CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-SSC-CPA-DD)
Version 01

CONTENTS

Annexes

NOTE:

(i) This form is for submission of CPAs that apply a small scale approved methodology using the provision of the proposed small scale CDM PoA.

(ii) The coordinating/managing entity shall prepare a CDM Small Scale Programme Activity Design Document (CDM-SSC-CPA-DD)[1,2] that is specified to the proposed PoA by using the provisions stated in the SSC PoA DD. At the time of requesting registration the SSC PoA DD must be accompanied by a CDM-SSC CPA-DD form that has been specified for the proposed SSC PoA, as well as by one completed CDM-SSC CPA-DD (using a real case). After the first CPA, every CPA that is added over time to the SSC PoA must submit a completed CDM-SSC CPA-DD.

[1] The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.

[2] At the time of requesting validation/registration, the coordinating managing entity is required to submit a completed CDM-POA-DD, the PoA specific CDM-CPA-DD, as well as one of such CDM-CPA-DD completed (using a real case).

SECTION A. General description of small scale CDM programme activity (CPA)

A.1. Title of the small-scale CPA:

1.1 MW Manggani Mini Hydroelectric Project, West Sumatra, Indonesia

Version 1
Date: December 14, 2009

A.2. Description of the small-scale CPA:

The SSC-CPA involves the re-construction of a run-of-river hydropower plant that was built by the Dutch in 1937 and then abandoned in 1942 located near Batang Rambutan River in the village of Puar Datar, West Sumatra, Indonesia. The SSC-CPA's installed capacity and estimated annual gross power generation is 1.168 MW[3] and 7000[4] MWh, respectively.

The project's purpose is to supply renewable electricity to the Sumatra grid via the Power Purchase Agreement (PPA) signed with PT. PLN (Persero), the Indonesian State-owned Electricity Company, West Sumatra Region (referred later as PLN). The net electricity generated from this project - annual estimated volume is 7000 MWh - will be supplied to the national grid via a 20 kV single line.

The 1.1 MW Manggani Mini Hydroelectric Project (referred later as the SSC-CPA Manggani or the project) is being proposed by PT. Pelita Prima Nusantara (referred later as the project implementer) and will generate renewable power, which will displace part of the electricity otherwise supplied by fossil fuel fired power plants. Thus, GHG emission reductions can be achieved via this SSC-CPA.

The project's contributions to the sustainable development of the local area as well as the host country are as follows:

Social well-being:

- The SSC-CPA Manggani leads to more development in the rural region.
- During construction, the SSC-CPA Manggani is expected to generate considerable employment opportunities for the local population.
- Various kinds of mechanical work generate employment on a regular and permanent basis for the local people that increase the young people's expertise and experiences in the rural region.

Economic well-being:

- The project activity creates jobs in the local region.
- Large investments in a rural region would not have been made in absence of the project.
- The generated electricity is fed into regional grids through the local grid, thereby improving the grid stability and availability of electricity to local consumers (villagers and sub-urban inhabitants). Due to

[3] The installed capacity is referred to PPA between the project implementer and PLN.

[4] The electricity generation assumption is referred to the financial projection as part of the loan proposal to the local bank (Bank Mega) with a load factor 68.4%.

increased grid reliability, new opportunities for industries and economic activities arise with a chance for more local employment and better overall development.
- The project activity leads to diversification of the regional energy supply, which is dominated by conventional fuel based generating units.
- The project activity contributes to economic sustainability around the rural region. .

Environmental well-being:
- The SSC-CPA Manggani utilizes hydropower to generate electricity, which otherwise would have been generated through fuel- (most likely fossil-fuel-) based power plants. This way it is contributing to a reduction in specific emissions (emissions of pollutant/unit of energy generated), including GHG emissions.
- As run-of-river hydropower projects produce no end products in the form of solid waste (ash, etc.), they address the problem of solid waste disposal encountered by most other sources of power.
- Being a renewable energy source, run-of-river hydro energy used to generate electricity contributes to resource conservation.
- The SSC-CPA Manggani is the rehabilitation of an old power-plant, it has hence no noteworthy negative impact on the surrounding environment.

Technological well-being:
- The project promotes local products developed in the region when spare parts replacement is needed to support renewable technology development especially for run-of-river hydropower technology.

A.3. Entity/individual responsible for the small-scale CPA:

PT. Pelita Prima Nusantara is the responsible project owner and implementer of the SSC-CPA Manggani.

A.4. Technical description of the small-scale CPA:

From water intake water is diverted to the power plant, flowing through a channel that goes directly to the power plant. The water then is conducted through penstock to the powerhouse. In the powerhouse, one turbine and a generator are located. From there the plant connects to the next nearby power sub-station through a new or modified existing power line. A discharge channel returns the water to the natural riverbed.

