

PROJECT IDEA NOTE (PIN)

Name of Project: Brenwe River Mini- Hydropower Project in Malekula, Vanuatu

Date Finalized: May 2012

Description of size and quality expected of a PIN

Basically a PIN will consist of approximately 5-10 pages providing indicative information on:

- the type and size of the project
- its location
- the anticipated total amount of greenhouse gas (GHG) reduction compared to the “business-as-usual” scenario (which will be elaborated in the baseline later on at Project Design Document (PDD) level)
- the suggested crediting life time
- the suggested Certified Emission Reductions (CERs)/Emission Reduction Units (ERUs)/Verified Emission Reduction (VERs) price in US\$ or €/ton CO₂e reduced
- the financial structuring (indicating which parties are expected to provide the project's financing)
- the project's other socio-economic or environmental effects/benefits

While every effort should be made to provide as complete and extensive information as possible, it is recognised that full information on every item listed in the template will not be available at all times for every project.

A. PROJECT DESCRIPTION, TYPE, LOCATION AND SCHEDULE

<p>OBJECTIVE OF THE PROJECT <i>Describe in not more than 5 lines</i></p>	<p>Electricity supply throughout Vanuatu is dominated by diesel generation, resulting in very high tariff. The power supply in Malekula island (second largest island in Vanuatu) where the proposed project is planned is limited, which constraints the economic development on the island.</p> <p>The objective of the proposed project activity is to utilize the hydropower potential which is technically and economically feasible. The proposed project activity will help improve electricity access in the region through the development of grid-connected renewable energy for rural areas. The project is expected to stimulate economic development in the region and support development of local industry like agriculture and fishery.</p>
<p>PROJECT DESCRIPTION AND PROPOSED ACTIVITIES <i>About ½ page</i></p>	<p>The Benwe River hydropower scheme has been proposed as part of the Technical Assistance by Asian Development Bank (ADB) in the Republic of Vanuatu. Under the Technical Assistance ADB will fund only the initial technical/feasibility study of the project.</p> <p>The proposed hydropower station will be located in the Brenwe River in the North West of the Malekula. A site at Benwe River was selected in the early 1990s for the construction of a hydropower station; the construction was initiated by the Chinese company China Chang Jiang Energy Corp. (CCJEC) which was funded by the government of China, and abandoned before completion. The entire infrastructure installed remains in ruins, and overgrown vegetation has taken over and the entire works are now nearly lost or useless. The site selected by CCJEC is the best site in Brenwe river for hydropower project. As the CCJEC structures cannot be used anymore and any new construction require the demolition of the existing structures before building new structures, which will be costlier than building a new one on the green ground. Hence the intake of the proposed Brenwe River Mini Hydropower project will be moved further upstream and the forebay. Penstock and powerhouse can be made on either side of the existing structures.</p> <p>The proposed project is a run-of-river hydropower project. A storage type hydropower project is not considered due to high cost and environmental impacts associated with it.</p> <p>The proposed project has an estimated power generating capacity of 1.2 MW and equivalent annual energy production of 5,636,141 KWh. The project will provide cheaper and more reliable power supply to meet the power demand on the Melekula Island. The project will also replace demand for imported fossil fuels with renewable energy resources, especially in the rural areas.</p> <p>The project will be implemented over a period of two years, inclusive of detailed design, procurement and construction activities. It is expected to be commissioned by 2014.</p> <p>The estimated total project cost is US\$13.3 million. The costs of environmental protection, environmental monitoring, and land acquisition (if any) and use are not included in the estimated total project cost.</p>

