

**Samoa– Project Idea Notes (PINs)  
and Project Design Documents  
(PDDs) developed Under ACP MEA  
Project**

# Upolu Wind Power Project, Samoa

## Background

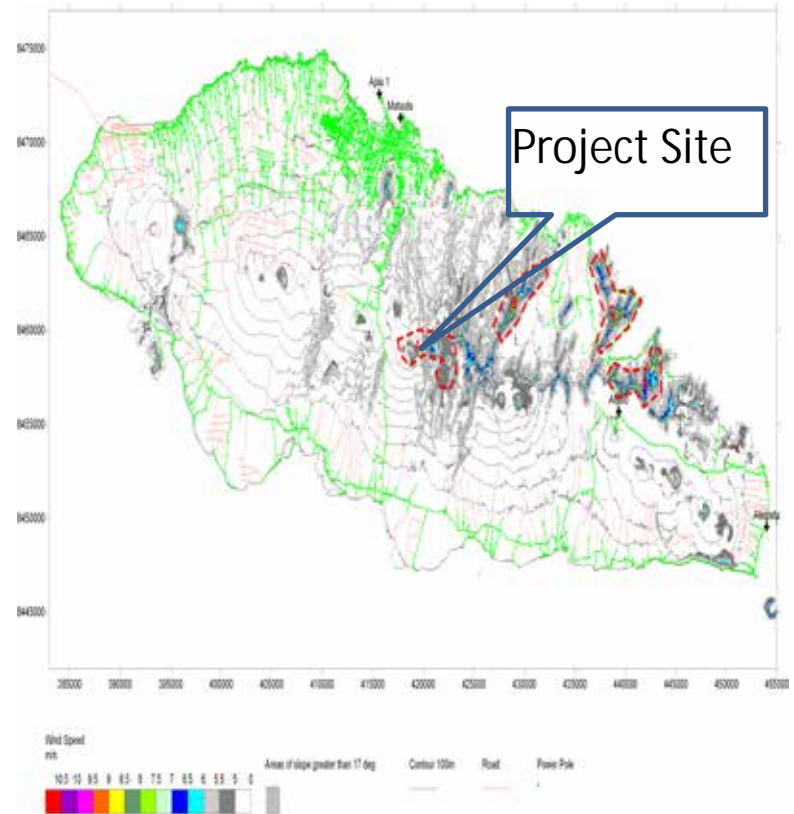
- Demand for energy has increased in Samoa over the last decade, thus reliable, affordable and environmentally sound energy services and supply is crucial to meeting this demand.
- The electricity sub-sector is largely managed by the Electric Power Corporation (EPC), a State Owned Enterprise, which is a combine generator, transmission/distribution network operator, and retailer
- Electricity in Samoa is primarily generated from diesel engine generators.
- According to Samoa Energy Sector Plan 2012-2016 the strategic direction of the Electricity Sub-sector is dominated by the potential for an immediate step change to a substantially renewable generation situation.

## Objective

- The objective of the proposed project activity is to generate electrical energy in sustainable means using wind, a clean source of energy.

# Project Description

- The grid connected Upolu Wind Power Project entails installation of seven Vergnet GEV MP 275 kW wind turbines with expected annual electricity generation to the order of 3,626 MWh annually.
- 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 currently doing a wind resource assessment project for Upolu Island, Samoa.
- The project is planned on Upolu island around the Afulio mast.



# Project Participant

Electric Power Corporation (EPC)

## Contact Details:

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# CDM Aspects

## Baseline Scenario

The baseline scenario for the project activity is generation of electricity using diesel fired gensets.

The share of renewable energy in electricity generation in Samoa is estimated at 13% for 2011 (Source: Samoa Energy Sector Plan Masyer Draft.)

## Additionality

- As per the 'Guidelines for Demonstrating Additionality of Micro-scale Project Activities' all renewable energy projects up-to 5MW and emission reduction of less than 20,000 tCO<sub>2</sub>e in LDC/SIDS are considered additional.