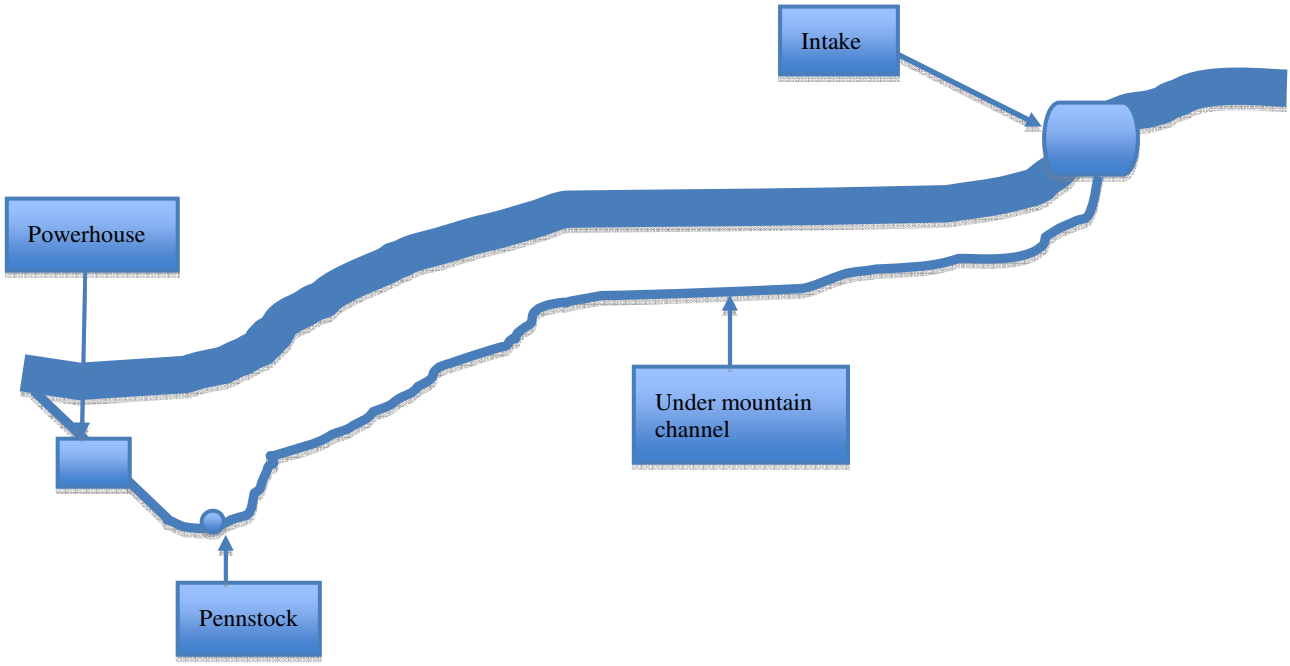

Figure 1: SSC-CPA Manggani scheme.

Table 1: Main technical parameters of the proposed project activity

Main parameters	Units	SSC-CPA Manggani
1. Turbine		
• Type		Francis Turbine with Horizontal Axis
• Diameter of runner	m	0.61
• Gross head	m	67.134
• Number of turbine	set	01
• Turbine discharge	m^3/s	1.76
• Efficiency	%	89
• Capacity	MW	1.0[5]
• Speed	rpm	750
2. Generator		
• Number	set	01
• Type		Synchronous, counter clockwise
• Rated voltage	kV	6.3
• Rated capacity	MW	1.0
• Efficiency	%	94
3. Transformer		
• Number	set	01
• Type		3 phases

[5] As per manufacturer specifications it is a 1 MW turbine but it can generate up to 1.168 MW. It is this latest value that has been reported in the PPA.

• Rated capacity	MVA	1.5
4. Annual river flow	m^3/s	1.76

Source: Technical specification from the technology provider

A.4.1. Identification of the small-scale CPA:

Sustainable Indonesian Hydro PoA – CPA001.Manggani

A.4.1.1. Host Party:

Republic of Indonesia

A.4.1.2. Geographic reference or other means of identification allowing the unique identification of the small-scale CPA (maximum one page):

SSC CPA Manggani is located in Puar Datar Village, Gunung Omeh Sub-district, Limapuluh Kota regency, West Sumatra Province, Indonesia. The project is located approximately 173 km from Padang, the capital city of West Sumatra Province. The project unique identification is the location of its powerhouse at 00°00'02" South and 100°16'04" East (see below figure).

