

PROJECT IDEA NOTE (PIN)

Name of Project: Efate Geothermal Power Project Phase 1

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. Vanuatu's national electrification rate is only some 28%, reflecting low affordability and accessibility.</p> <p>The objective of this project on Efate island of Vanuatu is to utilize the geothermal energy resource which is technically and economically feasible. The project will lead to an increase in the electricity supply in the region, reduce the grid cost of electricity and expand grid electricity supply to part of Efate which is not electrified currently.</p>
<p>PROJECT DESCRIPTION AND PROPOSED ACTIVITIES <i>About ½ page</i></p>	<p>In April 2009, an Australian geothermal company Kuth Energy Ltd., obtained two geothermal prospecting licenses on Efate, as provided under the Geothermal Energy Act of 1987. Kuth Energy has conducted initial geochemical and geophysical studies, and intends to develop a 5 MW (gross) geothermal power plant in first phase at Takara for supplying electricity to Union Electrique du Vanuatu (UNELCO).</p> <p>UNELCO is a private company providing electricity to Port Vila and surrounding areas under a concession agreement. UNELCO currently operates 23 MW of diesel capacity and 3 MW of wind power capacity, which results in high electricity tariff around US\$ 0.635/kWh.</p> <p>Based on the various studies carried out and considering the resource temperatures at Takara (150°C base case, 190°C best case), a binary cycle technology has been identified as the most appropriate technology for the project. This technology allows for considerable control over plant output.</p> <p>The electricity will be exported by a transmission system which would comprise an 11/60 kV generation substation, a single 60 kV transmission circuit and 60/20 kV interconnection substation at Tagabe. The project will also involve development of a proposed 60 kV transmission configuration which will include areas inside and outside the existing UNELCO concession.</p> <p>In considerations of construction lead time and the ability of the system to absorb geothermal plant output, the first 5 MW units is expected to start operation in 2015. The tentative schedule is as below</p> <p>Phase 1: 5MW gross First Slim hole drilling :August 2012 Power Purchase Agreement (PPA) finalization: July 2012 Financial Closure: September 2012 for equity raising for slim hole drilling. Start of Construction : June 2013 Commissioning: 2015</p>
<p>TECHNOLOGY TO BE EMPLOYED¹ <i>Describe in not more than 5 lines</i></p>	<p>The project will utilize a binary technology and will function as a base load plant. The first phase will consist of one 5MW (gross) binary turbine generator set and Phase 2 (to be designed as a separate CDM project) will consist of a 2 X 2.5MW binary turbine generator set. The detailed specification of vaporizer, turbine, condenser, feed pump, and preheater will be provided later.</p> <p>The technical details for Phase 1 are as below:</p> <ul style="list-style-type: none"> • Number of Generator - 1

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.

	<ul style="list-style-type: none"> • Turbine Type – Binary turbine generation set • Generator Output - 5000 kW • Plant Parasitic Load - 565 kW • Plant net output - 4344 kW • No. of exploration wells – 4 (2 production wells and 2 injection wells)
TYPE OF PROJECT	
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> See annex 1 for examples	Renewable Energy – Geothermal (1f)
LOCATION OF THE PROJECT	
Country	Vanuatu
City	Efate island
Brief description of the location of the project <i>No more than 3-5 lines</i>	The project is located at Takara site (Takara Springs) on Efate island of Vanuatu.
PROJECT PARTICIPANT	
Name of the Project Participant	Kuth Energy, which has the prospecting licence, is seeking to become the project developer as well.
Role of the Project Participant	a. Project Operator
Organizational category	a. Private company
Contact person	Tim Hewatt
Address	C/- Barrett & Partners 1 st Floor, B & P House Lini Highway Port Vila, Vanuatu
Telephone/Fax	+678 7744657/ +678 22317
E-mail and web address, if any	Email: tim.hewatt@kuthenergy.com Web Address: www.kuthenergy.com
Main activities <i>Describe in not more than 5 lines</i>	<p>Kuth Energy Ltd is one of Australia's leading geothermal energy companies. The company was incorporated in May 2007 and listed on the Australian Stock Exchange ASX in September 2007. The company's focus is the exploration and development of geothermal heat resources to provide renewable power for the future.</p> <p>In the company's short history, it has developed an active program of exploration and project development focused on establishing and commercializing geothermal power generation.</p>
Summary of the financials <i>Summarize the financials (total assets, revenues, profit, etc.) in not more than 5 lines</i>	The company's consolidated net assets in 2011 were Australian Dollar A\$ 4.73 million.
Summary of the relevant experience of the Project Participant <i>Describe in not more than 5 lines</i>	The company is currently active in identifying geothermal projects in Australia (Tasmani and Queensland), Vanuatu and Commonwealth of the Northern Mariana Islands (CNMI)

