Presentation 3

EXAMPLES OF PROJECT DESIGN DOCUMENT(PDD)

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1.0 Introduction

The project design document (PDD) is the most important document in the CDM process. This document is a compulsory requirement for the DNA approval and registration process by the CDM Executive Board (EB). This document comprises 7 parts with additional appendices and is publicly displayed for stakeholders' comments..

The seven parts of the PDD are as follows:

- Part A: Project introduction , salient features – basically similar to the PIN
- Part B: Describes baseline methodology and additionality of the project
- Part C: Crediting period details
- Part D: Monitoring details
- Part E: Estimation of GHG reduction with a list of all formulae used
- Part F: Environmental and SD impact

Part B explains the baseline methodology(ies) employed with rationale for its selection. It also lists all the formulae used in the emissions reduction calculations. It also describes the deemed project boundary and any associated leakage emission. The final emission reduction is the difference between the baseline reduction and the project emission (including leakage).

Part D details the monitoring methodology and plan. The description of the data to be monitored is presented and the persons/entity responsible for recording of this data is specified.

Part E furnishes the results of Environment Impact Assessment (EIA)studies performed and impacts of the project on Sustainable Development of the community/ies involved.

2.0 Example of a Project Design Document

The following sections present the excerpts from the PDD of the first CDM project in Fiji[1]:

2.1 Fiji small-scale hydro project (A bundled Small Scale Project)

A1. Title of the project activity :Vaturu and Wainikasou small-scale hydro project

A.2 Description of the project activity

The proposed project activity is one small-scale hydro project bundling two measures into one PDD. The Vaturu and Wainikasou projects are small-scale run-of-river hydro projects in Fiji….. Total installed capacity of the Vaturu and Wainikasou projects are 3MW and 6.5MW, respectively.

A.3 Project participants

- Sustainable Energy Limited (SEL), project developer
- ABN AMRO BANK N.V. London Branch, CER purchaser from an Annex 1 Country

A.4 Technical description of the project activity

A.4.1 Location of the project activity:

A.4.1.1 Host country Party: Fiji

A.4.1.2 Region/State/Province etc.: Viti Levu Island

A.4.1.3 City/Town/Community etc: Sabeto, Nandi Province (Vaturu project). Central highlands of Viti Levu in an area called Waimala-Naidasiri (Wainikasou project

A.4.4 Public funding of the project activity

- The project will not receive any public funding from Parties included in Annex I.

A.4.5 Confirmation that the small-scale project activity is not a debundled component of a larger project activity

- According to Appendix C of the simplified modalities and procedures for small-scale CDM project activities, the SEL small-scale renewable energy projects <u>are not part of a larger emission-reduction project.</u>

A.4.2 Type and category(ies) and technology of project activity

- Small Scale- Type/Category ID (Renewable Energy

[1] This PDD can be downloaded from cdm.unfccc.int

- Projects / Renewable electricity generation for a grid).

A.4.3 Brief statement on how anthropogenic emissions of greenhouse gases (GHGs) by sources are to be reduced by the proposed CDM project activity

- The proposed activity will displace existing and future generation facilities in Fijian national electricity grid. Under the business as usual scenario there would be continuing growth in diesel based electricity generation capacity.
- Total emission reductions from the electricity generated by the bundle of the projects are estimated as 523,488 tCO_{2e} over 21 years (crediting period), which means an average annual emission reduction of 24,928 $tCO_{2e.}$

B Baseline methodology

B.2 Project category applicable to the project activity

Two options for baseline calculation:

(a) The average of the "approximate operating margin" and the "build margin"

OR

(b) The weighted average emissions (in kgCO2/kWh) of the current generation mix.

Option (a) is selected .

Formulae used

Total emissions, E, are given by:

E(ton CO2/yr) = $\Sigma_J E_J$ (ton CO_2/yr) [1]

Where E_J = CO_2 emissions per year of the generation mode *j,* calculated by:

$\boldsymbol{E_J}$ **(ton** $\boldsymbol{CO_2}$**/yr) =** $\boldsymbol{PG_J}$ **(MWh/yr) * C**$\boldsymbol{EF_J}$ **(tCO2/TJ), [2]**

Where $\boldsymbol{PG_J}$ = electricity generation of power plant *j*

$\boldsymbol{CEF_J}$ = emission capacity of the fuel-fired power plant *j*

Weighted average emission <*E*>, representing the emission intensity, is given by:

<*E*> (ton CO2/MWh) = *E* (tCO2/yr) / *PG* (MWh/yr), [3]

Where *E* is given by equation (1);

also *PG* (MWh/yr) = Σ_J *PG* $_J$ (MWh/yr)

Equation 3 applies to both the operating margin and build margin cases.

