



MINISTRY OF LANDS, SURVEY AND NATURAL RESOURCES &
ENVIRONMENT

[ENERGY PLANNING UNIT]

NATIONAL RENEWABLE ENERGY POLICY

Prepared By : Energy Planning Unit

Adopted By : His Majesty's Cabinet on its CD 222 Dated 24 March 2006

RENEWABLE ENERGY POLICY FRAMEWORK – KINGDOM OF TONGA

Vision Statement

“that by the year 2015, the Kingdom of Tonga achieves an optimal socio-economic structure achieved by sustainable energy development.”

Goal

“the provision of sufficient, socially, financially, economically, technically, politically and environmentally sustainable renewable energy systems”

1.0 INSTUTIONAL POLICY STATEMENT

1.1 Ensure that the Energy Planning Division (EPU) of the Ministry of Lands, Survey and Natural Resources (MLSNR) has the capacity to plan, develop and manage renewable energy projects/programmes.

Strategies:

1.1.1 Provide the EPU with appropriate number of professional and support staff.

1.1.2 Identify a viable source of funds within the MLSNR or elsewhere for the purpose of financing office space, equipment and similar expenses in support of renewable energy programme development.

1.1.3 Empower the MLSNR with the responsibility of regulating the renewable energy industry in Tonga except for electricity produced from renewable energy sources which will be regulated under the provisions of the Tonga Electric Power Board Act.

Work Plans

1.1.1.1 Carry out a review of the EPU including staffing and functions.

1.1.1.2 Recruit additional professional and support staff.

1.1.1.3 Provide training on the design, installation, repair and maintenance of renewable energy systems.

1.1.2.1 Submit budgetary request to the Ministry of Finance.

1.1.2.2 Request additional funds from potential donors.

1.1.3.1 Develop appropriate regulations for renewable energy systems in the Kingdom of Tonga.

- 1.1.3.2 Establish an integrated technical advisory and support committee on renewable energy development.

2.0 RENEWABLE ENERGY POLICY STATEMENTS

- 2.1 To ensure that appropriate provisions regulating renewable energy are provided for, in a legislative framework.
- 2.2 To promote and encourage the use of proven, appropriate and affordable renewable energy technologies in Tonga based on a systematic approach.
- 2.3 To develop partnerships with potential foreign and local investors, donors and agencies in seeking funding sources and technical assistance for the development of renewable energy programmes in Tonga.
- 2.4 To encourage inter-governmental, statutory bodies, non-governmental, donors, financial institutions, beneficiaries and private sectors cooperation in renewable energy programmes.

Strategies:

- 2.1.1 The MLSNR shall act according to the law from time to time in force.
- 2.2.1 Promote and encourage the importation of renewable energy technologies which meet a minimum equipment specification and safety standard applicable to the Tongan condition.
- 2.2.2 Promote a national standard for installation and maintenance of renewable energy projects.
- 2.2.3 Build the capacity in Tonga to carry out assembling, installing, repairing, maintaining and testing of renewable energy equipment.
- 2.2.4 Include renewable energy in primary and secondary schools curriculum.
- 2.2.5 Promote community awareness in renewable energy technologies.
- 2.3.1 Build development partner interest in renewable energy programmes.
- 2.4.1 Encourage sharing of information amongst all stakeholders
- 2.4.2 Encourage community involvement in renewable energy development.

Work Plans

Solar Energy

1. Formulate a minimum quality and safety standard for solar energy equipment.
2. Formulate a national standard for installation and maintenance of solar energy systems.
3. Provide training on the design, installation, repair, maintenance and management of solar energy systems.
4. Establish a solar energy database.
5. Develop a project proposal for the installation of XXXX solar energy home systems.
6. Install XXXX renewable energy home systems in the outer islands by 200X.
7. Seek technical assistance for renewable energy programmes from potential donors.
8. Establish an incorporated solar energy committee for each island district
9. Provide public education and training on solar energy programmes.
10. Organise industrial shows related to solar energy technologies.
11. Identify renewable energy systems to meet the needs of different communities.
12. Develop a plan for solar energy programme.

Wind Energy

1. Provide training on wind energy assessment to EPU staff.
2. Establish a wind energy database.
3. Conduct wind energy assessment in potential locations throughout the Kingdom of Tonga
4. Provide relevant information and data to potential investors.
5. Involve the EPU staff in the preparation, designing and installation and maintenance of wind energy systems.

6. Seek technical assistance for development of wind energy project.
7. Provide public education and awareness, advice and training on wind energy programmes.
8. Organise industrial shows related to wind energy technologies.
9. Develop a plan for wind energy programme.

Biomass Energy

1. Write a project proposal for funding and technical assistance for biomass resource assessment in the Kingdom of Tonga: e.g. coconut husks, rubbish, etc.
2. Provide training in the area of biomass resource assessment to EPU staff.
3. Seek funding for a biogas demonstration project in cooperation with the Tongan Waste Management Project.
4. Provide public education and awareness, advice and training on biomass energy programmes.
5. Organise industrial shows related to biomass energy technologies.
6. Develop a plan for biomass energy programme.

Geothermal Energy

1. Write a project proposal for funding and technical assistance for geothermal resource assessment in the Kingdom of Tonga.

Wave Energy

1. Write a project proposal for funding and technical assistance for wave resource assessment in the Kingdom of Tonga including, tidal and Ocean Thermal Energy.