PROJECT PARTICIPANT	
Name of the Project Participant	Department of Energy , Mines and Mineral under the Ministry of Lands and Natural Resources
Role of the Project Participant	a. Other, please specify: <u>Joint Venture with Kuth Energy</u>
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
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>	Q4, 2015
Expected first year of CER/ERU/VERs delivery	First CER -2017
Project lifetime <i>Number of years</i>	30 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>	<p>In Oct 2011 a study had been carried out to understand the potential opportunity and the economic benefit it can bring to Efate Island.</p> <p>Available document:</p> <ul style="list-style-type: none"> ➤ Efate Geothermal Power and Island-Ring Grid Development Framework by Castlerock Consulting Pte Ltd ➤ Statement of Estimated Geothermal Resources, Takara Geothermal Project, Vanuatu ➤ ASX Release Vanuatu Inferred Geothermal Resource <p>The Feasibility Study is being reviewed by Government of Vanuatu and is expected to be approved by the Council of Ministers during June 2012. Subsequently Kuth Energy will be given clearance to carry out the slim hole drilling.</p>

<p>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></p>	<p>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.</p>
<p>The position of the Host Country with regard to the Kyoto Protocol</p>	<p>Has the Host Country ratified/acceded to the Kyoto Protocol? <u>Yes, 2001</u></p> <p>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></p>

B. METHODOLOGY AND ADDITIONALITY

<p>ESTIMATE OF GREENHOUSE GASES ABATED/ CO₂ SEQUESTERED <i>In metric tons of CO₂-equivalent, please attach calculations</i></p>	<p>Annual (if varies annually, provide schedule): <u>19,237</u> tCO₂-equivalent Up to and including 2012: <u>0</u> tCO₂-equivalent Up to a period of 10 years: tCO₂-equivalent Up to a period of 7 years: <u>134,659</u> tCO₂-equivalent</p> <table border="1" data-bbox="820 1010 1232 1339"> <thead> <tr> <th>Year</th> <th>Emission Reductions (tCO₂e)</th> </tr> </thead> <tbody> <tr><td>2016</td><td>19,237</td></tr> <tr><td>2017</td><td>19,237</td></tr> <tr><td>2018</td><td>19,237</td></tr> <tr><td>2019</td><td>19,237</td></tr> <tr><td>2020</td><td>19,237</td></tr> <tr><td>2021</td><td>19,237</td></tr> <tr><td>2022</td><td>19,237</td></tr> <tr><td>Total</td><td>134,659</td></tr> </tbody> </table>	Year	Emission Reductions (tCO ₂ e)	2016	19,237	2017	19,237	2018	19,237	2019	19,237	2020	19,237	2021	19,237	2022	19,237	Total	134,659
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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. The project reduces CO₂ emissions associated with electricity generation in the grid. The calculated average grid OM emission factor is 0.61 tonnes of CO₂e/MWh.</p> <p>Electricity supply throughout Vanuatu is dominated by diesel generation. For the Port Vila concession, UNELCO operates 23 MW of diesel capacity and 3 MW of wind power capacity. As a result of the reliance on relatively small-scale diesel generation, the base tariff in August 2011 was US\$ 0.635/kWh.</p> <p>Although regulation could result in further tariff reductions in the future, the only development that could yield the significant reduction in tariffs needed to significantly improve electricity affordability and the electrification ratio would be introduction of new, lower cost generation technologies that pass savings through to the power supply tariff. Geothermal energy offers such a prospect.</p> <p>Thus the baseline scenario in case of the project activity consists of diesel dominated electricity generation with very high operational costs due to high</p>																		