TECHNOLOGY TO BE EMPLOYED¹ <i>Describe in not more than 5 lines</i>	The salient features for the selected project size of 1200 KW are:	
	Description	Parameters
	Type of Power Plant	Run –of-the-river
	Installed Capacity	1200 kW
	Catchment Area at intake site	19km ²
	Gross Head	120m
	Design Flow	1.33m ³ /s (@20% flow)
	Turbines	Cross Flow Turbo , two units
	Generators	1200 kW, AC
	A transmission line of 20KV for a distance up to 30 Km is included in the pre-feasibility study.	
Greenhouse gases targeted CO ₂ /CH ₄ /N ₂ O/HFCs/PFCs/SF ₆ <i>(mention what is applicable)</i>	CO ₂	
Type of activities Abatement/CO ₂ sequestration	Abatement	
Field of activities <i>(mention what is applicable)</i> <i>See annex 1 for examples</i>	Renewable Energy – Mini Hydro Power (1 e)	
LOCATION OF THE PROJECT		
Country	The Republic of Vanuatu	
City	Malekula Island	
Brief description of the location of the project <i>No more than 3-5 lines</i>	The project is to be located on the Brenwe River. The project coordinates are: Intake Coordinates: S16° 04' 40" / E167 ° 16' 47" Powerhouse Coordinates: S16 ° 05' 34	
PROJECT PARTICIPANT		
Name of the Project Participant	Department of Energy under the Ministry of Lands and Natural Resources (MLNR)	
Role of the Project Participant	b. Owner of the site or project	
Organizational category	a. Government	
Contact person	Leo Moli / Benjamin Jesse	
Address	Department of Energy, PMB 9067, Port Vila, Vanuatu	
Telephone/Fax	+678 25201/+678 5333840	
E-mail and web address, if any	lmoli@vanuatu.com.vu , benjaminjes@gmail.com	
Main activities <i>Describe in not more than 5 lines</i>	The Ministry of Lands and Natural Resources oversees the functions of the Department of Lands, the Department of Geology, Mines and Water, the Department of Environment and Conservation and the Energy Unit. It also works in collaboration with other Ministries, such as the Ministry of Internal Affairs through the Port Vila Municipal Council, to deal with land issues.	
Summary of the financials <i>Summarize the financials (total assets, revenues, profit, etc.) in not more than 5 lines</i>	Not Applicable as Government Entity	

¹ Please note that support can only be provided to projects that employ commercially available technology. It would be useful to provide a few examples of where the proposed technology has been employed.

Summary of the relevant experience of the Project Participant <i>Describe in not more than 5 lines</i>	Not Applicable as Government Entity
<i>Please insert information for additional Project Participants as necessary.</i>	
EXPECTED SCHEDULE	
Earliest project start date <i>Year in which the plant/project activity will be operational</i>	2014
Expected first year of CER/ERU/VERs delivery	2015
Project lifetime <i>Number of years</i>	25 years
For CDM projects: Expected Crediting Period <i>7 years twice renewable or 10 years fixed</i>	7 years twice renewable
Current status or phase of the project <i>Identification and pre-selection phase/opportunity study finished/pre-feasibility study finished/feasibility study finished/negotiations phase/contracting phase etc. (mention what is applicable and indicate the documentation)</i>	The pre-feasibility study is finished. Available document: Interim Report : Promoting Access to Renewable energy in the Pacific Snowy Mountains Engineering Corporation (SMEC) has prepared this report as the third deliverable under the Contract for Consultancy Services COSO/41-550 signed on 2 November 2010, for consulting services of ADB TA 7329-REG: Promoting Access to Renewable Energy in the Pacific (the Project)
Current status of acceptance of the Host Country <i>Letter of No Objection/Endorsement is available; Letter of No Objection/Endorsement is under discussion or available; Letter of Approval is under discussion or available (mention what is applicable)</i>	The DNA Guidelines has been finalized and approved by National Advisory Committee on Climate Change (NACCC). The draft Cabinet paper for approval by Council of Ministers (CoM) is under circulation for comments. It is expected that the approval by CoM will be completed before June 2012.
The position of the Host Country with regard to the Kyoto Protocol	Has the Host Country ratified/acceded to the Kyoto Protocol? <u>Yes, 2001</u> Has the Host Country established a CDM Designated National Authority / JI Designated Focal Point? <u>In the process of establishing DNA to be completed by June 2012.</u>

