the last paragraph. 4. Data taken from FS and has been submitted to DOE (Sipansihaporas_FS). - Installed capacity in PD based on the actual installed capacity from the power station. 5. Word transfer technology has been	1. PP has provided the copy site layout plan and the original copy have been verified during the site visit. Closed 2. Purchase orders of turbines and generators had been provided by the PP and the original documents has been during the site visit.closed 3. As the equipments used in the project activity is not available in Indonesia, turbines and generators are procured from Japan. Closed. 4. Feasibility study report has been provided as supporting evidence for the parameters specified in Table 2 of section 1.9 and all parameters are consistent. Closed. 5. The project doesn't involve any technology transfer only equipments are purchased from Japan. So PP has removed the word "technology transfer".closed

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
		removed from PD as it is a high quality equipment transfer. 6. Documents training procedures has been submitted to DOE. Renun and Sipansihaporas units is under Pandan sector where all the training are conducted together. (Sipansihaporas_List of Training). Training documents have been submitted to DOE (Sipansihaporas_List of Training). It is the same document with Renun, as both Sipansihaporas and Renun under the Pandan sector. All the training will be held together for the Pandan sector.	6. Training documents are provided by the PP. Closed.
CL 7 Provide copy of construction permit, EIA report and other regulatory clearances which are applicable in this project activity.	1.10.1	Copy all documents have been submitted to DOE. Construction permit is a requirement in order to receive the EIA approval. Original construction permit can not be found at the current time.	Clearance from Forestry Department and EIA from Departemen Pertambangan Dan Energi Republik Indonesia has been provided by the PP. Closed.

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
		The latest land deed agreement from forestry department has been submitted to DOE.	
CL 8 Justify why this section is not applicable for this project.	1.12.1	PD has been revised in section 1.12.	Proper information is provided in section 1.12 by the PP. The project activity aims to supply electricity to the grid, and not primarily for creating GHG emissions primarily for the purpose of its subsequent removal. Closed.
CL 9 PP has to provide an undertaking letter addressed to the VCS registry stating that they have not will not go for any other form of environmental credits other than VCS.	1.13.2 1.14	Document of undertaking letter has been provided by PP and submitted to DOE (Sipansihaporas_Undertaking Letter).	Undertaking letter addressed to the VCS registry stating that PP has not gone for any other form of environmental credits other than VCS, has been provided by Edward Batubara, sector manager of PT PLN (Persero) Sektor Pembangkitan Pandan. Closed.
CL 10 1. Please elaborate how the project is going to contribute to the development of the region by increasing community development and corporate social responsibility of PT. PLN (Persero).	1.16.1	1. Explanation how the project contributes to the community development and CSR has been added in PD section 1.16. 2. The word has been removed fsection 1.16.	1. Contribution towards community development by PT P.L.N has been explained in details in the revised PD. Closed. 2. Grid frequency was not relevant in the context of Economic Well

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
2. The term “grid frequency” is not clear. 3. How the project is going to generate employment opportunity in the local area is not clear.		3. Explanation how the project generates employment opportunity in the local has been added in PD section 1.16.	being. So the PP has removed the word from section 1.16 in the revised PD. Closed. 3. PP has given brief description about the generation of employment opportunity by the project activity in the revised PD. Closed
CL 11 PP needs to provide information/Reference on methodology deviations/methodology revisions	2.1.3	There is no requirement for methodology deviations or revisions. No explanation needed in PD regarding methodology deviation or revisions. Information about no deviation/revision on methodology has been added in PD section 2.1.	Response for CL 11 should be reflected in the PD. There is no requirement for methodology deviations or revisions for the project activity. So no explanation is required. Closed.
CL 12 Kindly provide all literatures and sources referenced to determine the baseline.	2.4.7	All literatures and sources referenced to determine the baseline have been submitted to DOE (see references in financial analysis sheet).	Literatures and references which were required to develop the baseline has been provided by the PP. Closed.