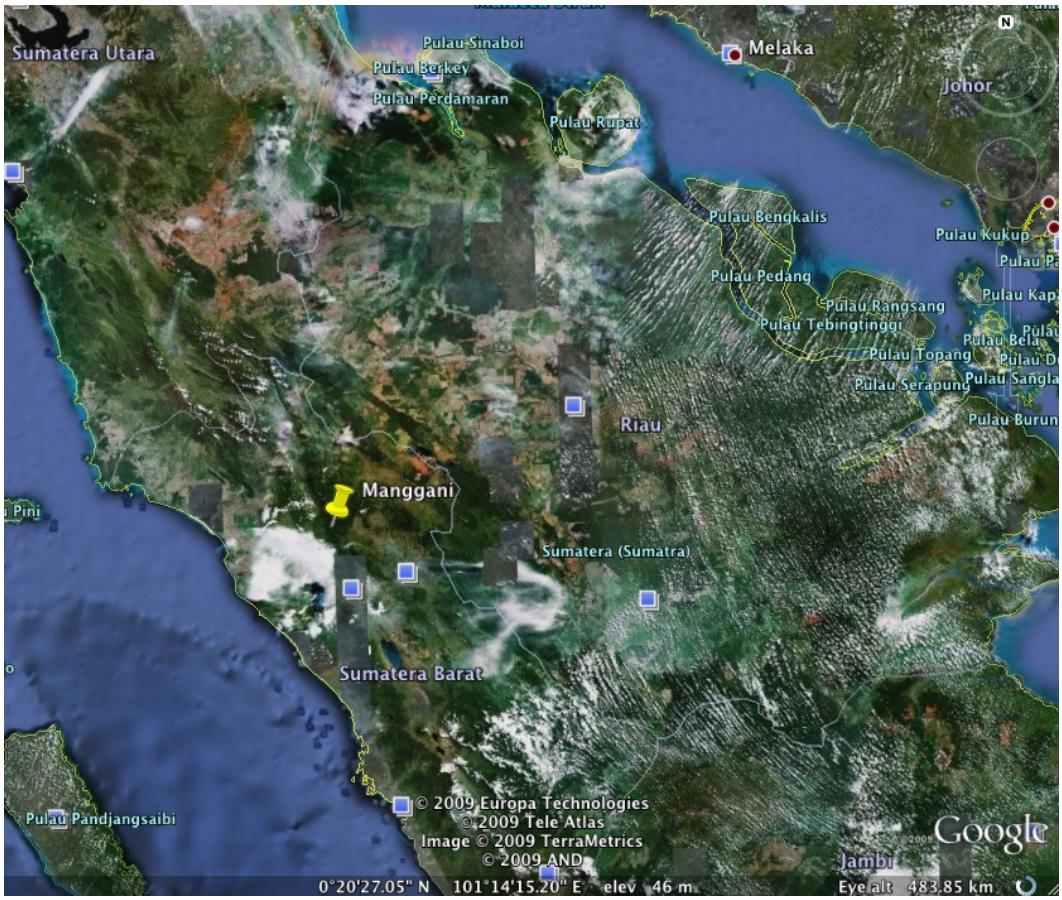

Figure 2: Project Location. Source: Google Earth

A.4.2. Duration of the small-scale CPA:

A.4.2.1. Starting date of the small-scale CPA:

02/11/2007 (Signature of a loan agreement with the local bank (Bank Mega))

This is the date where the project implementer made a commitment with the local bank (Bank Mega), is considered as the date of the project financial closure. This is in accordance with the "CDM Glossary of Terms/version 05", which defines the starting date of project as "the earliest date at which either the implementation or construction or real action of a project activity begins". See section B3 for a project timeline and more details.

A.4.2.2. Expected operational lifetime of the small-scale CPA:

30 years

A.4.3. Choice of the crediting period and related information:

Renewable crediting period;

A.4.3.1. Starting date of the crediting period:

Later of March 1, 2010 or date of inclusion of this SSC-CPA in the Sustainable Small Hydropower Programme of Activities (PoA) in Indonesia

A.4.3.2. Length of the crediting period, first crediting period if the choice is renewable CP:

7 years

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

Table 2: Estimated amount of emission reductions over the chosen crediting period

Years	Annual estimation of emission reductions in tonnes of $tCO_2.eq$
Year 1	5,201
Year 2	5,201
Year 3	5,201
Year 4	5,201
Year 5	5,201
Year 6	5,201
Year 7	5,201
Total emission reductions (tonnes of CO_2-eq)	36,407
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2-eq)	5,201

A.4.5. Public funding of the CPA:

The project does not receive public funding.

A.4.6. Information to confirm that the proposed small-scale CPA is not a de-bundled component

The compendium of guidance on the debundling for SSC project activities (EB47) is used to demonstrate that the SSC-CPA included in the PoA is not a de-bundled component of a large-scale activity.

By using the precise geographical coordinates of the SSC-CPA provided in section A.4.1.2 and comparing it with the database of registered hydro Indonesian CDM project activities and registered PoAs it has been established there is no other registered SSC-CPA of a PoA, an application to register another small-scale CPA of a PoA or another registered CDM project activity with the following characteristics:
a) The same project implementer as SSC-CPA Manggani.
b) The boundary is within 1 km of the boundary of the proposed SSC-CPA, at the closest point.

Moreover, the coordinating entity does not manage another PoA of the same sectoral scope within Indonesia.

Therefore, the project is not a de-bundled component.

A.4.7. Confirmation that small-scale CPA is neither registered as an individual CDM project activity or is part of another Registered PoA:

By using the precise geographical coordinates of the SSC-CPA provided in section A.4.1.2 and comparing it with the database of registered CDM project activities and registered PoAs it has been established that the SSC-CPA is neither registered as an individual CDM project activity nor is part of another registered PoA.

SECTION B. Eligibility of small-scale CPA and Estimation of emissions reductions

B.1. Title and reference of the Registered PoA to which small-scale CPA is added:

Sustainable Small Hydropower Programme of Activities (PoA) in Indonesia (referred later on as SSC-PoA).

