Request For Proposal

For

The Strategic Designing of Method of Integrating Renewable Energy into the Tongan Education Curriculum through development of Renewable Energy Resource Guidebook

1. Background

The Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) is a continuation of the close collaboration between the Secretariat of the Pacific Regional Environment Programme (SPREP), UNDP and the Global Environment Facility (GEF) to build the capacity of the PICs to deal with the challenges of Climate Change

The global environment and development goal of PIGGAREP is the reduction of the growth rate of GHG emissions from fossil fuel use in the Pacific Island Countries (PICs) through the removal of the barriers to the widespread and cost effective use of feasible renewable energy (RE) technologies. The specific objective of the project is the promotion of the productive use of RE to reduce GHG emission by removing the major barriers to the widespread and cost-effective use of commercially viable RE technologies (RETs). PIGGAREP consists of various activities whose outputs will contribute to the removal of the major barriers to the widespread utilization of RE technologies (RETs). The project is expected to bring about in the PICs: (1) Increased number of successful commercial RE applications; (2) Expanded market for RET applications; (3) Enhanced institutional capacity to design, implement and monitor RE projects; (4) Availability and accessibility of financing to existing and new RE projects; (5) Strengthened legal and regulatory structures in the energy and environmental sectors; and, (6) Increased awareness and knowledge on RE and RETs among key stakeholders.

Tonga is one of the participating PICs in the PIGGAREP and one of the activities in its 2013/2014 Work Plan and Budget is: "Capacity Strengthening to Sustain/Disseminate RE Knowledge, in that will involve the RE integration into the school curriculum in Tonga through development resource guidebook to assist teachers and students.

Supporting educational initiatives on climate change and disaster risk management are key areas of sustainability and their integration into the curriculum of all countries will help equip today's children with the necessary knowledge and skills for sustainable futures in the face of the potential impacts of climate change and disasters. Analysis and stocktaking of Climate Change Education [CCE] have revealed that Tonga's curriculum climate change contents have been directly or indirectly integrated to each Key Learning Area [KLA] of about seven subjects. As a matter of fact, aspects of climate change mitigation measures and options in the energy sector required special consideration particularly in this transitional period to a greener economy. The Tonga Government's massive effort towards clean technologies under Tonga Energy Roadmap Initiative 2020 needs complement from all corners of the society, particularly the capacity of future generations to maintain the momentum on a sustainable fashion.

2. Instruction to Offerors

- The Proposal must cover all the objectives, output and activities as specified in the Terms of Reference (TOR)
- The Proposal must include costs for professional fees and logistics
- US$ only must be used in the Proposal
- The Proposal must include:
    - An updated CV of the individual/s who will undertake the update feasibility study
    - A summary of recent work in the areas to be covered in this consultancy (including client and work produced);

- Information on availability;
- Total person days proposed for the work on the consultancy and daily rate in US$ and
- A methodology and work plan (maximum 10 pages)

- As this task will involve specialized skills, experience and qualification (in curriculum writing and a fair knowledge on Renewable Energy), the Proposal must specify such experience and qualification of the individual(s) who will undertake the assigned task(s);
- The consultancy preferably should commence in the beginning of November 2013.
- The offer must be in English language only;
- The above-mentioned documents, information and requirements, including the TOR are mandatory and as such are required to form a complete tender. An offer will be rejected unless it is substantially responsive;
- If a proposal is received prior to the formal submission date, correction/modification can be made up to the formal submission date;
- The Proposals must be submitted in electronic format only (Word and PDF format, 3 MB max) by email to the email address specified below; and
- The task must be taken in Tonga. The exact number of working days will be determined subsequently between the successful Consultants, the TERM IU and the PIGGAREP Project Management Office (SPREP, Apia, Samoa)
- Proposal must be received by 4:pm Tonga Time, Friday, November 8th 2013

Acknowledgements of receipts of proposal will be provided by email. Successful as well as unsuccessful bidders will be informed by email once evaluation and selection process are completed.

3. Award of Contract and Evaluation Criteria:

Proposals will be evaluated according to the following criteria:

i. Price (30%)
ii. Specific Experience in Curriculum writing and a fair knowledge on RE in the Pacific small Island states (30%)
iii. Experience working in Tonga/PICs plus qualification (20%)
iv. Methodology/Work Plan (20%)

4. **Activity Monitoring, Evaluation and Criterion**

The CCE&DRM Working Group (refer to ToR) will validate the entire work, timeline and work plan on the basis of TERM IU/Ministry of Lands, Environment, Climate Change and Natural Resources evaluation of the extent to which the Consultants demonstrate that they will offer the best value for money, and that it satisfy the following criteria.