The emission intensity coefficient, *<E>*baseline, is

<*E*>baseline (ton CO2/MWh) = {<*E*>operating margin (tCO2/MWh) +
<*E*>build margin (tCO2/MWh)} / 2

The baselines emissions, $E_{baseline}$, are given by:

$E_{baseline}$ (ton CO2/yr) = $<E>_{baseline}$ (tCO2/MWh) * *PEG* (MWh/yr)

Where *PEG* stands for the Project's electricity generation

Difference between Baseline emissions and the project activity emissions represents the emission reductions due to the project activity during a given period. In this project activity emissions = 0 (Hydro)

The emission reduction = 0.656 tons CO2/MWh * 38,000 MWh/year = 24,928 tons CO2/year

B.3 Description of how the anthropogenic GHG emissions by sources are reduced below those that would have occurred in the absence of the proposed CDM project activity

The Project will result in the reduction of greenhouse gases that would not occur if the project were not implemented. The numerous barriers and risks associated with the implementation of the proposed project activity are identified.

Two scenarios are considered : 1)**The continuation of current activities**

2) The construction of two minihydro plants

Using simplified modalities and procedures for CDM small-scale project activities evidence to why the proposed project is additional is offered under the following categories of barriers:

(a) investment barrier,

(b) technological barrier, and

(c) prevailing practice.

Based on the barrier analysis the project is shown to be additional.

B.4 Description of the project boundary for the project activity

For Vaturu and Wainikasou this includes emissions from activities that occur at the project location related to the production of electricity from hydropower. the emissions related to production, transport and distribution of the fuel used in the power plants in the baseline are not included in the project boundary, as these do not occur at the physical and geographical site of the project. For the same reason the emissions related to the transport and distribution of electricity are also excluded from the project boundary.

C. Duration of the project and crediting period

C.1.1. Starting date of the project activity (DD/MM/YYYY): 01/05/2004

C.1.2. Expected operational lifetime of the project activity: 50y-0m

C.2 Choice of the crediting period and related information:

C.2.1.1. Starting date of the first crediting period (DD/MM/YYYY): 01/06/2005

C.2.1.2. Length of the first crediting period: 7y-0

D. Monitoring methodology and plan

D.1. Name and reference of approved methodology applied to the project activity:

Type I.D. Projects, the monitoring will consist of metering the electricity generated by the renewable technology

D.2. Justification of the choice of the methodology and why it is applicable to the project activity:

D.3 Data to be monitored:

ID n°	Data type	Data variable	Data unit	Measured (m), calculated (c) indicated (I)or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data to be kept?	Comment
D.3.1	Electricity	Electricity Generation of the Project delivered to the Grid	MWh	M	Daily	100%	Electronic and paper	During the whole crediting period + 2 years	This item will be monitored by meters and through the electricity bill by the distribution company

D.4. Name of person/entity determining the monitoring methodology:

EcoSecurities Ltd. is the entity determining the monitoring plan and participating in the project as the CO_2 Advisor. FEA is responsible for operating and maintaining the projects operations management is to be carried out by SEL under given parameters.

Baseline calculations

The following table shows the operating margin data for 10 plants in Viti Levu:

Operating Margin Data:

Plant Name	Technology	Fuel Type	MWh	MW	Fuel Consumption Unit	Fuel Consumption per year	Year Plant Online
Kinoya	Internal Combustion	diesel	132,138	35.51	litres	32,497,208	72,77,01
Vuda	Internal Combustion	diesel	83,282	24.08	litres	20,993,160	76, 01
Nadi	Internal Combustion	diesel	9,265	7.64	litres	2,564,347	68, 70
Sigatoka	Internal Combustion	diesel	4,298	8.88	litres	1,248,977	53 to 03
Deuba	Internal Combustion	diesel	3,926	1.7	litres	1,317,100	54 to 79
Rakiraki	Internal Combustion	diesel	1,808	1	litres	523,500	1997
Korovou	Internal Combustion	diesel	745	1.095	litres	236,970	99 to 04
Rokobili	Internal Combustion	diesel	4,292	3.3	litres	924,281	2003
Monasavu	Internal Combustion	diesel	123	0.155	litres	90,800.00	2003
Vatuwaka	Internal Combustion	diesel	5,106.00	5	litres	1,293,050.00	2003

Source: Fijian Electricity Authority (March 2004, obtained through personal communications)

And the build margin data for 6 recently constructed power plants:

Build Margin Data – 20% of recent plants built:

Plant Name	Technology	Fuel Type	Fuel Consumption (liters/year)	MWh	Cum Gen	% of capacity	Year Online
Sigatoka 5,6,7,8,9	Internal Combustion	diesel	618,862	2,130	2,130	0.35	2003
Korovou 2+3	Internal Combustion	diesel	157,980	496.67	2,626	0.43	2003
Rokobili	Internal Combustion	diesel	924,281	4,292	6,918	1.14	2003
Monasavu	Internal Combustion	diesel	90,800	123	7,041	1.16	2003
Vatuwaka	Internal Combustion	diesel	1,293,050	5,106.00	12,147	2.00	2003
Kinoya 3,4	Internal Combustion	diesel	19,163,377	77,921	90,068	14.86	2001