B.2. Justification of the why the small-scale CPA is eligible to be included in the Registered PoA :

SSC-CPA Manggani is eligible to be included to the SSC-PoA because it fulfils all eligibility requirement of the SSC-PoA:

i. be a hydropower plant generating electricity.	SSC-CPA Manggani is a newly developed hydro

	project. All electrical equipment used in this CPA is new.
ii. comply with all eligibility requirements defined in AMS I.D. v15.	See table below.
iii. not be a capacity addition/retrofit/replacement activity at an existing hydropower plant.	SSC-CPA Manggani is re-construction of a 1937 Dutch built small hydro power plant project that has been unused since 1942. It cannot be therefore considered as an addition/retrofit/replacement project.
iv. export the renewable electricity generated to the relevant and clearly identified grid within the geographical boundary of Indonesia.	SSC-CPA Manggani is a run-of-river hydro power plant owned by one private entity and developed in West Sumatra Province, Indonesia. It connects to Sumatra Grid, which is relevant and clearly identified grid in the West Sumatra Province.
v. have a cooperation agreement with PT.HPI that governs the CPA's participation in the PoA.	The project implementer has a cooperation agreement and contractually ceded its rights to claim and own emission reductions under the Clean Development Mechanism or any voluntary scheme to the coordinating entity of the SSC-PoA.
vi. not result in the construction of new reservoirs or in an increase in the capacity of existing reservoirs where the power density of the power plant is less than 4 W/m^2.	Not applicable, the project is a run-of-river project.
vii. consist of one or more hydropower projects. Proposed projects can only be bundled in one CPA if they share some equipment (e.g. sub-station, connection line, power house), are undertaken by the same project implementer, or below if each constituent of the CPA is below 150 kW (1% of the type 1 small-scale threshold).	Not applicable, the project consists of one hydropower project.

SSC-CPA Manggani fulfils also all eligibility requirement of AMS I.D. version 15:

This category comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass, that supply electricity to and/or displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit.	The project consists of an hydropower plant delivering its electricity to an electricity grid (Sumatra grid).
Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: • The project activity is implemented in an existing reservoir with no change in the volume of reservoir;	Always true as per eligibility requirements vi of the SSC-PoA

• The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m^2; • The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m^2.	
If the unit added has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel[6], the capacity of the entire unit shall not exceed the limit of 15 MW.	The proposed SSC-CPA does not have a non-renewable component.
Combined heat and power (co-generation) systems are not eligible under this category.	The proposed SSC-CPA does not consist in a combined and heat project.
In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct[7] from the existing units.	Always true as per eligibility requirements iii of the SSC-PoA.
Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category. To qualify as a small-scale project, the total output of the modified or retrofitted unit shall not exceed the limit of 15 MW.	Always true as per eligibility requirements iii of the SSC-PoA.

B.3. Assessment and demonstration of additionality of the small-scale CPA , as per eligibility criteria listed in the Registered PoA:

As per section E.5.2 of the SSC-PoA-DD and because the proposed SSC-CPA has a PPA, the projects participants need to prove through a financial analysis that the proposed SSC-CPA would not have occurred anyway without CDM income due the investment barrier:

[6] Co-fired system uses both fossil and renewable fuels.

[7] Physically distinct units are those that are capable of generating electricity without the operation of existing units, and that do not directly affect the mechanical, thermal, or electrical characteristics of the existing facility. For example, the addition of a steam turbine to an existing combustion turbine to create a combined cycle unit would not be considered "physically distinct".

Prior consideration of the CDM:
As per the Glossary of CDM terms (version 5) the PPs define the starting date of the project activity as the 22 November 2007 as the date assessed when the financial closure of the project is reached by signing the loan agreement with the local bank (Bank Mega).
Before the signing of loan agreement, the project implementer has signed 3 other contracts (civil work, transmission lines and electromechanical equipments). These 3 contracts are not considered as event in which the project implementer "has committed to expenditures related to the implementation or related to the construction of the project activity" because there is not any deadline clausal that could cause any shortfall to the project implementer. These 3 contracts were only parts of the requirements of the local bank for loan agreement and were paid afterwards.

Date	Events
7th February 2004	The project implementer signed an agreement with chiefs of indigenous people who owned the land (Agreement with Ninik and Mamak of Puar Data Village, Limapuluhkota Regency, West Sumatra Province).
14th June 2004	The project implementer received a recommendation letter from Regent of Limapuluhkota Regency whom allowed the project implementer to re-construct/rehabilitate the SSC-CPA Manggani and to sign a PPA with PLN.
28th July 2005	The project implementer received an approval letter of the EMMP (UKL/UPL) for SSC-CPA Manggani re-construction from the Regent Secretary of Limapuluhkota Regency.
January 2006	The project implementer prepared the Feasibility Study Report.
26th June 2007	The project implementer made a clear commitment that the SSC-CPA Manggani re-construction will not be feasible without CDM revenue. Thus, the project implementer assigned its director to search CDM buyer/consultant/project developer that could help them in securing the CDM revenue.
28th June 2007	The project implementer signed a PPA with PLN.
2nd July 2007	The project implementer signed a contract for civil work with PT. Spark Coal Energy. The contract stated that the project implementer should pay the first payment after heavy equipment mobilization into project site and starting the civil work. The signed contract is basically to fulfill bank requirements without any financial obligation.
11th July 2007	The project implementer signed a contract for transmission lines work with PT. Kunango Jantan. The contract stated that the project implementer should pay the down payment after 2 weeks of the contract signing or the written notice from the project implementer to the contractor. The signed contract is basically to fulfill bank requirements without any financial obligation.
27th July 2007	The project implementer signed a contract with technology provider, Golden Marudai International Ltd. The contract stated that the shipment should be effected within 275 days after receipt of down payment and Letter of Credit (L/C) confirmed by the project implementer's bank. In addition to that, the delivery should be postponed accordingly, should the payment be delayed. The signed contract is basically to fulfill bank requirements without any financial obligation.
September 2007	The project implementer sent a revised proposal to Bank Mega, in which the CDM revenue is considered as other additional income.