Photographs:

Solar Energy



Energy from the Sun...



On 2004 Agricultural Show in Vava'u, King Tupou IV very interested on Solar Energy demonstrated by EPU.



Energy Planner Mr.Tevita Tukunga explain Solar Energy to her Royal Highness in 'Eua 2004 Agricultural show.



Installation of PV Systems in the Outer Islands...



One of households electrified by Solar Energy in Fotuha'a Island, Ha'apai

Wind Energy



North America Wind Power Plant

Number of generators.	170
Number of homes that can be powered by the farm.	33,000
Length of blades in feet	77
Cubic Yards of cement in each foundation	125
Height of tower	212
Tons of carbon dioxide emissions saved per year	585,000
Owned by Florida Power and Light Energy	
Estimated Cost	100 Million
Paid to landowners per year per tower for 20 years	\$2000.00
<p>A computer turns the blades to face the wind. They start to rotate when the wind reaches 7 mph. At 9 mph the blades turn at 14 rpm and start to generate electricity. When the wind reaches 13 mph the blades increase their rpm to 22, the maximum speed. At 33 mph the turbine generates its maximum power and at 56 mph the computer automatically turns the blades sideways to the wind. Towers and turbines are built to withstand wind at up to 134 mph.</p>	

Biomass Energy

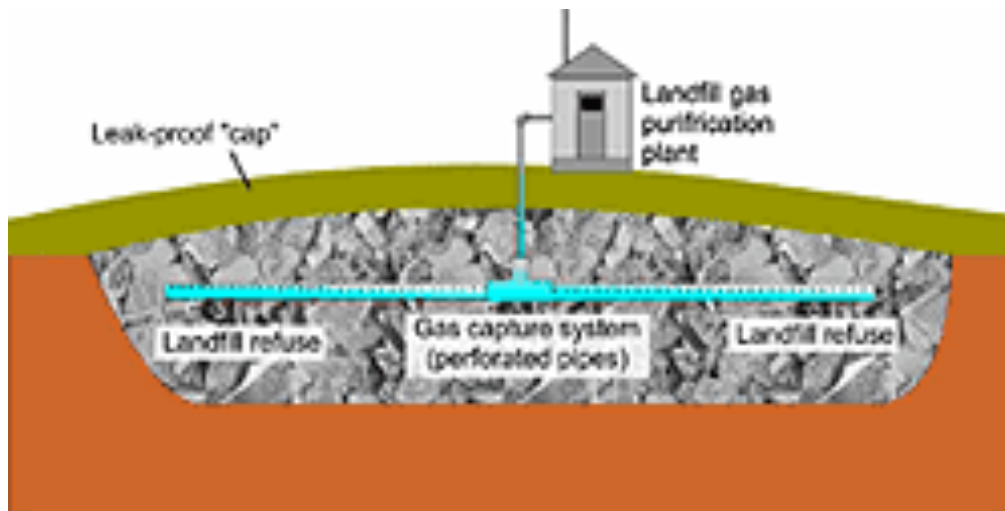
The term "biomass" refers to any form of plant or animal tissue. In the energy industry, biomass refers to wood, straw, biological waste products such as manure, and other natural materials that contain stored energy. The energy stored in biomass can be released by burning the material directly, or by feeding it to micro-organisms that use it to make biogas, a form of natural gas. Energy from biomass is still used around the world, for everything from cooking and heating to generating electricity



This generating station in Canada, burns biomass fuel from nearby sawmills produce energy.



Biogas can be made using plant and animal wastes.



Biogas can be captured from landfill waste.

Geothermal Energy

GEOTHERMAL POWER PLANT:



This geothermal power plant in Nevada has a capacity of 12 megawatts. Credit: Joel Renner, INEEL

Wave Energy

WAVE ENERGY POWER PLANT:



A company called **Wavegen** now operate a commercial wave power station called "Limpet" on the Scottish island of Islay,



The Limpet unit on Islay has an inclined oscillating water column (OWC) that couples with the surge-dominated wave field adjacent to the shore. The water depth at the entrance to the OWC is typically seven metres.

The design of the air chamber is important to maximise the capture of wave energy and conversion to pneumatic power.

The turbines are carefully matched to the air chamber to maximise power output.

The performance has been optimised for annual average wave intensities of between 15 and 25kW/m. The water column feeds a pair of counter-rotating turbines, each of which drives a 250kW generator, giving a nameplate rating of 500kW.



*A company called **Ocean Power Delivery** is developing a method of offshore wave energy collection, using a floating tube called "Pelamis". This long, hinged tube (about the size of 5 railway carriages) bobs up and down in the waves, as the hinges bend they pump hydraulic fluid which drives generators.*

Ocean Power Delivery Ltd has developed a novel offshore wave energy converter called Pelamis. Building on technology developed for the offshore industry, the Pelamis has a similar output to a modern wind turbine. The first full-scale pre-production prototype has been built and is being tested at the European Marine Energy Centre in Orkney.

It is anticipated that future 'wave farm' projects would consist of an arrangement of interlinked multi-machines connected to shore by a single subsea cable. A typical 30MW installation would occupy a square kilometre of ocean and provide sufficient electricity for 20,000 homes. Twenty of these farms could power a city such as Edinburgh.