	costs of diesel.
<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>As indicated earlier, the Vanuatu grid where the proposed Efate geothermal power project will be located is currently facing electricity shortage and the existing diesel-based fuel generation has very high operational costs. This can be considered as the possible baseline scenario. In the absence of the proposed project activity, the baseline scenario would have continued, as it would require no additional investments and do not face any barriers.</p> <p>In Vanuatu there are a number of potential geothermal sites which have been identified, including sites adjacent to Port Vila. However, due to high exploration and capital costs, these sites have not proceeded. As per the 'Guidelines on Additionality of First-of-its-kind Project Activities' the proposed geothermal project activity can be considered as 'First of its Kind' in Vanuatu as there are no other existing geothermal project in the country.</p> <p>Further project additionally can be demonstrated as per "Guidelines for Demonstrating Additionality of Micro-Scale Project Activities" (EB 63, version 03).</p> <p>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> <ul style="list-style-type: none"> a) 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; b) 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); c) The project activity is designed for distributed energy generation (not connected to a national or regional grid) with both conditions (i) and (ii) satisfied; <ul style="list-style-type: none"> (i) Each of the independent subsystem/measure in the project activity is smaller than or equal to 1500 kW electrical installed capacity; (ii) End users of the subsystem or measure are households/communities/ Small and Medium-sized Enterprises (SMEs). 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>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 and further</p>

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

	<p>demonstration of the additionality with investment analysis or barrier analysis or both is deemed not necessary.</p> <p>Although project activity faces technological barriers such as availability of skilled labour, capacity for O&M etc.</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>Efate accounts for 86% of utility power generation in Vanuatu, and 73% of utility customers. Peak demand in 2010 was 11.2 MW. Electricity is provided by a private company, UNELCO, under a concession agreement for Port Vila and surrounding areas that will run until 2031. A portion of Efate remains outside the UNELCO concession, and is not served by grid electricity. Some limited areas within the UNELCO concession are also currently un-served. Nearly 30% of households on Efate currently do not have an electricity connection.</p> <p>The key challenges for the power sector include (i) developing alternative power supplies to reduce the impact to the economy from diesel importation, (ii) increasing access to electricity including development of new transmission network in the un-served areas and (iii) delivering sustainable operation and maintenance models for rural electrification projects. Increase in access to electricity and reduced cost of electricity will also aid private sector development and economic growth.</p> <p>The project involves very high initial investment – the development of first 5MW would require an investment of US\$ 45 million.</p> <p>The proposed project activity is not envisaged to run under a public incentive scheme or is required by law.</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 project is covered under the following approved methodology <i>Type:</i> I. Renewable energy projects</p> <p><i>Category:</i> I.D³ – Grid connected renewable electricity generation (I.D./Version 17,EB 61)</p> <p>Scope Number: 1</p> <p>The project will supply electricity to Efate island which accounts for 86% of utility power generation in Vanuatu, and 73% of utility customers. The grid in consideration in case of the geothermal power project is the Efate grid which is 90% powered by diesel generators.</p>

C. FINANCE

TOTAL CAPITAL COST ESTIMATE (PRE-OPERATIONAL)			
Total project costs	The cost estimate below is for base case.		
	Cost Item	Thousand US\$	Cost Borne by
	Initial Exploration and Site development	4,812	Developer

