

PROJECT IDEA NOTE (PIN)

Name of Project: Upolu Wind Power Project, Samoa

Date submitted: 12th October 2012

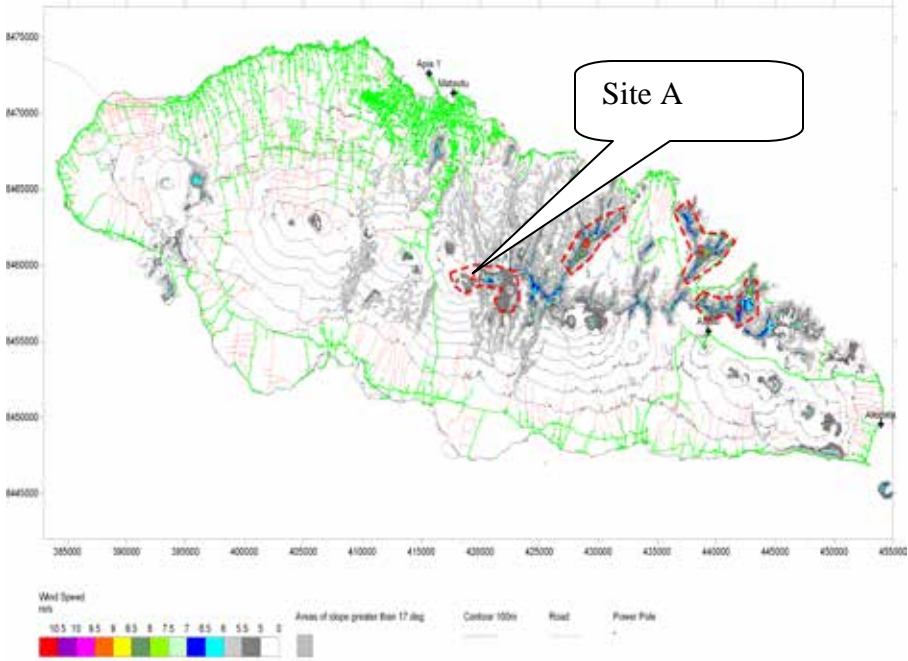
Description of size and quality expected of a PIN

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>Demand for energy has increased in Samoa over the last decade, thus reliable, affordable and environmentally sound energy services and supply is crucial to meeting this demand. Electricity is generated primarily from diesel generators from facilities on Upolu (close to Apia), Savai'i and Manono Island.</p> <p>The objective of the proposed project activity is to generate electricity in using wind, a clean source of energy. This project will contribute to Samoa's climate change mitigation efforts.</p>
<p>PROJECT DESCRIPTION AND PROPOSED ACTIVITIES <i>About ½ page</i></p>	<p>The Government of Samoa, the power utility Electric Power Corporation (EPC), the Secretariat of the Pacific Islands Applied Geoscience Commission (SOPAC) and the United Nations Development Program (UNDP) are undertaking a wind resource assessment project for Upolu Island, Samoa. The project has installed, and operated two wind monitoring stations on Upolu: one in Aleipata on the southeast coast and one on higher ground at the Afulilo dam.</p> <p>The grid connected Upolu Wind Power Project entails installation of seven Vergnet GEV MP 275 kW wind turbines. The project activity can generate electricity to the order of 3,626 MWh annually which otherwise would have been generated by diesel gensets. The project is planned on Upolu island around the Afulilo mast, site A shown on wind resource map below:</p>  <p style="text-align: center;"><i>Figure 1: Wind Resource map of Upolu Island</i></p> <p>Currently project is in site assessment stage. To further assess the suitability of the wind farm development in Uplolu for the selected site, and to increase certainty levels of future estimates, GHD has recommended following actions:</p> <ul style="list-style-type: none"> • Onsite and reference data: Acquire wind data at the selected site for at least 12months.

