PINs and PDDs developed for the 3 PoAs in Fiji

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Outline

- Introduction of PoA
- PIN introduction - Hydro
- PIN introduction - Biogas
- PIN introduction - Wastewater
- Project for PoA development

Introduction of PoA

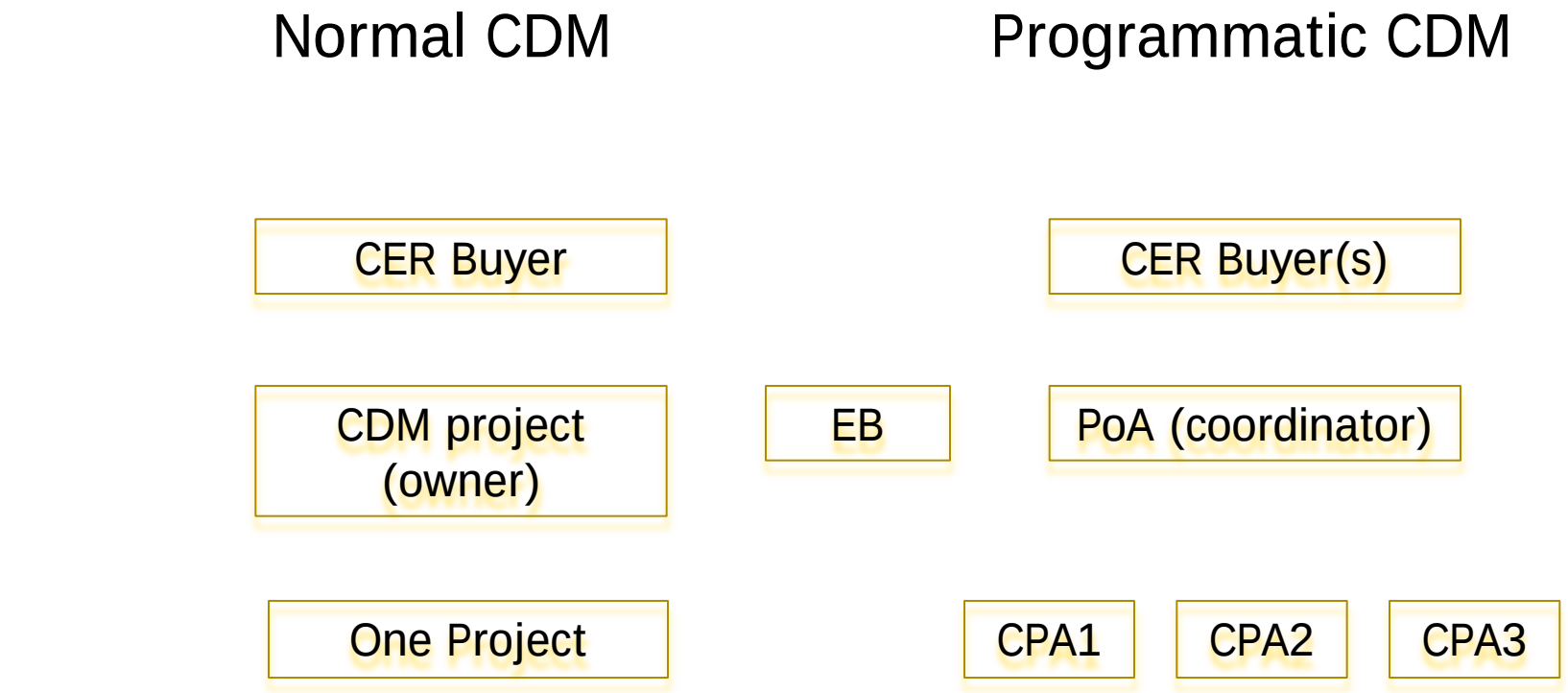
- Programme of Activity (PoA):

  A voluntary coordinated action by a private or public entity which coordinates and implements any policy/measure or stated goal (i.e. incentive schemes and voluntary programs), which leads to GHG emission reductions or increases net GHG removals by sinks that are additional to any that would occur in the absence of the PoA, via an unlimited number of CDM program activities (CPA).