Team/Consultant Competencies:

- Excellent planning and facilitation skills;
- Cultural awareness and sensitivity;
- Ability to research, analyze and present complex information;
- Ability to ensure long term effective strategies are in place for RE integration in Curriculum;
- Strong teamwork and communication skills;
- Strong analytical and presentation skills;
- Good command of English and Tongan (both oral and written);
- Proven ability to meet deadlines.

These criteria will be taken note of when the evaluation team evaluate the proposal along with the above stated evaluation criteria

All Proposals must be addressed to:

The Tonga Energy Roadmap Implementation Unit [TERM-IU] and copied to SPREP on the following emails:

TERM IU:

'Inoke Finau Vala

Director TERM IU

PO Box 827

Nuku'alofa

Email: inokefvala@gmail.com

SPREP:

Silia Kilepoa Ualesi

PIGGAREP Project Manager

SPREP

Email: siliau@sprep.org

TERMS OF REFERENCE

for

The Strategic Designing of Method of Integrating Renewable Energy into the Tongan Education Curriculum through development of Renewable Energy Resource Guidebook

Background

In 2009 the Forum Education Ministers Meeting (FEdMM) endorsed the Pacific Education Development Framework (PEDF) which identifies Education for Sustainable Development (ESD) as one of several cross-cutting themes. In 2011, the Forum Leaders endorsed the *Waiheke Declaration on Sustainable Economic Development* in which they recognized the importance of focusing regional efforts on productive sectors such as tourism, fisheries and agriculture. They also highlighted the importance of education, energy and infrastructure in creating an enabling environment for sustainable economic development. In 2012, the Leaders confirmed the crucial importance of developing more sustainable and efficient energy systems in adapting to the climate change impacts and in enhancing the capacity of their people through relevant education channels.

Making RE a part of the energy mix alongside conventional energy is fraught with challenges in Tonga due to various known reasons. The fossil fuel-based system that attaches a high premium to the stability and predictability of the current flow is ill-prepared to integrate intermittence which is a hallmark of renewable energy. However, Government has made tremendous effort, in collaboration with green development partners, through the TERM to cope with all issues and to ensure that this huge green transformation attempt is achievable and beneficial to all. Instantaneously, it is crucial that capacities at all levels must be developed to complement these ongoing green efforts and in preparation for this emerging renewable-energy industry in the country and abroad.

The Global Environmental Facility [GEF] through SPREP's Pacific Island Greenhouse Gas Abatement through Renewable Energy Projects [PIGGAREP] regional initiatives have made the effort to reduce information, knowledge and awareness barriers that Tonga has encountered in the Renewable Energy Sector. The effort would definitely enable Tonga to bring RE issues, challenges and solutions closer to every citizen through educational means and children.

1. Purpose

The purpose of the consultancy work is to compliment TERM Initiative through developing comprehensive resource guidebook that contains basic skills and knowledge in Renewable Energy to assist Teachers and Students of Class 5 to Class 10 [Form 4] levels. A tool to assist them in classroom when teaching Renewable Energy related topics of the Curriculum. This will eventually enhance the renewable energy content of the school curriculum and strengthen the capacity of the teachers to effectively deliver on the RE content of the curriculum.

2. Scope of Work

The Consultants will be the key implementers of this project in close collaboration with the Climate Change Education & Disaster Risk Management Working Group, [CCE&DRM] Ministry of Lands, and Environment, Climate Change and Natural Resources [MLECCNR], Tonga Energy Roadmap Implementation Unit [TERM-IU] and other relevant stakeholders.

The work will involve the followings:

(i) Assess existing Curriculum and carry out a gap analysis and stock take of the adequacy and appropriateness of the RE and climate change mitigation content in each key learning areas [KLA] & gaps and be presented to the CCE&DRM Working Group and TERM IU.

(ii) Drafting a RE Resource Guidebook for Teachers.
(iii) Conduct consultation with selected Teachers/schools to introduce and demonstrate the usage of the Resource Guidebook
(iv) Graphic designing - which will be done separately when required.

3. Specific Tasks

The Consultants will undertake but not limited to the following tasks as specifically detailed hereunder:

(i) Appraise of existing curriculum:

- Appraise, analyze and identify key issues and gaps concerning RE aspects in curriculum
- Highlight strategic approaches and recommend potential areas of interventions Identify solutions for embedding RE into curriculum that is appropriate, balanced, sensible, and progressively builds on existing teaching/learning methods and content.