	<ul style="list-style-type: none"> • Wind flow modelling: Undertake wind monitoring at the new proposed site (i.e. Site A). • Power system losses: Conduct studies on the power system and the grid availability to estimate the losses. <p>Levelised cost of energy (LCE)¹ at 5% Discount rate for the proposed 2 MW wind farm is 0.16 USD/kWh (0.42 SAT\$/kWh²).</p>
TECHNOLOGY TO BE EMPLOYED³ <i>Describe in not more than 5 lines</i>	<p>The salient features for the project are listed below:</p> <ul style="list-style-type: none"> • Manufacturer: Vergent S.A. • Type and rated power : GEV MP - 200 kW to 275 kW • Axis of the rotor : Horizontal • Orientation of the rotor : Crown orientation - natural orientation by propeller downstream, corrected with the need by hydraulic engine • Height of the hub: 50 –55 or 60 m • Rotor diameter: 28 –30 –32 m • Rotation speed of the rotor: 31 or 46 rpm • Rated wind speed: 13 m/s • Cut-in wind speed: 4 m/s • Maximum wind speed (production mode): 20 m/s (29 m/s instantaneous) • Expected PLF: 21.5% • Power control system: Regulation by setting in flag (pitch). Active control with hydraulic system
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 – Wind (1 d)
LOCATION OF THE PROJECT	
Country	Samoa
City	Upolu 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 Upolu Island at Afulilio mast, Mt Le Pu'e. The project coordinates are: Latitude: 13° 56' 24" S Longitude: 171°45' 40.4" W
PROJECT PARTICIPANT	
Name of the Project Participant	Electric Power Corporation (EPC)
Role of the Project Participant	b. Owner of the site or project

¹ Levelised Cost of Energy is the price at which electricity must be generated from a specific source to break even over the lifetime of the project. It is an economic assessment of the cost of the energy-generating system including all the costs over its lifetime: initial investment, operations and maintenance, cost of fuel. It is very useful in comparing cost of generation from other sources.

² 1 USD = 2.63 WST

³ 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.

Organizational category	a. Government
Contact person	Tile Leia Tuimalealiifano
Address	P.O.Box 2011, 5th Floor, TATTE Building, Sogi, Apia, SAMOA
Telephone/Fax	Telephone 685 65401/Fax 685 23748
E-mail and web address, if any	leiat@epc.ws
Main activities <i>Describe in not more than 5 lines</i>	The Electric Power Corporation of Samoa (EPC) was incorporated on 19 December 1972 and is an autonomous State-owned corporation. It is endowed with the necessary powers to carry out its functions as the entity responsible for the generation, transmission, distribution, and selling of electricity in Samoa. From its simple beginning shortly after its establishment in supplying electricity exclusively to the Apia township, amidst the many challenges and constraints, the Corporation now provides power to 95 per cent of the population of Samoa.
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>	2015
Expected first year of CER/ERU/VERs delivery	2016
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> For JI projects: Period within which ERUs are to be earned <i>(up to and including 2012)</i>	7 years renewable twice
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>	Opportunity study is finished. Available document: Upolu (Samoa) Wind Resource Assessment Report

<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</i> <i>(mention what is applicable)</i></p>	<p>Project is being developed under voluntary market and need not apply for Letter of no Objection.</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, 16 Feb 2005</u></p> <p>Has the Host Country established a CDM Designated National Authority / JI Designated Focal Point? <u>Yes in year 2010</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>2900</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: 20,300tCO₂-equivalent</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Emission Reduction (tCO_{2e})</th> </tr> </thead> <tbody> <tr><td>2016</td><td>2900</td></tr> <tr><td>2017</td><td>2900</td></tr> <tr><td>2018</td><td>2900</td></tr> <tr><td>2019</td><td>2900</td></tr> <tr><td>2020</td><td>2900</td></tr> <tr><td>2021</td><td>2900</td></tr> <tr><td>2022</td><td>2900</td></tr> </tbody> </table>	Year	Emission Reduction (tCO _{2e})	2016	2900	2017	2900	2018	2900	2019	2900	2020	2900	2021	2900	2022	2900
Year	Emission Reduction (tCO _{2e})																
2016	2900																
2017	2900																
2018	2900																
2019	2900																
2020	2900																
2021	2900																
2022	2900																
<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 	<p>CO₂ is the targeted emission reductions by the project activity.</p> <p>The proposed wind power project generates electricity which otherwise will be generated using grid connected diesel fired generation sets. The share of renewable energy in electricity generation in Samoa is estimated at 13% for 2011.</p>																