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
CL 13 1. The risk free rates and premium risk are obtained from other countries which need to be justified with supporting evidences. 2. When the PP is a government company based in the host country – Indonesia, who is into the power generation sector, PP needs to demonstrate consideration of calculating country risk. 3. The premium risk is provided for the country which is not specific to the project activity; kindly justify the application of the same for this project activity. 4. PP needs to provide loan sanction letter and also needs to include the same in the revised PD. 5. PP needs to explain the determination of capacity utilization factor for this project activity with supporting evidences. 6. Biography of Dr. Damodaran is not relevant to this project. 7. Further, it is not clear if the tariff taken is as per feasibility study or	2.5.1 2.5.2 2.5.3 2.5.4 2.5.5	1. The justification and references for the risk free risk and premium risk obtained from other countries have been noted and explained in PD. 2. Power generation sector is PP. Country risk will reflect the economic risks for particular country affected by various risks for investing in such country. Regardless private or government entity, risks such as inflation, consumer confidence, political stability, currency, domestic economic strength etc will reflect on stability of index capital market value (Damodaran uses the standard deviation of equity market value and bond value to find country risk adjustment). 3. As per guidance the proposed benchmark must be suitable for the specific project activity. The premium country risk is justified due to the fact that the project activity takes place in Indonesia and not in the US. Such country risk therefore incorporate the	In Indonesia, the financial condition of entire country has not been as healthy as it has been verified through various sources submitted by the PP. In such conditions, the sector specific risk could not be established. However, the PP has come up with risk associated with the project have been calculated through country risk. PP has also taken the lowest beta value from energy sector which is conservative and hence accepted. List of all hydro power plant in the northern Sumatra grid as per 1996 as been provided and found appropriate. It is found acceptable and hence closed. Details on Asahan project has been provided in the revised and relevant explanation has been added in the revised PD. CL 13 is closed.

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
loan application? 8. PP to justify the appropriateness of the project type / industrial sector considered when calculating for beta value hence they need to correct the same in the financial calculation/WACC sheet provided to the DOE. 9. PP needs to clarify whether the beta value chosen represents raw/unlevered or levered value. 10. The beta value needs to be taken from similar type of industrial sector i.e. energy generation 11. PP need to provide evidences on equity amount, operational life time of the project activity, fair value for the project at the end of the operational life time. 12. PP needs to explain the determination of industry sector specific risk rate. 13. The PP is requested to provide justification on the appropriateness of the chosen benchmark as per the EB guidance on investment analysis. 14. As per the guidance provided in the		additional risk an investor has to take by investing in Indonesia instead of in the US. As risk free rate the US treasury bill has been taken on which the country risk has been added. Please see further explanation in the supporting document (Renun_Risk Premium Damodaran). 4. Document loan sanction letter has been submitted to DOE and added in PD (Sipansihaporas_Loan Agreement). 5. Capacity utilization factor is taken from feasibility study 1990. Relevant document has been submitted to DOE. The PLF value in the FS is similar to the actual PLF after commissioning. This shows the realistic value applied in the PD. 6. Biography of Damodaran has been removed in PDD section 2.5 Investment Analysis. 7. Tariff used in the IRR calculation taken from feasibility study 1990. See	CL 13 is closed The appropriateness of the chosen benchmark to the project activity is discussed transparently in the PD section

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
tool for demonstration and assessment of additionality version 5.2, guidance point no. 13, the PP needs to demonstrate that there was only one possible project developer and had been using consistently for similar projects with similar risks, developed by the same company. 15. PP to substantiate all arguments made under the poor performance of PLN with supportive evidences for all assumptions/ data provided. 16. PP needs to provide the project IRR after adding revenue resulting from VCS benefits 17. Provide a copy of financial statements of the organization. 18. Financial unsoundness is mentioned as one of the reasons for the project not being viable. Highlight this in the financial statements especially if these are not in English. 19. Provide support for the claims of inability to meet financial covenants. 20. Operating costs in the feasibility report does not agree to the financial analysis. Please provide proper		financial analysis sheet. 8. Beta of the electric generation industry has been compared over all years available. Lowest Beta has been applied in the benchmark analysis. 9. Beta used represent levered beta since the project is mostly financed by Loan. Beta values, formula of this type cost of equity by Damodaran are adhered in the cash flow spreadsheet calculation along with reference footnotes. 10. Beta value has been taken from the industrial sector for electricity generation. 11. Evidences have been provided to the DOE (Sipansihaporas_FS). A suggested common technical lifetime of 30 years as well as a 5% residual asset value at the end of the calculation period. 5% has been taken from the whole investment cost and not only generating equipment, due to conservativeness.	2.5. Since the PP planned to obtained loan from foreign bank and the equity from the government, the most appropriate bench mark would be WACC to assess the viability of the project. It is found conservative and hence accepted Same as above Copy of loan sanction letter has been provided and verified by the DOE. Refer to explanation given in CAR 7 Biography of Dr. Damodaran is not relevant in the discussion for additionality, which has been removed from the revised PD