(ii) Drafting of the RE Teachers Resource Guidebook(s):

- Prepare the first draft of the RE Teachers Resource Guidebook, Conduct consultations with selected Teachers and Summary Report
- Prepare the second draft of the RE Teachers Resource Guidebook, Conduct consultations with selected Teachers and Summary Report
- Present the third draft to CCE&DRM Working Group for endorsement
- Submit the final draft to the Chairperson of CCE&DRM Working Group and Director of Tonga Energy Roadmap.

(iii) Consultation with selected Teachers to introduce the RE Teachers Resource Guidebook(s):

- Selected teachers and schools must be in Tongatapu, Ha'apai, Vava'u and 'Eua.

(i) Graphic Designing:

- Graphic Design will be done when required.

4. Issues to Address

Annex 1 to this TOR provides details of the key areas to be enhanced in RE Sector which need to be addressed in the curriculum. It is obvious that RE technical intricacies can be a challenge when embedding it in the curriculum. Therefore, sufficient time and resources be allocated for teachers to master both the theory and practice of renewable energy technologies and to develop a coherent work scheme in classroom. Students must also gain not only an understanding of RE energy resources, but a greater confidence in investigating, questioning, and experimenting with scientific ideas. The following issues have been identified;

i. "Pacific Island Countries [PICs] have no alternatives but to effectively address climate change issues through adaptation and mitigation measures"

ii. "PIC are especially affected by the growing gap between increasing vulnerability and the lack of capacities to cope with the adverse effects of climate change"

iii. "While climate change was present in the secondary and partly primary curriculum, the depth and focus differ in countries"

iv. "Though education sector is not one of the key climate-sensitive sectors, it is however, likely to incur indirect impacts from climate change."

v. "So far it has not been considered to mainstream climate change into existing education policy frameworks, strategies and planning processes."

vi. "Tool Kits, scientific equipment, apparatus and measuring devices for demonstration and practical works on RE must also be available in classrooms and must be considered in certain sections of the Resource Guidebook.

5. Work Expected Outputs

The work to be carried by the Consultants is to develop a RE Resource Guidebook, in most appropriate language, to assist teachers with approaches to integrating RE into classroom curriculum and will also provide real examples of the different ways that clean energy concepts can be presented to students in various subjects. The Resource Guidebook must also provide students of Class 5 to Class 10 with a variety of projects to broaden their knowledge of RE Sources as stipulated in **Annex 1**. Key outputs of the service will be:

a) Inception report on analysis of current Curriculum as well as needs assessment instruments, work plan and report of any data collection. Inception Report must address Section 1 – 10 of this TOR
b) First and Second Draft of RE Resource Guidebook
c) Final versions of the Teachers RE Resource Guidebook
d) Capacity development and consultation with Teachers
e) 2 hard copies and an electronic copy of the final draft of Teachers RE Resource Guidebook to be handed over to CCE&DRM Working Group and TERM-IU Director.

Remuneration will be made in 5 portions according to the delivery of the above outputs on a timely manner which will be distributed equally.

6. Duration of Consultancy Service

The consultancy work is expected start in November 2013 and to be completed within two to three months from date of the signing of the Contract. However, early completion would be an advantage.

7. Inputs:

The Team is required to have its own computer and stationaries for the work that will be undertaken. TERM IU must also provide assistance to the Consultants with relevant data and information.

ANNEX 1: SUPPLIMENTARY NOTES - RECT

Climate change is already disproportionally affecting the islands of the Pacific. Although islanders have done little to contribute to the cause – producing less than 0.03% of current global greenhouse gas emissions – they are among the first to be exposed and the least able to respond . At the same time, despite efforts to reduce their reliance on fossil fuels and improve energy security, many PICs remain almost 100% dependent on imported petroleum products for power generation and transportation. Sustainable energy (SE) and climate change adaptation (CCA) are therefore top priorities for PICs governments as expressed in regionally endorsed frameworks and in national policies and strategic documents.