³ <http://cdm.unfccc.int/methodologies/DB/RSCTZ8SKT4F7N1CFDXCSA7BDQ7FU1X>

	Exploration Drilling	7135	Developer, possibly with GOV
	Transmission	5155	GOV
	Distribution	5933	New concessionaire or GOV
	Geothermal Field and Plant, first 5MW	27,030	Developer
	Service cables outside UNELC	416	New concessionaire or GOV
	Total Cost	50,481	
SOURCES OF FINANCE TO BE SOUGHT OR ALREADY IDENTIFIED			
Equity Name of the organizations, status of financing agreements and finance (in US\$ million)	The proposed project developer Kuth Energy will put in equity. No financing in place as yet. It is dependent on successful slim hole drilling.		
Debt – Long-term Name of the organizations, status of financing agreements and finance (in US\$ million)	World Bank has expressed interest in providing a loan.		
Carbon finance advance payments sought from the buyer. (US\$ million and a brief clarification, not more than 5 lines)	To be decided once the contractual documents are finalized between GOV and Kuth Energy.		
SOURCES OF CARBON FINANCE Name of carbon financiers that you are contacting (if any)	NA		
INDICATIVE CER/ERU/VER PRICE PER tCO_{2e} <i>Price is subject to negotiation. Please indicate VER or CER preference if known.</i>	US\$ 8 – 10 (Indicative price range only. To be decided upon selection of IPP)		
TOTAL EMISSION REDUCTION PURCHASE AGREEMENT (ERPA) VALUE			
A period until 2012 (end of the first commitment period)	NA		
A period of 10 years			
A period of 7 years	US\$1 million - US\$1.4 million (Indicative values only)		

D. EXPECTED ENVIRONMENTAL AND SOCIAL BENEFITS

LOCAL BENEFITS E.g. impacts on local air, water and other pollution.	The exploitation of geothermal energy does not produce NO _x or SO _x , and will produce substantially less GHG emissions compared to fossil fuel generated electricity.
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	The primary benefit of the project activity to Vanuatu will be a reduction in the unit cost of generation in the coming years. This will have a positive impact on overall economy. A portion of Efate remains outside the UNELCO concession, and is not served by grid electricity. As per 2009 census 24% of households in Efate island are

<p>number of people that will benefit from this project. <i>About ¼ page</i></p>	<p>not connected to grid electricity. Increase in additional electricity generation would help increase electricity supply in the under-served and un-served region. The project also involves investment in new transmission system in areas which have no grid connectivity.</p> <p>Electricity in Vanuatu is mainly generated using costly to run and highly polluting diesel generators. Geothermal energy will reduce the countries reliance on imported diesel and improve energy security.</p> <p>The project will also increase the share of renewable energy in Vanuatu which is less than 10% currently.</p> <p>The project will also involve technology transfer. The training of local staff for the Project will provide them with new skill sets enabling them to choose a career in their chosen field</p>
<p>What are the possible direct effects (e.g. employment creation, provision of capital required, foreign exchange effects)? <i>About ¼ page</i></p>	<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 improvement in living standards.
<p>ENVIRONMENTAL STRATEGY/ PRIORITIES OF THE HOST COUNTRY A brief description of the project's consistency with the environmental strategy and priorities of the Host Country <i>About ¼ page</i></p>	<p>The project presents Vanuatu a unique opportunity to develop an environmentally friendly, less costly source of power generation. According to Vanuatu National Energy Policy Framework, Government of Vanuatu aims to increase use of renewable energy (RE) in Vanuatu, the project is in line with the policy as project activity is a geothermal renewable energy project which will not only increase share of RE in country's energy generation profile but also reduce country's reliance on expensive imported fossil fuel for power generation.</p> <p>In addition to the benefits listed in section above project activity offers following benefits:</p> <p>No Noise Pollution: According studies geothermal power plant operation typically produces no noise according to common sound level standards, and thus is not considered an issue of concern.</p> <p>No Impact on Water: Project activity will have no impact on surface waterways.</p> <p>Land Use; Geothermal project uses less surface area as compared to other power generating alternatives.</p> <p>No Emissions: there are virtually any emissions associated with the project. In addition project will help to reduce sulfur emissions that would have occurred from natural venting if these sites had been left untapped.</p> <p>Any developmental project in Vanuatu should 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 documents 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>
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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