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
support for the operating costs. 21. The website provided as a reference for the tax rate is not in English. 22. Clarify whether operating cost includes interest cost or not. 23. There is no discussion on PLF part in the sensitivity analysis. PP needs to submit the same in revised PD. 24. PP is requested to provide the evidence for potential and installed capacities for Hydro Power plants in Indonesia. 25. Reference need to be provided for data taken for existing hydropower plants in north Sumatra region. 26. From the table provided for existing projects, it can be observed that all projects are located only at one location. PP needs to clarify on the same. 27. It is not clear from the discussion which is the second project compared with Asahan hydro project. Kindly clarify the same.		12. As the project activity generates electricity a Beta for electric generation is applied to specify the risk premium to the underlying industry. 13. Justification on the appropriateness of the chosen benchmark has been added in PD section 2.5 Investment Analysis section. 14. The applied benchmark is not company specific. Sector and not company specific data has been used to determine the benchmark. 15. Arguments about poor financial performance of PLN have been supported by relevant document which is ADB's impact evaluation report. Such document had been submitted to DOE. 16. As per page 5 of the additionality tool, PP needs to show that the proposed project activity is not the most	The tariff has been taken as per the actual internal transfer pricing. It has been considered for the year 2002 using average escalation which is realistic.

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
		economically attractive or economically not feasible without the revenue of carbon credits. The calculation of the project IRR including carbon credit revenues is not required. 17. Copy of financial statement of the organization can be found in the company's website www.pln.co.id. 18. The information is taken from ADB's report. Such document has been submitted to DOE. 19. The information is taken from ADB's report. Such document has been submitted to DOE. 20. Operating cost is 1.5% of investment cost. This value taken from feasibility study 1990. 21. Reference of tax taken from government law UU No. 17 tahun 2000. As the document is in Bahasa, the	

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		paragraph mentioned the tax has been translated and submitted to DOE. (Sipansihaporas_UU No 17 tahun 2000_translation). 22. O&M costs already include escalation of 5% per year. 23. Paramater PLF on sensitivity analysis has been added. 24. Evidence for potential and installed capacities for Hydro Power plants in Indonesia has been submitted to DOE (Sipansihaporas_Indonesia Power Sector). 25. List of existing hydropower plants have been taken from the DNA approved grid emission factor calculation for Sumatra regions (Sipansihaporas_EF Sumatra grid 2008). The data used in the EF calculation is taken from: PT PLN (Persero) Pembangkitan Sumatera Bagian Utara 1958-2007.	

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
		26. Table has been revised to include all power plants in northern Sumatra region. 27. Asahan hydro is not connected to the grid as the power plant is only supplying the electricity to the INALUM factory. The second project mentioned in PD is the proposed project activity and it is the only large-scale hydro project in northern Sumatra region which is developed by PLN and connected to the grid.	
CL 14 “the power density of the project is more than 10W/m².” – Provide supporting evidence for the same or calculation of power density.	3.1.2	The project is a run-off-river type of hydropower plant with a regulating pondage. The regulating pondage has a surface area of 178,000 m² and power density of 281 w/m². PD has been revised in section 2.2 and 4.1 and 4.3.	Proper calculation for power density has been included in section 4.1 and 4.3. Values used to calculate the same has been taken from feasibility study report which has been cross verified Sipansihaporas FS. Closed.
CL 15 PP needs to identify procedures for emergency preparedness for cases where emergencies can cause unintended emissions. For example if both the main and	3.4.4 3.4.8	Procedures for emergency preparedness for cases where emergencies can cause unintended emissions if both the main and back up failed at the same time has	In case of total failure of all meters no credits will be claimed during such period which is satisfactory. Closed.