The emission factor is calculated as below:

Calculation of Emission Factors:

Name	Technology	Fuel Type	kWh	liters/year	kWh /liter	Density (kg/l)	Carbon %	CEF (kg CO2/kWh)	kg CO2
Kinoya	Internal Combustion	diesel	132,138,000	32,497,208.00	4.07	0.83	86.10%	0.644	85,152,759
Vuda	Internal Combustion	diesel	83,282,000	20,993,160.00	3.97	0.83	86.10%	0.661	55,008,587
Nadi	Internal Combustion	diesel	9,265,000	2,564,347.00	3.61	0.83	86.10%	0.725	6,719,384
Sigatoka	Internal Combustion	diesel	4,298,000	1,248,977.00	3.44	0.83	86.10%	0.761	3,272,707
Deuba	Internal Combustion	diesel	3,926,000	1,317,100.00	2.98	0.83	86.10%	0.879	3,451,210
Rakiraki	Internal Combustion	diesel	1,808,000	523,500.00	3.45	0.83	86.10%	0.759	1,371,732
Korovou	Internal Combustion	diesel	745,000	236,970.00	3.14	0.83	86.10%	0.833	620,935
Rokobili	Internal Combustion	diesel	4,292,000	924,281.00	4.64	0.83	86.10%	0.564	2,421,903
Monasavu	Internal Combustion	diesel	123,000	90,800.00	1.35	0.83	86.10%	1.934	237,924
Vatuwaka	Internal Combustion	diesel	5,106,000	1,293,050.00	3.95	0.83	86.10%	0.664	3,388,192
		SUM:	244,983,000	Total kWh				SUM:	161,645,333

Sources: Plant data, FEA, 2003
Density - Kemps Engineering Handbook
Carbon % - Kemps Engineering Handbook

Approximate Operating Margin (OM) Calculation:

Total kWh	Total kg CO_2	OM (tCO_2/MWh)
244,983,000	161,645,333	**0.66**

Build Margin:

Name	Technology	Fuel Type	kWh	liters/year	kWh/liter	Density	Carbon %	CEF (kg CO2/kWh)	Kg CO2
Sigatoka 5,6,7,	Internal Combustion	diesel	2,129,640	618,862	3.44	0.83	86.10%	0.761	1,621,612
Korovou 2+3	Internal Combustion	diesel	496,667	157,980	3.14	0.83	86.10%	0.833	413,957
Rokobili	Internal Combustion	diesel	4,292,000	924,281	4.64	0.83	86.10%	0.564	2,421,903
Monasavu	Internal Combustion	diesel	123,000	90,800	1.35	0.83	86.10%	1.934	237,924
Vatuwaka	Internal Combustion	diesel	5,106,000	1,293,050	3.95	0.83	86.10%	0.664	3,388,192
Kinoya 3,4	Internal Combustion	diesel	77,920,859	19,163,378	4.07	0.83	86.10%	0.644	50,213,990
Vuda 3,4	Internal Combustion	diesel	43,577,791	10,984,793	3.97	0.83	86.10%	0.661	28,783,563
		SUM:	133,645,956	Total kWh				SUM:	87,081,140

Sources: Plant data, FEA, 2003
Density - Kemps Engineering Handbook
Carbon % - Kemps Engineering Handbook

Build Margin (BM) Calculation:

Total kWh	Total kg CO_2	BM (tCO_2/MWh)
133,645,956	87,081,139.59	**0.65**

The baseline emission rate (BER) taken as the average of build margin and operating margin was 0.656 tCO_2/MWh.

Calculation of Emission Reductions:

Emission Reduction Calculations for Vaturu + Wainikasou bundle:

	Year 1
Project Generation (MWh/year)	38,000
Average of Operating Margin and Build Margin CEF:	0.656
Total Emission Reductions:	24,928

F. Environmental Impacts

Statements of Environmental Impact have been carried out for both the Vaturu and Wainikasou projects. Information contained in these reports suggests that there are no negative environmental impacts expected from the projects. Evidence of this is provided below through extracts from the Statement of Environmental Impact undertaken for Vaturu and Wainikasou by SEL.

G. STAKEHOLDERS COMMENTS

Extensive stakeholder consultation has been undertaken for both projects: Vaturu and Wainikasou.Specifically, for Vaturu the FEA has consulted the three stakeholders of the project and obtained their approvals for power generation from the Water Treatment Plant. Regarding the landowners, meetings with them were undertaken and their issues addressed, so the “landowners finally agreed to the consent put forward to them by FEA”, as described in the stakeholder consultation report for Vaturu.

As for the Wainikasou project, the land where the project will be implemented is acquired Native Land by the State. Although no landowners would be involved in the project (i.e., it is State land), consultation was undertaken with the Native Land Trust Board, with positive results.

Download the complete PDD : www.cdmunfccc.int