# CDM Aspects Contd...

## Additionality

- Further additionality assessments will be carried out demonstrating that the project activity cannot be implemented in the absence of the CDM by carrying out barrier analysis and/or investment analysis as appropriate.
- In addition, potential barrier analysis in terms of technological barriers (availability of skilled labour, capacity for O&M etc) and barriers due to prevailing practice can also be explored.

# CDM Aspects Contd...

## Applicable Methodology

AMS I D :Grid connected renewable electricity generation (Version 17,EB 61)

Scope Number : 01

## Estimated Emission Reductions

2,900 tCO<sub>2</sub>-equivalent/year

# Local Benefits & Socio-Economic Impacts

## Local Benefits

- ∅ 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 end products in the form of waste (eg. Particulate Matter, Fly ash, Water effluent etc.). 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 (eg. fossil fuel) resource conservation and prevents subsequent degradation of other resources.



# Environmental & Socio-Economic Impacts

- ∅ 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 conventional practice, reduces stress on the economy of the country.
- ∅ The project contributes to diversification of the national energy supply, which is dominated by conventional fuel based generating units.
- ∅ 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.

# Coconut oil based power generation in Samoa

## Background

- Pacific Islands Renewable Energy Project (PIREP) Samoa national report and the Promotion of Renewable Energy, Energy these reports indicated a great potential for the use of biofuels such as coconut oil.
- The Government of Samoa's draft policy objectives for the Energy Sector are to meet growing demand by maximising the use of indigenous Renewable Energy resources and minimising the import of fuel<sup>6</sup>. Specifically, it spells out a strategy to: "Promote alternative fuels to substitute petroleum products to reduce dependency of the economy on fossil fuels".

## Objective

- Samoa is currently dependent on the import of diesel fuel for a significant part of its power generation. Therefore, the Samoan Electric Power Corporation (EPC) is looking into viable and cleaner alternatives that make use of an abundant local resource: the coconut.
- As coconut-based exporting agro industries are struggling, project will also help develop a new domestic market for coconuts.

# Project Description

- The proposed Coconut Oil Fuelled 1 MW power plant is planned to be built next to, or as part of the planned new EPC power station in Savai'i.
- The location offers following benefits:
  - Ø High rural unemployment in Savai'i
  - Ø Good coconut resource and limited commercial coconut market
  - Ø Higher landed cost of fuel for EPC in Savai'i
  - Ø Fits well into the plans to build a new power station
  - Ø Good infrastructure (ring road) for collection of nuts
- It is estimated for the production of 660,000 litres of coconut fuel approximately 1,011 tonnes of copra or 5 million nuts will be required.
- Training will be arranged and human capacity building will be done locally.

# Project Participant

Electric Power Corporation (EPC)

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# CDM Aspects

## Baseline Scenario

- In absence of the project activity baseline scenario would be use of diesel for power generation resulting in GHG emissions into the atmosphere.

## Additionality

- Can be demonstrated as per “Guidelines for demonstrating additionally of Micro-scale project activities” EB 63 (version 3)”.  
As per the paragraph 3 of the guidelines:
- Project activities up to 5 MW that employ renewable energy technology are additional if :
  - Ø *The geographic location of the project activity is in LDC/SID or special underdeveloped zone of the host country identified by the Government before 28 May 2010;*

# CDM Aspects Contd...

- According to the United Nations, Samoa is classified both as a Least Developed Country (LDC) and Small Island Developing State (SIDS). Hence proposed project, which is having installed capacity of 1 MW is considered to be automatically additional as per the above EB guidelines.

## Methodology

- AMS I.G - Plant oil production and use for energy generation in stationary applications (I.G, Version 01,EB 55)

## Estimated Emission Reductions

- 1,771 tCO<sub>2</sub>-equivalent/year

# Local Benefits & Socio-Economic Impacts

## Local Benefits

- The project promotes use of coconut oil, which is a renewable fuel.
- It is clean, safe, biodegradable and free of Sulphur as compared with the diesel.
- Combustion of coconut oil used in the project activity reduces serious air pollutants such as soot, particulates, carbon monoxide, hydrocarbons and air toxics.
- Further, substitution of diesel with coconut oil results in reduction of anthropogenic GHG emissions through avoidance of carbonaceous fossil fuels.