5th November 2007	The project implementer sent a letter to Mr. Ario Senoadji, the Vice President of Renewable Energy at PT. PLN (Persero) to notify their intention to seek for CDM.
22nd November 2007	The project implementer signed a loan agreement with Bank Mega, which is concluded as the project financial closure and the CDM project start date.
Beginning of 2008	The project implementer has profoundly communicated with some CDM project developers/consultants and discussed about the CDM registration possibility.
January 2008	Civil work started.
25th April 2008	The project implementer signed a contract for EPC work, PT. Tiara Indotim.
12th June 2008	The project implementer received the temporary clearance for electricity generation clearance from Directorate General of Electricity and Energy Utilization/DGEEU (Indonesian: Direktorat Jenderal Listrik dan Pemanfaatan Energi/DJLPE).
June 2008	The project implementer was approached by South Pole CAM Ltd. to have possibility of the proposed SSC-CPA to be registered as CDM project.
July 2008	Transmission lines work started.
September 2008	The first draft of ERPA sent to the project implementer by South Pole CAM Ltd..
October 2008	The project implementer signed an ERPA with South Pole CAM Ltd..
October 2009	The installation of hydro turbine and generator started.
28 December 2009	Commissioning of the project is planned.
January 2010	Commercial operation of the project is planned.

As per the project timeline provided below and the *Guidance on the demonstration and assessment of prior consideration of the CDM (version 3)* and because the project start date is dated before 2nd of August 2008, the proposed SSC-CPA can be defined as an existing project activity. Several events can be used to assess the awareness of the CDM prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project:

- the 26th June 2007, the PO took the decision to assign internal resource for CDM services search
- September 2007, the PO included the CDM revenues in the financial plan provided to the Bank
- 5th November 2007, the PO informed PLN about its willingness to seek for CDM status

Events in the beginning of 2008 until October 2008 show also that the project implementer have continuously and rapidly sought to secure CDM status since the investment decision.

At the light of all these events, it can be therefore concluded that the CDM has been seriously considered by the project implementer.

Financial analysis:
An investment analysis has been conducted for the proposed project which has included the various variables and input data for the capital investment, operating & maintenance cost and estimated savings or revenues, as shown in the following table.

Table 3: Input data for financial analysis

PROJECT DATA			
	Unit	**Value**	**Reference**

Technical lifetime	year	**30**	*Tool to determine the remaining lifetime of equipment (Version 01), EB 50.*
Investment decision date	DD/MM/YY	22-Nov-07	*Loan agreement*
Construction start date	year	**2008**	*Commissioning plan*
Date project starts operating	year	**2010**	*Commissioning plan*
Annual electricity generation	MWh/year	**7'000**	*Detail financial report sent to the local bank.*
FINANCIAL PARAMETERS			
	Unit	**Value**	**Reference**
Electricity tariff	IDR/kWh	**461.50**	*PPA*
Increase in electricity tariff	% per 3 years	**6.00%**	*PPA*
Inflation	% per 3 years	**10.00%**	*Detail financial report sent to the local bank*, which is conservative when one considers that the inflation is circa 10% per year in Indonesia.
Corporate tax	% p.a.	**30.00%**	*Tax regulation UU no 17 year 2000*[8]
(Other taxes)	% p.a.	**0.00%**	-
Depreciation	%	**3.33%**	*Tax regulation UU no 17 year 2000*
Exchange Rate	USD/IDR	**0.000111**	12 last months average at investment decision: http://www.oanda.com
COSTS AND EQUIPMENT			
	Unit	**Value**	**Reference**
Total investments	IDR	**16'364'000'000**	*Detail financial report sent to the local bank.*
(Other revenues)	IDR	**0**	-
Operation & Maintenance cost	IDR/year	**584'000'000**	*Detail financial report sent to the local bank.*
(Other operating expenditure)	IDR/year	**0**	-
Insurance	% of Capex p.a.	**0.1215%**	*Insurance quotation dated on December 11, 2007.*

The benchmark used to compare the return of the project has been chosen as the WACC and has been calculated as per the investment decision date. In order to determine the WACC the CAPM has been used to estimate the cost-of-equity. The list of parameters used to estimate the WACC is provided below:

Parameters	Description	Source and choice of the value	value
RFR (Risk free rate)	Indonesian government 20-year bond rate	Source: Central Bank of Indonesia. Lowest yield for 19 years bond as per the 22/11/2007	9.93%

[8] Tax regulation available at investment decision date.