- Coordinating or Managing Entity (C/ME):

  A PoA shall be proposed by the C/ME. The C/ME shall be a PP authorized by all participating host country DNAs involved and identified to communicates with the EB

Introduction - Normal CDM and PoA



Introduction

- PoA characteristics
  - Large Program of micro/small activities
  - Full scalability(PoA does not need to define ex-ante the scale and location of each project activity)
  - Substantially lower transaction costs
  - Reduce the non-registration risk
  - Reduce the development cost
  - Shortening the time to market (secure CER revenues)
  - Opportunities to convert future carbon revenues into upfront carbon finance

How to develop a PIN for PoA

1. • Screening the potential PoA PINs
2. • Consider the advantages and challenges
3. • Select the PoA to develop and confirm CME
4. • Acquire the data/info/report
5. • Refer the methodologies and Tools
6. • Develop a PIN for PoA

National Grid-connected Hydropower PoA in Fiji

Hydro PoA - Project Description

Project description	
Objective	Utilize the water resources for electricity generation Replace the conventional fuel consumption
Technology	Hydraulic turbine and generator
Description	Fiji Electricity Authority (FEA) plans to construct and operate several hydropower projects activities in Viti-Levu Island in Fiji in the near future. Among them, Wailoa Downstream Hydropower Project is a small-scale hydropower Component Project Activity (CPA), which could be the first real case CPA under the proposed PoA. The installed capacity of the CPA is 15MW.
Boundary	Fiji's main island (Viti-Levu)

Hydro PoA - Project Information

Project Information	
Coordinating/Management Entity	Fiji Electricity Authority
Project Participants	Fiji Electricity Authority
GHG Target	CO_2
Total Cost (PoA level estimated)	137.5 US$ million
Capital Cost (CPA level estimated)	37.5 US$ million
O&M Cost (CPA level estimated)	11,250 US$/year

Hydro PoA - Project Information

Project Information	
Expected Starting Date	2013
Duration of the PoA	28 years
Estimated annual GHG emission reductions	57,564 tCO_{2e}
In a period of 7 years	402,948 tCO_{2e}

Hydro PoA – Sector Background & Baseline

Sector Background & Baseline	
Sector Background	Fiji is heavily dependent on imported fuel to meet a major component of its energy demand. The strategy is to replace most of the diesel burn with renewable energy sources by 2015.
Baseline	Supply of electricity from the FEA grid and addition of diesel generation capacity to the FEA grid to meet growing demand.

Hydro PoA – Methodology & Additionality

Methodology & Additionality	
Methodology	AMS-I.D: the grid-connected installations
Additionality	Renewable energy project cost : **FJ$ 4.3 million** per MW Diesels power plant only cost : **FJ$ 1.3-1.8 million** per MW Financial/economic barriers are existed in Fiji.

Hydro PoA – Environmental/Social/Economic

Environmental / Social / Economic benefits	
Environment	ü GHG emission reductions ü Not affect the local air quality, only use kinetic energy from falling water ü Minimum noise pollution
Socio-economic	ü Supply electricity in a cleaner way ü Jobs opportunities ü Energy security ü Training program
Environmental Strategy	ü Fiji energy strategy: research, promotion and utilization of renewable energy applications in Fiji.

Hydro PoA – Advantages/Challenges

	Comments
Advantages	ü Utilizing matured hydro technology ü Local water resources are abundant ü PO and CME are the same entity
Challenges	ü Investment and financing sources uncertain ü Project delivery schedule uncertain ü Number of potential CPAs uncertain

National Biogas Program of Activity in Fiji

Biogas PoA - Project Description

Project description	
Objective	Introducing biogas digesters to local households. Animal manure and agricultural waste will be used as raw material.
Technology	The primary technology of biogas is an anaerobic **digester** equipped with a system for the **collection** and utilization of biogas as fuel for cooking by local residents.
Description	The activities under the program project will utilize the rich agriculture resource in Fiji for installation of several household biogas digester projects around rural area of Fiji as one Programmatic CDM activity. The biogas collected will be applied mainly as fuel for local residents for cooking etc.
Boundary	Fiji's main island (Viti-Levu)

Biogas PoA - Project Information

Project Information	
Coordinating/Management Entity	Fiji Department of Energy
Project Participants	Fiji Department of Energy
GHG Target	CH_4 & CO_2
Total Cost (PoA level estimated)	252.98 US$ million
Capital Cost (CPA level estimated)	29.27 US$ million
O&M Cost (CPA level estimated)	599 US$ thousand/year

Biogas PoA - Project Information

Project Information	
Expected Starting Date	2013
Duration of the PoA	28 years
Estimated annual GHG emission reductions	17,233 tCO_{2e}
In a period of 7 years	120,631 tCO_{2e}

Biogas PoA – Sector Background & Baseline

Sector Background & Baseline	
Sector Background	**67%** of households surveyed use **firewood** and **agriculture residues** for cooking. **25%** : use **fuel wood** and **LPG**. **6%** : **fuel wood** and **kerosene**. **2%**: use three different fuel types (Fuel wood and LPG and Kerosene stove)
Baseline	The main sources of energy for household cooking in Fiji are firewood and agricultural residues. The baseline will be the continues of current situation.