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
back up failed at the same time.		been added in PD section 3.4. Monitoring.	
CL 16 1. Abbreviation of emission reduction, baseline emission and project emission are not inline with the equation. 2. Justification for rejection of Simple adjusted OM, Dispatch data analysis OM, Average OM is not sufficient. 3. Justification for $PE_y = 0 \text{ tCO}_2\text{e/yr}$ lacks clarity. And also reason behind the omission Project Emission from fossil fuel consumption is missing.	4.1.1 4.1.4	1. Abbreviation of emission reduction, baseline emission and project emission has been revised in PD. 2. As per “Tool to calculate the emission factor for an electricity system” , simple OM can be chosen if low-cost/must run ration is below 50%. This is the case in the grid connected to the project activity. No further justification for rejection of other OM calculation methods is needed. PD has been revised in section 4.1. Calculation of $EF_{OM,y}$. 3. Explanation about project emission from fossil fuel has been revised in PD section 4.1 and 4.3.	1. PP has revised the abbreviations of project emission, baseline emission and emission reduction which are inline with the equation mentioned. Closed. 2. Proper justification is provided and calculation of CM (Excel Sheet) provided by Indonesian DNA has been submitted as a supporting evidence. Closed. 3. Proper explanation has been provided for $PE_y = 0 \text{ tCO}_2\text{/yr}$ by the PP. Theproject emission is mainly due to diesel consumption.According to “Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion”, if project emission is less than 1% of emission reduction then $PE_y = 0 \text{ tCO}_2\text{/yr}$. The project emission due to the project activity is $2.8 \text{ tCO}_2\text{/yr}$ which much less than 1% of emission reduction.

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			Closed.
CL 17 Provide the exact URL for the reference of NCV of diesel.	4.3.1 4.3.2 4.3.3 4.3.4	Value of NCV diesel is taken from 2006 IPCC Guidelines for National Greenhouse Gas Inventories.	Reference provided for NCV has been cross verified with IPCC 2006 guideline. Closed.
CL 18 PP is requested to submit the copy of the EIA for verification.	5.1 5.2	Copy of EIA has been submitted to DOE (Sipansihaporas_EIA). Document EIA has been submitted to DOE together with translation of the summary.	Copy of EIA is submitted by the PP. Closed.
CL 19 1. PP needs to submit all the documentary evidence for the stakeholder consultation done. 2. However the date and venue of meeting, mode of invitation for stakeholder consultation, persons invited, persons present for the stakeholder consultation, contact details and summary of comments received are not transparent in PD. Kindly provide evidences for all the above	6.1 6.2 6.3 6.4 6.5 6.6	1. Document for stakeholder consultation report has been submitted to DOE (Sipansihaporas_Stakeholder Report). Specific date of stakeholder consultation has been added in PD section 6. Starting dates of the project activity are: - Unit 1 on 14 December 2004 - Unit 2 on 21 October 2002	1. Specific date of stakeholders meeting is 17 th September 2004. Venue, persons invited, summary of comments are clearly mentioned in the revised PD and copy of Stakeholders Consultation Report, dated September, 2004 has been provided as a supporting evidence. Closed. 2. Copy of Stakeholders Consultation Report, dated September, 2004 has been provided by the PP.

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
		From the beginning PP has planned to conduct the stakeholder consultation after the project completed and both units start the commissioning. 2. All information about the date and venue of meeting, mode of invitation for stakeholder consultation, persons invited, persons present for the stakeholder consultation, contact details and summary of comments received has been added in PD section 6. Document stakeholder report has been submitted to DOE (Sipansihaporas_Stakeholder Consultation report). All comments during the forum from stakeholders are summarized in the stakeholder report. This document has been submitted to DOE (Sipansihaporas_Stakeholder Consutation).	Closed.

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project proponents' response	Validation team conclusion
CL 20 1. Also provide the project implementation schedule in detail. 2. Documented evidence for the operational life time of the project has to be submitted.	7.1	1. Project implementation schedule in detail has been explained in PD section 7. 2. Operational lifetime of 30 years has been chosen, as it is common in hydropower project. Operational lifetime of 30 years is common in hydropower project. Operational lifetime of 30 years chosen as it is common in hydropower project.	1. Project implementation schedule is provided in the revised PD by PP. Closed. 2. Operational lifetime of the HPP is mentioned as 30 years which is correct and conservative. Closed.