ß	5 year average beta for energy sector in Indonesia or emerging market (Beta is the correlation between an energy stock index performance and average stock market performance)	2003-2007 average beta as provided by Prof. Aswath Damodaran[9] is used	1.09
r_m	Rate of return of the market	not required here as beta from Prof. Aswath Damodaran is used.	
$r_{portfolio}$	Rate of return of the portfolio	not required here as beta from Prof. Aswath Damodaran is used.	
MR (Market Return)	5 years averaged yearly rate of return of the Jakarta Composite Index	JSX- yearly average yield calculated from 22 November 2002 to 22 November 2007	47.09%
RP (Risk Premium)	Small company risk premium	Small-company risk premium; average of premiums for "microcap" (10th decile) sector, from "Stocks, Bonds, Bills and Inflation," Valuation edition, 2001 Yearbook, Ibbotsons Analysis. Copy available upon request.	2.62%
CD (Cost of debt)	Interest Rate Loans by commercial banks for investment	Interest rate form commercial bank for investment loans in November 2007. Source: Central Bank of Indonesia	13.19%
% Debt (Debt ratio)	Average industry debt ratio	Based on a common practice in the power industry, http://www.worldbank.org/html/dec/Publications/Workpapers/WPS1800series/wps1868/wps1868.pdf - Government. Support to Private Infrastructure Projects in Emerging Markets, page 6, last paragraph B.	70%
%Equity	Average industry equity ratio	Calculated as 1- %Debt ratio	30%
%Tax (Tax rate)	Tax rate applicable to the hydro project	Tax Regulation, UU no 17 year 2000[10]	30%

[9] Personal communication

[10] www.pajak.go.id, *Undang-undang nomor 17, tahun 2000*

CE (Cost of equity)	Five years average expected return on equity in Indonesia	Calculated as per CAPM	53,21%
Investment decision date	Date	As per guidance 6 of Guidance on the Assessment of Investment Analysis (Version 02). It will be usually considered as the date in which the main payment being made or financial closure, whichever is the earliest.	22.11.07

As per the date of investment the CAPM and the WACC has been found as 53.21% and 22.43% respectively.

The results of the financial analysis show that the project is not financially viable. The Project IRR without CDM revenue shows an IRR of 13.40%, which below 22.43%, the benchmark rate of return for comparison as stated in section E.5.2 in the SSC-PoA-DD. Moreover, as shown in the table below, while altering the investment, the O&M costs or the revenues, the IRR stays below the benchmark. Only great variations of investment costs or revenues of more than 40% could reach the benchmark. Therefore, the proposed SSC-CPA is considered as additional.

Table 4: IRR calculation results and sensitivity analysis

	IRR	Variation that hits the Benchmark	Likelihood to happen
Initial	13.33%	---	---
Investment -10%	14.70%	-43%	There is more than one year between the investment decision date and the date in which the financial report used for this analysis. The probability of a 43% decrease in the total investment cost is not likely to happen because the inflation, average consumer prices in Indonesia is more than 10%. 2005, 2006 and 2007 show an annual price increase of 15.3%, 13.9% and 13.4% respectively[11].
Revenues +10%	14.87%	+62%	The revenues of this hydro plant are linked linearly with the feeding tariff and the plant load factor. The probability of a 61% increase the revenue is very unlikely because the electricity tariff was fixed in the PPA (signed before the project start

[11] calculated based on Indonesian Wholesale Price Indices :http://www.bps.go.id/eng/tab_sub/view.php?tabel=1&daftar=1&id_subyek=20&notab=1

			date) and because the load factor is already very high (68.4%) and as a consequence a raise of 62% is not realistic.
O&M -10%	13.65%	-315%	No O&M expenditures is not a relevant hypothesis

B.4. Description of the sources and gases included in the project boundary and proof that the small-scale CPA is located within the geographical boundary of the registered PoA.

The GHG emission sources included in or excluded from the project boundary are as follows:

Table 5: GHG Sources included to within project boundary

	Source	Gas	Included?	Justification/Explanation
Baseline	Sumatra Grid	CO_2	Included	According to AMS I.D. version 13, only CO_2 emissions from electricity generation should be accounted for.
		CH_4	Excluded	According AMS I.D.
		N_2O	Excluded	According AMS I.D.
Project Activity	SSC-CPA Manggani	CO_2	Excluded	According AMS I.D.
		CH_4	Excluded	According AMS I.D.
		N_2O	Excluded	According AMS I.D.

SSC-CPA Manggani is located within the boundaries of Republic of Indonesia as specified in A.4.1.2.

B.5. Emission reductions:

B.5.1. Data and parameters that are available at validation:

The CO_2 emission factor for the Sumatra Grid will be taken from the EF grid value published by the Indonesian DNA.

The weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$) are calculated according to the procedures prescribed in the "Tool to calculate the emission factor for an electricity system", Version 01, 19 October 2007 (EB 35).

Data / Parameter:	$EF_{grid,CM}$
Data unit:	t CO_2/MWh
Description:	CO_2 emission factor for electricity displaced in the grid
Source of data used:	Indonesia DNA published value
Value applied:	0.743
Justification of the choice of data or description of measurement methods and procedures	The parameter is calculated as the combined margin (CM) according to the "Tool to calculate the emission factor for an electricity system (version 01)". For operating margin (OM) and built margin (BM) the respective ex-ante approaches are chosen by using the latest years of OM and BM data available from PLN (the national electricity company).

actually applied:	Indonesian DNA website link: http://dna-cdm.menlh.go.id/id/database/
Any comment:	

B.5.2. Ex-ante calculation of emission reductions:

The total emission reductions of the SSC-CPA is calculated on the basis of the equations and parameters presented and explained in the section E.6.1 of the SSC-PoA-DD and B.5.1 of this document. Baseline information for the combined margin emission factor is publicly available in the Indonesian DNA website.