B. METHODOLOGY AND ADDITIONALITY

ESTIMATE OF GREENHOUSE GASES ABATED/	Annual (if varies annually, provide schedule): <u>_4,241_</u> tCO ₂ -equivalent Up to and including 2012: <u>_0_</u> tCO ₂ -equivalent
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<p>CO₂ SEQUESTERED <i>In metric tons of CO₂-equivalent, please attach calculations</i></p>	<p>Up to a period of 10 years: - tCO₂-equivalent Up to a period of 7 years: 29,687 tCO₂-equivalent</p> <table border="1" data-bbox="748 289 1300 575"> <thead> <tr> <th>Year</th> <th>Emission Reduction (tCO_{2e})</th> </tr> </thead> <tbody> <tr><td>2015</td><td>4,241</td></tr> <tr><td>2016</td><td>4,241</td></tr> <tr><td>2017</td><td>4,241</td></tr> <tr><td>2018</td><td>4,241</td></tr> <tr><td>2019</td><td>4,241</td></tr> <tr><td>2020</td><td>4,241</td></tr> <tr><td>2021</td><td>4,241</td></tr> </tbody> </table>	Year	Emission Reduction (tCO _{2e})	2015	4,241	2016	4,241	2017	4,241	2018	4,241	2019	4,241	2020	4,241	2021	4,241
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<p>BASELINE SCENARIO CDM/JI projects must result in GHG emissions being lower than “business-as-usual” in the Host Country. At the PIN stage questions to be answered are at least:</p> <ul style="list-style-type: none"> • Which emissions are being reduced by the proposed CDM/JI project? • What would the future look like without the proposed CDM/JI project? <p><i>About ¼ - ½ page</i></p>	<p>CO₂ is the targeted emission reductions by the project activity.</p> <p>Like other small island countries in the Pacific, Vanuatu relies on imported fuels for transportation and electricity production. Vanuatu also faces challenges in the development of the energy sector to satisfy the increasing electricity demand and growing fuel import. Vanuatu’s grid power supply in Port Vila is operated at a high reliability level but on other islands such as Santo, Malekula and Tanna, electricity supply is less reliable. Old and inefficient diesel generators are still used on these islands, requiring high maintenance and consuming more imported fossil fuel for each kWh of electricity generation.</p> <p>The existing power supply in Malekula is limited and is managed and generated by Union Electrique du Vanuatu UNELCO. The current capacity is only 240kW and is based on diesel and coconut oil. To enhance economic development, it is necessary to increase electricity access of local households and meet the electricity demand increase of agriculture and fishing industry and a growing population due to the decentralization of the government offices to Malekula.</p> <p>In the absence of this program the baseline scenario would be continued usage of diesel based electricity generation with very high operational costs due to high costs of diesel.</p>																
<p>ADDITIONALITY Please explain which additionality arguments apply to the project: (i) there is no regulation or incentive scheme in place covering the project (ii) the project is financially weak or not the least cost option (iii) country risk, new technology for country, other barriers (iv) other</p>	<p>Project additionally can be demonstrated as per “Guidelines for Demonstrating Additionally of Micro-Scale Project Activities” (EB 63, version 03). As per the paragraph 2 of the guidelines:</p> <p>Project activities up to 5 MW that employ renewable energy technology are additional if any one of the below conditions are satisfied:</p> <ol style="list-style-type: none"> The geographic location of the project activity is in LDCs/SIDs or in a special underdeveloped zone of the host country identified by the Government before 28 May 2010; The project activity is an off-grid activity supplying energy to households/communities (less than 12 hours grid availability per 24 hours day is also considered as off grid. for this assessment); The project activity is designed for distributed energy generation (not connected to a national or regional grid) with both conditions (i) and (ii) satisfied; 																

	<p>(i) Each of the independent subsystem/measure in the project activity is smaller than or equal to 1500 kW electrical installed capacity;</p> <p>(ii) End users of the subsystem or measure are households/communities/ Small and Medium-sized Enterprises (SMEs).</p> <p>d) The project activity employs specific renewable energy technologies/measures recommended by the host country DNA and approved by the Board to be additional in the host country (conditions apply: The total installed capacity of technology/measure contributes less than or equal to 5% to national annual electricity generation).</p> <p>According to the United Nations, Vanuatu is classified both as a Least Developed Country (LDC) and Small Island Developing State (SIDS)². Hence proposed project, which is having installed capacity of 5 MW is considered to be automatically additional as per the above EB guidelines.</p> <p>In addition, potential barrier analysis in terms of prevailing practice barrier and technological barriers (availability of skilled labour, capacity for operation and maintenance etc.) can also be explored.</p> <p>The project activity can also contribute the further development of hydropower plants in Vanuatu and to adopt more sustainable practices and in turn seeking carbon finance.</p>
<p>SECTOR BACKGROUND Please describe the laws, regulations, policies and strategies of the Host Country that are of central relevance to the proposed project, as well as any other major trends in the relevant sector.</p> <p>Please in particular explain if the project is running under a public incentive scheme (e.g. preferential tariffs, grants, Official Development Assistance) or is required by law. If the project is already in operation, please describe if CDM/JI revenues were considered in project planning.</p>	<p>An estimated 27% of the Vanuatu population has access to electricity. Access rates in the main urban centers of Port Vila and Luganville are high at about 75%, dropping off considerably in rural areas. Power is supplied to the main urban areas of Port Vila, Luganville, East Malekula and Tanna under a concession arrangement to a private power company UNELCO (subsidiary of the SUEZ group).</p> <p>Vanuatu's grid power supply in Port Vila is considerably being operated at a high reliability level but other islands such as Santo, Malekula and Tanna are not up to par. The power supply is mainly dominated by diesel based generation.</p> <p>There is potential for increasing the electricity access rate in both urban and rural areas as well make electricity affordable. The electricity tariff charged to consumers across Vanuatu is the highest (up to US\$ 0.65/kWh) in the Pacific Island Countries. Vanuatu does not have indigenous sources of fossil fuels, and the import of diesel for power generation has a high cost to the economy. However, there are significant indigenous resources which are being increasingly utilized and hydropower generation is one of them.</p> <p>Malekula is the second largest Island of Republic of Vanuatu and is situated in the northern side of the country. The total land area of Malekula Island is about 2,100 km² while the total number of inhabitants scattered around the Islands is only about 25,000. Malekula's number of households increased from 3659 (1999) to 4950 (2009), or an AAGR of 3.07% per annum.</p> <p>The economic activities around the Island are mainly rural type activities where</p>