Biogas PoA – Methodology & Additionality

Methodology & Additionality	
Methodology	AMS-I.C “Thermal energy production with or without electricity” AMS-III.R: “Methane recovery in agricultural activities at household/small farm level”
Additionality	Investment Barrier: By comparing the household income data and biogas cost, the majority of the rural population cannot afford the capital cost of investment for a biogas system. Technology barrier: The failure rate of biogas plants is as high as 77%.

Biogas PoA – Environmental/Social/Economic

Environmental / Social / Economic benefits	
Environment	ü Promotion of environmental sustainability ü Improve the local organic waste usage ü Mitigation of deforestation and soil erosion
Socio-economic	ü Provides a wide range of improvements in overall living standard ü Contribute the local residents' energy saving ü Income from the sale of extra biogas could be applicable
Environmental Strategy	ü As per National Energy Security Situation Report 2010 of Fiji, one of the guiding principles of Strategic Development Plan of Fiji is environmental sustainability.

Biogas PoA – Advantages/Challenges

	Comments
Advantages	ü Local biogas raw materials are abundant ü High biogas demand in local area ü Utilizing stable technology in a cleaner and more efficient way
Challenges	ü Baseline study is complex ü Monitoring data is complex ü Management challenges (numbers of biogas system shall be managed) ü Operation and maintenance risk etc. failure of some previous biogas digesters.

Sewerage Treatment PoA in Fiji

Sewerage PoA - Project Description

Project description	
Objective	Recover methane generated by the anaerobic decomposition of organic matter in sludge of sewerage treatment plant.
Technology	anaerobic digester equipped with a system for the capture, collection and utilization of biogas from wastewater.
Description	Utilize local wastewater from residents' daily life and other agricultural and industrial wastewater resources by installing new methane capture and combustion system to supply thermal energy or generate electricity.
Boundary	Republic of Fiji

Sewerage PoA - Project Information

Project Information	
Coordinating/Management Entity	Fiji Water Authority
Project Participants	Fiji Water Authority
GHG Target	CH_4 and CO_2
Total Cost (PoA level estimated)	8.97 US$ million
Capital Cost (CPA level estimated)	83,680 US$
O&M Cost (CPA level estimated)	3,347 US$/year

Sewerage PoA - Project Information

Project Information	
Expected Starting Date	2013
Duration of the PoA	28 years
Estimated annual GHG emission reductions	16,625 tCO_{2e}
In a period of 7 years	116,378 tCO_{2e}

Sewerage PoA – Sector Background & Baseline

Sector Background & Baseline	
Sector Background	Coastal environments near urban areas, such as Suva Lagoon, are subject to contamination from wastewater from industry, domestic waste, urban storm water and shipping related activities. High concentrations of nutrients and microorganisms related to sewage contamination appear to be the major problem.
Baseline	ü For energy sources Currently the main sources of energy for household thermal and electricity demand in Fiji are rely on petroleum products. ü For wastewater treatment The methane is directly venting to the atmosphere.

Sewerage PoA – Methodology & Additionality

Methodology & Additionality	
Methodology	AMS III.H-Methane recovery in wastewater treatment AMS-I.C .Thermal energy production with or without electricity.
Additionality	Technological barrier: ü Not widely applied in Fiji ü Infiltration into the sewerage network during any rainy weather Only one sewerage treatment plant using biogas collection technology (kinoya: developed as a CDM project)

Sewerage PoA – Environmental/Social/Economic

Environmental / Social / Economic benefits	
Environment	ü Provide a solution for local wastewater disposal ü Local water quality will be improved and secured ü Prevent the drinking water pollution ü Improve local air quality
Socio-economic	ü Improvements in overall living standard ü Employment, professional qualification will be created
Environmental Strategy	ü As per National Energy Security Situation Report 2010 of Fiji, one of the guiding principles of Strategic Development Plan of Fiji is environmental sustainability.