Baseline emissions

Table 6: Net electricity generation of the project

Year	year 1	year 2	year 3	year 4	year 5	year 6	year 7
$EG_{BL,y}$ (MWh/year)	7,000	7,000	7,000	7,000	7,000	7,000	7,000

EF_{CO2}= 0.743 tCO_2/MWh[12]

Equation:

$BE_y = EG_{BL,y} * EF_{CO2}$

Result:

Table 7: Baseline emissions from electricity generation

Year	year 1	year 2	year 3	year 4	year 5	year 6	year 7
$BE_{y,}(tCO_2/year)$	5,201	5,201	5,201	5,201	5,201	5,201	5,201

B.5.3. Summary of the ex-ante estimation of emission reductions:

Table 8: Ex-ante estimation of emission reductions

[12] Indonesian DNA published value: http://dna-cdm.menlh.go.id/id/database/

Year	Estimation of project activity emissions (tonnes of CO_2 e)	Estimation of baseline emissions (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of overall emission reductions (tonnes of CO_2 e)
2010	0	5,201	0	5,201
2011	0	5,201	0	5,201
2012	0	5,201	0	5,201
2013	0	5,201	0	5,201
2014	0	5,201	0	5,201
2015	0	5,201	0	5,201
2016	0	5,201	0	5,201
Total estimated emissions and emission reductions in tonnes of CO_2 e	0	36,407	0	36,407

B.6.1. Description of the monitoring plan:

The monitoring plan of SSC-CPA Manggani is consistent with methodology AMS 1.D. "Grid connected renewable electricity generation" (version 15). Description of the monitoring plan is presented below.

1. Monitoring Plan Objective and Organisation

The project implementer will monitor the electricity delivered to the Sumatra grid by the respective project. The project implementer personnel will be trained adequately for this task. The data will be archived electronically and be stored for 2 years after the end of the crediting period of the SSC-CPA.
To ensure that the data is reliable and transparent, the project implementer will also establish Quality Assurance and Quality Control (QA/QC) measures to effectively control and manage data reading, recording, auditing as well as archiving data and all relevant documents.

2. Monitoring Data

Data to be monitored is the net electricity delivered to the Sumatra grid by the project. The monitoring of electricity delivered as follows:
a) At the first day of each month the project implementer personnel and the grid company will take a meter reading and record this figure in the operational data record. The operational data record will be used as the electricity invoice preparation.
b) If revenue meter failed to record the exported electricity from the proposed SSC-CPA, the electricity invoice will be referred to the last 3-months electricity invoices.
The entity responsible for monitoring, which is the project implementer, will provide the verifying DOE with meter readings for electricity delivered and calibration certificates.

3. Quality Assurance and Quality Control

QA&QC procedures for recording, maintaining and archiving data shall be implemented as part of this

SSC-CPA.
The installation location of the meters will be further defined when the project is at a more developed stage. The project implementer will implement QA&QC measures to calibrate and guarantee the accuracy of metering and safety of the project operation.
The metering devices will be calibrated and inspected every 5 years as per the Government of Indonesia regulation, to ensure their accuracy.

4. Verification of Monitoring Results

The responsibilities for verification of the projects will be further defined when the project is at a more developed stage. The project implementer, with a help of the coordinating entity will carry the responsibility for providing the DOE with all required necessary information, before, during and in the event of queries, after the verification.

The parameter to be monitored is:

Data / Parameter:	EG_y
Data unit:	MWh/year
Description:	Net electricity generation of the project activity in year "y"
Source of data used:	Measured by an electricity meter
Value applied:	7,000 MWh/year
Description of measurement methods and procedures actually applied:	The net electricity production will be measured continuously. A high level of accuracy of the measurements will be achieved due to the use of high-precision equipment calibrated and tested according to recognized standards.
QA/QC procedures to be applied:	QA: the device will be recalibrated and tested according to the instructions (schedules, procedures) for QA based on technology provider manual and/or government regulations. QC: there will be strict compliance maintenance schedule organized by the project implementer.
Any comment:	Data will be used for billing and therefore checked by project owner and power company (PT. PLN). Data will be archive electronically during the crediting period and be stored for two years afterwards.

C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

☐ Please tick if this information is provided at the PoA level. In this case sections C.2. and C.3. need not be completed in this form.

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

The issues covered by the environmental diagnostic were the biophysical, biodiversity, socioeconomical and cultural characteristics of the area and people next to project and vulnerabilities and compensation activities due to the construction and operation of the small hydropower.

Regarding biophysical and biodiversity consequences the diagnostic found that the project does not have a significant impact due to the fact that no dam is built, the ecological flow will be preserved, and because the reforestation activities will contribute to the preservation of the surrounding ecosystem.

In the area of socioeconomical and cultural impacts the diagnostic found that the project will contribute positively to create employment for the communities living next to the project during its construction and operation, including reforestation activities.

Overall the conclusion was that the hydroelectric project does not cause any significant negative environmental impact. Instead, the reforestation activities to be carried out will positively contribute to preserve the basin of the Batang Rambutan River. Due to these facts the Environmental Management and Monitoring Plan (EMMP) from the Lima Puluh Kota Regency was approved on July 28th 2005.

C.3. Please state whether an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA), in accordance with the host Party laws/regulations:

Based on the Ministry of Environment Decree No. 11 in year 2006, SSC-CPA Manggani will not need an environmental impact assessment but only an Environmental Management and Monitoring Plan (EMMP) because it is a run-of-river small hydro power plant with an installed capacity ≤ 15 MW and no dam construction.