² <http://www.un.org/special-rep/ohrlls/sid/list.htm>

	<p>agriculture (coconut/copra plantation and oil production) dominates some small scale activities such as fishery, tourism, forestry and animal husbandry. The local people produce vegetables and fruits which they sell in the local markets for their daily needs and livelihoods. There are no major or minor scale industries except for a bio-fuel (coconut/copra oil) production mill that provides employment opportunities to the local people and boost ups Malekula's economy. In the southern east part of the Island, there are coconut plantations activities from which they export raw coconut overseas.</p> <p>The share of hydro power is currently very low in Vanuatu. The only known hydro project is the 1.2 MW Sarakata River Hydroelectric Power Station which was developed under the Grant Aid provided by Government of Japan.</p>
<p>METHODOLOGY Please choose from the following options:</p> <p>For CDM projects:</p> <p>(i) project is covered by an existing Approved CDM Methodology or Approved CDM Small-Scale Methodology</p> <p>(iii) projects needs modification of existing Approved CDM Methodology</p>	<p>The projects under this programme fall under the scope of following methodology³</p> <p><i>Type:</i> I. Renewable energy projects</p> <p><i>Category:</i> I.F⁴ – Renewable electricity generation for captive use and mini-grid (Version 02/EB61)</p> <p>The project will replace diesel based power generation in the region.</p>

C. FINANCE

TOTAL CAPITAL COST ESTIMATE (PRE-OPERATIONAL)													
<p>Total project costs</p>	<p>Based on the pre-feasibility study the cost estimates for the indentified projects are as below</p> <table border="1" data-bbox="613 1245 1414 1549"> <thead> <tr> <th>Item</th> <th>Total</th> <th>%</th> </tr> </thead> <tbody> <tr> <td>Capital Expenditure (includes preparatory works, general cost, civil works, water control plant, electrical and mechanical, consulting services and transmission cost)</td> <td>12,983,768</td> <td>97%</td> </tr> <tr> <td>Financing Charges During Development</td> <td>340,952</td> <td>3%</td> </tr> <tr> <td>Total Project requirements</td> <td>13,324,720</td> <td>100%</td> </tr> </tbody> </table> <p>The cost of land acquisition and resettlement (if any) and environmental protection and mitigation during construction are not included in the above estimate.</p>	Item	Total	%	Capital Expenditure (includes preparatory works, general cost, civil works, water control plant, electrical and mechanical, consulting services and transmission cost)	12,983,768	97%	Financing Charges During Development	340,952	3%	Total Project requirements	13,324,720	100%
Item	Total	%											
Capital Expenditure (includes preparatory works, general cost, civil works, water control plant, electrical and mechanical, consulting services and transmission cost)	12,983,768	97%											
Financing Charges During Development	340,952	3%											
Total Project requirements	13,324,720	100%											

³ Appropriate methodology - I.A/I.F for the project will be decided during PDD preparation once further information is available.

⁴ http://cdm.unfccc.int/filestorage/4/1/J/41JF08WD9MSEB5YLHTZ6KVAPUC7XNQ/EB61_repan18_Revision_%20AMS-I.F_ver02.pdf?t=cGJ8bTI5MGJkfDDQFZQOrj20lvbehi1G-28x

SOURCES OF FINANCE TO BE SOUGHT OR ALREADY IDENTIFIED	
Equity Name of the organizations, status of financing agreements and finance (in US\$ million)	US\$ 3.9 million
Debt – Long-term Name of the organizations, status of financing agreements and finance (in US\$ million)	ADB's Asian Development Fund (ADF) Proposed ADB loan US\$ 9.3 million
SOURCES OF CARBON FINANCE Name of carbon financiers that you are contacting (if any)	NA
INDICATIVE CER/ERU/VER PRICE PER tCO₂e <i>Price is subject to negotiation. Please indicate VER or CER preference if known.</i>	US\$ 8 – 10 (Indicative price range only)
TOTAL EMISSION REDUCTION PURCHASE AGREEMENT (ERPA) VALUE	
A period until 2012 (end of the first commitment period)	-
A period of 10 years	
A period of 7 years	US\$ 237,496 - US\$296,870