Sewerage PoA – Advantages/Challenges

	Comments
Advantages	ü Several wastewater treatment plants have the potential to be developed as CPAs. ü Familiar of the technology by the PO and easy to implement ü PO and CME are the same entity ü Relevant CDM experiences from Kinoya CDM project
Challenges	ü Project development schedule uncertain ü Technology of utilization of methane collected uncertain ü Design, construction and operation is not ready ü Monitoring data is complex

Project for PoA development - Sewerage Treatment Project

- Methodologies

  - Wastewater PoA will be used AMS-III.H;
  - Every conditions to apply AMS-III.H shall be satisfied. (wastewater treatment system, ambient temperature, CPA adding date, depth of lagoons, COD removal rate .etc)

Project for PoA development

- Management structure/Monitoring of CME

  CME shall:

- ü manage each CPA and properly record all documents and data.
- ü Responsible for inclusion of CPA under the PoA
- ü Prepare the eligibility criteria of CPA
- ü Select the eligible CPA
- ü Communicate with DOE and EB for issues

Project for PoA development

- Baseline emission/Project emission/Leakage emission
- To determine the baseline emission factor, current electricity generation situation and fuel consumption status shall be obtained and analyzed.
- Project emission and leakage emission shall be calculated as the conditions of methodologies and tools.

Viti Levu Grid Details

DIESEL FUEL CONSUMPTION -LITRES

Station	2004	2005	2006	2007	2008	2009
Vuda	23,677,152	24,267,964	25,943,885	15,940,489	13,059,021	13,371,865
Nadi	1,276,254	2,202,757	14,416	1,865	100,295	85,684
Sigatoka	5,470,636	3,592,829	2,663,326	2,299,300	2,109,218	2,143,439
Rakiraki	593,600	818,700	850,866	1,274,700	1,053,600	659,644
Kinoya- 2	22,784,722	33,185,053	54,287,795	25,305,655	14,995,457	21,232,679
Deuba	1,670,767	2,635,850	585,553	289,344	767,526	603,157
Kinoya - 1	0	0	0	6,639,212	21,516,870	24,118,659
Korovou	241,200	214,600	82,207	97,592	63,481	10,657
Levuka	2,963,406	2,864,034	2,427,865	2,509,267	2,500,037	2,815,449
Rokobili	4,568,190	5,613,120	691,577	198,490	85,240	0
Vatuwaqa	1,132,361	2,286,950	29,200	0	0	0

UNIT GENERATED -MWh

Station	Year Commissioned	Fuel Used	Installed Capacity (MW)	2004	2005	2006	2007	2008	2009
Wailoa-Hydro	1983	Hydro	83.2	357,279	322,489	315,569	481,098	462,986	436,081
Wainikasou-Hydro	2003	Hydro	6.6	8,919	15,151	18,272	21,079	18,420	16,058
Nagado-Hydro	2004	Hydro	2.8	0	0	6,085	4,922	12,996	7,990
Butoni Wind Farm	2007	Wind	10	0	0	0	3,351	4,604	7,211
Vuda	1976/2001	Diesel	24.08	95,587	98,246	104,441	63,729	52,464	53,818
Nadi	1962/1970	Diesel	2.2	4,013	7,621	50	41	336	106
Sigatoka	2000	Diesel	4.16	19,520	13,116	9,981	8,314	7,626	8,016
Rakiraki	2000	Diesel	2.08	2,088	2,594	2,808	4,438	3,498	2,239
Kinoya- 2	2005	Diesel	29.8	92,233	142,988	231,753	104,760	59,666	85,929
Kinoya - 1	2001	Diesel	20.6	0	0	0	30,534	96,923	113,918
Deuba	2002	Diesel	4.2	7,192	9,374	2,002	1,041	2,346	2,195
Korovou	1999/2006	Diesel	0.9	705	792	278	283	173	33
Levuka	2006/2008	Diesel	2.8	10,281	9,396	9,162	9,359	9,152	10,209
Vatuwaqa	2004	Diesel	2.8	3,090	8,733	2,862	0	0	0
Rokobili	2002	Diesel	3.42	18,142	21,400	2,862	723	341	0

Project for PoA development

Challenages:

- Obtain the key data and parameters
- CME proper management
  - properly operate the PoA and manage CPA inclusion
  - clearly allocate the jobs and responsibilities
  - summarize the difference of each CPA
  - identify the eligibility of CPA inclusion

THANKS FOR YOUR ATTENTION!

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