SECTION D. Stakeholders' comments

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

☐ Please tick if this information is provided at the PoA level. In this case sections D.2. to D.4. need not be completed in this form.

D.2. Brief description how comments by local stakeholders have been invited and compiled:

Invitation procedure:
Previously to the organization of the meeting, the project implementer identified local residents, tribes' representatives and local policy makers as possible affected individuals making sure that their participation in the consultation. Personal invitations were sent out by mail and publicly announced in front of the Puar Datar Village office two weeks in advance of the meeting.

Meeting and compilations of comments:
The meeting, organized on July 6th 2009 at 10:00am at the Puar Datar Village office in the Lima Puluh Kota Regency, was attended by 15 members of the community, including tribes' representatives, youth organization, as well as local authorities as Environmental Agency of Lima Puluh Kota Regency, Gunung Omeh Sub-district.

The meeting started with a welcoming speech, Agenda of the meeting presentation and also an explanation of the proposed SSC-CPA that put special emphasis on the environmental and socio-economic issue of the Manggani mini hydro power plant construction by Mr. Sadman as the project

implementer representative. Subsequently, a presentation of the greenhouse gases (GHGs), the global climate change, CDM overall scheme and registration process under PoA and Gold Standard CDM was conducted by Ms. Ikke Martha, a representative of South Pole Carbon Asset Management Ltd..

The participants did not mention any negative impact upon the environmental parameters such as soil, water quality and quantity, etc. Moreover, everyone agreed that the project would be beneficial to both the environment and their communities and expect positive social benefits. Mr. Sadman then opened the space for open questions from the participants. A representative of the project implementer compiled minutes of the meeting.

D.3. Summary of the comments received:

Question 1 (Datuk Bosa Batuah):

- *As the representative of Banu Hampu tribe, I would like to express my support to the reconstruction/rehabilitation of Manggani Mini Hydropower (MHPP). The reconstruction/rehabilitation of Manggani MHPP would overcome the lack of supply of electricity in the Gunung Omeh sub-district. I hope that PT. PPN will prioritize employing the local community in this project.*

Answer 1 (Mr.Sadman, PT. PPN representative):

- *Thank you for the question. PT. PPN, as the owner of Manggani MHPP, really appreciated the support from all local stakeholders on this project.*

- *Currently, we almost finish civil works in relation to reconstruction/rehabilitation of Manggani MHPP. During the pre-reconstruction and reconstruction period, we have employed 100 workers from local villages. The reconstruction jobs are road and bridge construction; reconstruction of the water channel; reconstruction of the Power House; build the guardhouse and transmission work. During operational phase, 20 local workers will be employed as field operators and technicians.*

Question 2 (Dodi Arestu):

- *For electricity generation purpose, the Manggani MHPP will utilize the Batang Rambutan River flow. Will the project affect the river water quality?*

- *We strongly urge that the project management shall not employed people from other villages/regencies/provinces during the reconstruction and operational phase of the Manggani MHPP.*

Answer 1 (Mr. Sadman):
As we have explained earlier, most workers for vacant positions at the Manggani MHPP are coming from Puar Datar Jorong, with a few exceptions of some highly technical positions.

Answer 2 (Ms. Ikke Martha, South Pole Carbon Asset Management Ltd. representative):
The Manggani MHPP is a small capacity hydropower plant of 1.1 MW maximum electricity generation. Therefore, we do not need to construct a large water dam as in other hydro power plants. Potential energy from water flow will be converted into mechanical energy to turn the turbine. Afterwards, the used water will be directed out of the Power House and shall be returned to its original course.

Question 3 (Dasral):

- *How many CPAs could join in the PoA, and are there any special requirements to be a CPA project?*
- *What kind of benefits that local community could gain from this project?*

Answer 1 (Ms. Ikke Martha):
There is no limitation number for MHPP to join the PoA. Any MHPP could join the PoA as long as it is connected to the PLN Grid (On Grid) and has 1 MW capacity in minimum. The 1 MW capacity is a specific requirement from South Pole, because to register a CDM Project we need to do validation and verification processes. The validation cost is around 40,000 € while ER from mini hydropower plants around 5,000 tCO2e. Therefore, MHPP with capacity under 1 MW will not be too attractive to be developed at this stage, still there is a possibility to include other MHPPs lower than 1 MW in the future as soon as the PoA registered.

Answer 2 (Mr. Sadman):
Local community will get social and economical benefits from the project. As previously discussed, some new job openings are available for the community with respect to specific skills and specialization. This new working field could increase the social welfare of worker in particular and increase the district income in general. The earning from CER issuance will be uses to maintain the power plant operation. Thus, the community will be benefited by continuation of power supply from this power plant.

D.4. Report on how due account was taken of any comments received:

All comments were considered and there was no need to amend the SSC-CPA-DD in order to take those comments in to account. Further, see summary of comments and answers above.

Annex 1

CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE SMALL-SCALE CPA

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The project does not receive any public funding.

Annex 3

BASELINE INFORMATION

The baseline information was retrieved from Indonesian DNA website: http://dna-cdm.menlh.go.id/id/database/

Annex 4

MONITORING INFORMATION

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