<p>project? About ¼ - ½ page</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 68, version 04). As per the paragraph 2 of the guidelines: 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 one of the Least Developed Countries or the small island developing States (LDCs/SIDS) or in a special underdeveloped zone (SUZ) of the host country. 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 <p>According to the United Nations, Samoa is classified as both a Least Developed Country (LDC) and Small Island Developing State (SIDS)⁴. Hence proposed project, which is having installed capacity of 2 MW, is considered to be automatically additional as per the above EB guidelines.</p> <p>In addition the project is first-of-its-kind as per ‘Guidelines on Additionality of First-of-its kind project activities’ version 02.</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</p>	<p>The energy sector is important to Samoa’s economic, social, infrastructure and environmental development. The electricity sub-sector is largely managed by the Electric Power Corporation (EPC), a State-owned enterprise whose business scope covers electricity generation, transmission/distribution network operation, and retail. Electricity is generated primarily from reciprocating diesel engine generators from facilities on Upolu (currently close to Apia), Savai’i and Manono Island. A renewable energy source currently comprises approximately 13% of total primary energy for electricity generation. The electricity transmission network comprises predominantly 33kV and some 22kV circuits on Upolu and Savai’i.</p> <p>About 98% of the population in country has been electrified with the EPC seeking alternative energy options to provide electricity to those currently not connected to the grid. The Electricity Act 2010 set the following target for the electricity sector, “to provide for a new legislative framework for regulating the</p>

⁴ <http://www.un.org/special-rep/ohrlls/sid/list.htm>

<p>already in operation, please describe if CDM/JI revenues were considered in project planning.</p>	<p><i>electricity sector, the establishment of the post of the Electricity Regulator and the Office of the Regulator, and for related matters</i>". It also encourages the participation of the private sector in both generation and provision of transmission networks, with licensing from the Electricity Regulator. Electricity tariffs shall be fixed in accordance with the Electricity Act.</p> <p>According to Samoa Energy Sector Plan 2012-2016, the strategic direction of the electricity sub-sector is to substantially increase the share of electricity generation from renewable sources. This requires significant adaptation on the part of EPC and presents significant opportunities for the private sector to be more actively involved as Independent Power Producers (IPPs), potentially as network operators and, by means of Interconnection Agreements, at the individual consumer level.</p> <p>The options of solar, wind and hydro are near commercial if not commercial already but do not offer the economic advantages potentially available via biomass options.</p> <p>The electricity sector in Samoa has numerous renewable energy opportunities with the greatest challenge to choose the most optimal opportunities.</p> <p>The proposed project activity is a renewable wind power project and it is in line with the government strategy and will help Samoa realize its goal of substantially increase the share of electricity from renewable sources.</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 methodology</p> <p><i>Type:</i> I. Renewable energy projects</p> <p><i>Category:</i> I.D⁵ – Grid connected renewable electricity generation (I.D./Version 17,EB 61)</p> <p>Scope Number: 1</p>