D. EXPECTED ENVIRONMENTAL AND SOCIAL BENEFITS

LOCAL BENEFITS E.g. impacts on local air, water and other pollution.	The project will deliver improved air quality, both locally and globally, by eliminating NO _x , SO _x and CO ₂ emissions associated with diesel based power generation.
SOCIO-ECONOMIC ASPECTS	
What social and economic effects can be attributed to the project and which would not have occurred in a comparable situation without that project? Indicate the communities and the number of people that will benefit from this project. <i>About ¼ page</i>	<ul style="list-style-type: none"> The project will provide cheaper and more reliable power supply to meet the Malekula power demand. The project will also reduce demand for imported fuels through renewable energy resources, especially in the rural areas. Hydropower will offset a proportion of the diesel currently used, and so reduce the overall cost of generation. The project will lead to increase in electricity supply in the island which will benefit the local industry. <p>There may be additional, indirect, benefits that result from the reduced cost of electricity generation and increased electricity supply.</p>
What are the possible direct effects (e.g. employment creation, provision of capital required, foreign exchange effects)? <i>About ¼ page</i>	<ul style="list-style-type: none"> Jobs, training and income generation during construction and operation through direct employment. Compensatory benefit through improved services and infrastructure and support of livelihoods programmes. Benefit sharing schemes may provide the best opportunity to provide a positive impact to the entire community including vulnerable groups. Access to electricity. Income generation opportunities generated from increased human activity in the area. Overall poverty reduction and improvement in living standards.
ENVIRONMENTAL STRATEGY/ PRIORITIES OF THE HOST	The proposed project activity is consistent with environmental strategy and priorities of the host country. Any developmental project in Vanuatu should

<p>COUNTRY A brief description of the project's consistency with the environmental strategy and priorities of the Host Country About ¼ page</p>	<p>meet the criteria's set out in Government of Republic of Vanuatu, Priority and Action Agenda 2006-2015 and Planning Long, Acting Short agenda (2009-2012). For environment conservation the two document set out following policy priorities for Government of Vanuatu :</p> <p><i>"Equitable and Sustainable development of land while ensuring the heritage of future generation".</i> A key performance indicator for implementation of this policy is <i>"Environment Impact Assessment (EIA) should be conducted for all development related projects"</i>.</p> <p><i>"Promote sound and sustainable environmental management practices; Implement the Environmental Protection and Conservation Act and the regulation of related activities"</i></p> <p>The project activity meets the above criteria's as a detailed Environment Impact Analysis (EIA) for the project will be carried out in accordance with The Environmental Protection and Conservation Act No. 12 of 2002 (amended in 2010) and appropriate mitigation measures are planned to be developed through the EIA and the Environmental Management Plan (EMP).</p> <p>Project activity is renewable energy based power generation which will help country to make a transition from the traditional energy supply source to the renewable energy sources. Hence, the project activity is also in line with country's Renewable Energy Policy Framework wherein goal is to increase renewable energy use in Vanuatu.</p> <p>The project activity is a run-of-river hydroelectric power plant. It is a well established technology which utilizes water for energy generation without depleting it or impacting the natural environment. Since the project activity generates electricity from renewable source, it avoids emission such as SOx , NOx and other particulates matter which would have been emitted from the fossil fuel fired plants.</p>
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ANNEX I - Technologies

1. Renewables
 - 1a. Biomass
 - 1b. Biogas
 - 1c. Bagasse
 - 1d. Wind
 - 1e. Hydro
 - 1f. Geothermal
 - 1g. Photovoltaic
 - 1h. Solar Thermal
2. Fossil Fuel Switch
3. Energy Efficiency
 - 3a. Cement Efficiency Improvement
 - 3b. Construction material
 - 3c. District heating
 - 3d. Steel Gas Recovery
 - 3e. Other Energy Efficiency
4. Waste Management
 - 4a. Landfill Gas recovery/utilization
 - 4b. Composting
 - 4c. Recycling
 - 4d. Biodigestor
 - 4e. Wastewater Management
5. Coalmine/Coalbed Methane
6. Oil and Gas Sector
 - 6a. Flared Gas Reduction
 - 6b. Reduction of technical losses in distribution system
7. N₂O removal
8. HFC23 Destruction
9. SF₆ Recovery
10. Transportation
 - 9a. Fuel switch
 - 9b. Modal switch
11. Others