## Socio-economic

- The collection and sale of coconuts to EPC by smallholders (households) in Savai'i
- Imported diesel fuel prices have risen substantially in recent years and remain volatile.
- Waste generated (leftover shell and husk) could be used for additional power generation, through either gasification or a steam turbine.

# Environmental & Socio-Economic Impacts

## Socio-Economic

- Livelihoods for small farmers that will have a market for coconuts that was previously not there.
- plantations are expected to require more labour for harvesting more nuts and replanting, creating local long-term jobs.
- During construction there will be a significant requirement for construction labour and during operation, 31 (expected) full Time Employment will be created.



# Biomass Gasification Power Plant in Samoa

## Background

- Samoa's National Energy Policy goal is *"To increase the contribution of Renewable Energy for energy services and supply by 20% by the year 2030"*. Renewable Energy is one of the five strategic areas of the *Samoa National Energy Policy* with the objective to *"successfully shift from fossil fuel dependency to Renewable Energy investment"*.
- Further ,scientific research shows that fossil fuels are depleting at a faster rate than anticipated, consequently Gov of Samoa realises that there is a need to promote and increase renewable energy investment options and generation across the country.
- The electricity comes from a diesel power generator based on Luganville and from the Sarakata Hydro Power Station.
- Recent studies have shown that there is an adequate potential of biomass gasification, biogas, wind, biodiesel and biofuels in

# Project Description

- The Government of Samoa through the Ministry of Natural Resource and Environment (MNRE) and the Government of Australia signed an agreement to implement the Greenhouse Gas (GHG) Abatement pilot project through renewable energy technology (biomass gasification technology) as a priority in the National GHG Abatement Strategy (NGHGAS) 2008-2018.
- The responsibility for implementation of the gasification technology program has been assigned to the Renewable Energy Division of the MNRE.
- Biomass gasification power generation offers scope for MNRE, EPC and Samoan consumers to develop an additional source of electricity at a cost that is competitive with current diesel generated power systems
- For Samoa to gain experience with biomass gasification technology, biomass growing, harvesting and processing a demonstration project of capacity 500 KWe is planned initially at sites already identified by MNRE. In case of budget constraints a smaller 250 KWe capacity may be implemented.

# Project Participant

Electric Power Corporation (EPC)

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# CDM Aspects

## Baseline Scenario

- Reduced diesel based electricity generation
- Reduction in associated CO<sub>2</sub> emissions

## Additionality

- Project additionally will be demonstrated as per “Guidelines for Demonstrating Additionally of Micro-Scale Project Activities” (EB 63, version 03).
- As per the guidelines Project activities up to 5 MW that employ renewable energy technology in LDCs/SIDs are considered additional .
- According to the United Nations, Samoa is classified both as a Least Developed Country (LDC) and Small Island Developing State (SIDS).

## **Applicable Methodology**

- AMS I D :Grid connected renewable electricity generation (Version 17,EB 61)
- Scope Number : 01

## **Estimated Emission Reductions**

- 2,803 tCO<sub>2</sub>-equivalent/year

# Local Benefits & Socio-Economic Impacts

## Local Benefits

- The project will use biomass for power generation. There will be no GHG emission from this project activity.
- Combustion of biomass in the proposed project does not result in net increase in GHG emissions of CO<sub>2</sub>, CH<sub>4</sub> and NO<sub>x</sub>.
- There is no fly ash or solid waste from this biomass gasification process

## Socio-economic

- The project brings additional investment in the area to contribute in meeting increasing power demand of the people.
- Use of biomass energy for electricity generation instead conventional practice, reduces stress on the economy of the country.
- The project contributes to diversification of the national energy supply, which is dominated by conventional fuel based generating units.

# Local Benefits & Socio-Economic Impacts

## Socio – Economic Impacts

- 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, (eg. civil works, construction activity,) and during the operation of the project activity.
- The project will involves construction of roads to project site which will improve/ strengthen access of the region.

**Thank You!**