⁵ <http://cdm.unfccc.int/methodologies/DB/RSCTZ8SKT4F7N1CFDXCSA7BDQ7FU1X>

C. FINANCE

TOTAL CAPITAL COST ESTIMATE (PRE-OPERATIONAL)											
Total project costs	Estimated initial cost projections for the project are as below: <table border="1"> <thead> <tr> <th>Parameter</th> <th>Value ('000)</th> </tr> </thead> <tbody> <tr> <td>Wind Farm Capital Cost (Euro)</td> <td>4,094</td> </tr> <tr> <td>Access Road (SAT\$)⁶</td> <td>134</td> </tr> <tr> <td>Grid Connection (SAT\$/kW)</td> <td>544</td> </tr> <tr> <td>O&M (Euro/ year)</td> <td>70</td> </tr> </tbody> </table>	Parameter	Value ('000)	Wind Farm Capital Cost (Euro)	4,094	Access Road (SAT\$) ⁶	134	Grid Connection (SAT\$/kW)	544	O&M (Euro/ year)	70
Parameter	Value ('000)										
Wind Farm Capital Cost (Euro)	4,094										
Access Road (SAT\$) ⁶	134										
Grid Connection (SAT\$/kW)	544										
O&M (Euro/ year)	70										
SOURCES OF FINANCE TO BE SOUGHT OR ALREADY IDENTIFIED											
Equity Name of the organizations, status of financing agreements and finance (in US\$ million)	Information regarding project funding is not yet available.										
Debt – Long-term Name of the organizations, status of financing agreements and finance (in US\$ million)	Information regarding project funding is not yet available.										
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)	N/A										
A period of 10 years	N/A										
A period of 7 years	US\$ 162,400 – US\$ 203,000										

D. EXPECTED ENVIRONMENTAL AND SOCIAL BENEFITS

LOCAL BENEFITS E.g. impacts on local air, water and other pollution.	<ul style="list-style-type: none"> The project utilizes wind energy for generating electricity which otherwise would have been generated through operation of existing power plants in grid mix, contributing to reduction in GHG emissions. Wind power projects produce no CO₂ and other air pollutants such as soot and SO₂. This will help in reduction of overall pollution associated with conventional power generation. Being a renewable resource, using wind energy to generate electricity contributes to conventional (e.g. fossil fuel) resource conservation and prevents subsequent degradation of other resources.
--	--

⁶ Exchange Rate (Euro/SAT\$): 3.85

SOCIO-ECONOMIC ASPECTS	
<p>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></p>	<ul style="list-style-type: none"> · The project brings additional investment in the area to contribute in meeting increasing power demand of the people. · Use of wind energy for electricity generation instead of conventional practice, reduces stress on the economy of the country, as country depends entirely on imported diesel to meet its demand. · The project contributes to diversification of the national energy supply, which is dominated by conventional fuel based generating units.
<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"> · The project activity will help to development of plant site which is an isolated rural area. · The project contributes for social wellbeing by generating job opportunities during the initial stage of project development, (e.g. civil works, construction activity,) and during the operation of the project activity. (e.g. Security, O & M personnel). · The project will involve construction of roads to project site which will improve/ strengthen access of the region.
<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>Samoa is committed to ensuring environmental sustainability, therefore environment sustainability score to sustainable development criteria of the country. It is a priority focal area of the Ministry of Natural Resources & Environment (MNRE) work program. The environment features prominently as a cross-cutting issue in all development initiatives. According to Strategy for development of Samoa 2012-2016 key strategic areas for sustainable energy supply are identified as:</p> <ul style="list-style-type: none"> Ø Promote and increase renewable energy investment and generation; Ø Efficient, affordable and reliable electricity supply; Ø Effective management of petroleum supply; Ø Promote energy efficiency practices in all sectors particularly the transport sector; and Ø Efficient and effective coordination and management of the sector through the implementation of the energy sector plan. <p>The key indicators for the above-mentioned strategic areas are identified as :</p> <ul style="list-style-type: none"> Ø Gradually phase out fossil fuels; Ø Increase the contribution of RE for energy services and supply by 8% over the 4 year planning horizon; Ø Complete and implement energy sector plan; and Ø Establish the energy regulatory functions. <p>The proposed project activity uses wind energy for power generation, which is a renewable source of energy. It is considered more environmentally friendly and cleaner than fossil fuel and is in line with Samoa sustainable energy plans. Environment Impact Assessment of the project needs to be carried out before starting of the project. Also a preliminary impact assessment needs to be studied and included in the Feasibility study report. The environment impacts of the proposed project will be studied during the feasibility study stage and later. However no significant negative effects are envisaged from the wind power project.</p>

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