The 'Framework for Action on Energy Security in the Pacific' (FAESP) endorsed by PICs Ministers of Energy in 2011 identifies priority national and regional actions to reach the PICs goal of energy security. Progress at the national level has been slow, due to limited human, technical and financial resources and limited national expertise. In this regard a strengthened regional capacity to supplement national capacity is a vital element for the effective pursuit of national and regional goals for a more sustainable and secure energy sector. The Kyoto Protocol to the UNFCCC was adopted at the Third Session of the Conference of the Parties to the UNFCCC held in 1997, Kyoto, Japan. This contains legally binding commitments for developed countries to reduce greenhouse gas emissions. These countries agreed to reduce their GHG emissions by at least 5% below 1990 levels on a global level in the commitment period 2008–2012. This Protocol came into force in 2005. Tonga acceded to the Kyoto Protocol in January 2008. Like all developing countries, Tonga has no reduction commitments under the Kyoto Protocol, however Tonga can undertake mitigation actions to contribute to the achievement of the core objective of the UNFCCC.

The Tonga Energy Road Map (TERM) is a government-adopted ten year road map to reduce the Kingdom's vulnerability to oil price shocks and achieve an increase in quality access to modern energy services in an environmentally sustainable manner. TERM serves as a guiding document for Government actions toward green economy and as technologies change over time, TERM is periodically updated to factor in those changes. The Tonga Joint National Action Plan on Climate Change and Disaster Risk Management initiative has also laid a path and target for greenhouse gas emission reduction of 10% by 2015 based on 2000 level. The overall Tonga's Strategic Development Framework [TSDF] 2011/2014 has a vision which is "To develop and promote a just, equitable and progressive society in which the people of Tonga enjoy good health, peace, harmony and prosperity, in meeting their aspirations in life" Ultimate Objectives include: Sound education standards, by emphasizing quality universal basic education. Appropriate skilled workforce to meet the available opportunities in Tonga and overseas is required by delivering improved Technical and Vocational Education and Training. Reinforcing skills from policy analysis to RE management to mechanical and electrical skills at the tradesman level, and applying to daily life is needed.

The Forum Leaders identified the following priority areas in relation to energy: 1) strengthening human capacity development initiatives to support national and regional energy programmes, including a focus on development of apprentice schemes for power utilities and alternative energy technologies; 2) encouraging the necessary actions that would facilitate investment in sustainable renewable energy technologies and in energy efficiency and conservation initiatives; 3) increased investment in basic infrastructure to improve access to water and sanitation and energy as a pre-requisite for progress in achieving the MDGs; and 4) a need to mobilise additional support to further reduce the Pacific's dependence on fossil fuels.

This proposed work aims to address the 4 issues of (1) Knowledge barriers among Teachers and students in RE (2) Accessible and effective learning environment for the lifelong educational needs in the area of RE, (3) Lacking in electro-technology skills among teachers and students, and (4) Awareness barriers at all levels of the society. Hence, the followings facts must also be considered which directly related to the key issues above and may provide useful hints;

- Knowledge is one of the key factors for the future growth of renewable energies and clean, secure supplies. Through education, the necessary know-how for the growth of renewable energy in Tonga and mitigate of climate change will also be propagated.
- RE Resource Guidebook may contain, games, factsheets, illustrations, practical works, quizzes and posters which will be developed in consultation with teachers.
- Teachers' capacity to deliver and to create awareness need to be strengthened as well as career path for students interested in this field of RE will be developed.
- An ideal introduction to renewable energy and provides valuable learning in a fun way for Primary will also be developed. By making the learning exercise fun to do, the students could be more apt to remember the lesson.
- Perhaps the RE Resource Guidebook may be designed/prepared to ensure students will enjoy making their own renewable energy models and love the character that depict the difference types of RE sources, transformation and uses. The training modules will also provide some basic experience on research and helps students to look critically at their own environment. With changing times and economics, some habits need to change to adjust to the economy of our daily life.

The RE Resource Guidebook for Teacher's must cover the following RE sources and be integrated into English, Tonga, Science, Mathematics, Geography and other sugjects' KLA and activities;

Solar: *Most renewable energy comes either directly or indirectly from the sun. Sunlight, or solar energy, can be used directly for heating and lighting homes and other buildings, for generating electricity, and for hot water heating, solar cooling, and a variety of commercial and industrial uses.*

Wind: *The sun's heat also drives the winds, whose energy is captured with wind turbines. The Earth's rotation also contributes to the winds, particularly through the Coriolis effect.*

Biomass: *Along with the rain and snow, sunlight causes plants to grow. The organic matter that makes up those plants is known as biomass. Biomass can be used to produce electricity, transportation fuels, or chemicals. The use of biomass for any of these purposes is called biomass energy.*

Hydrogen: *Hydrogen also can be found in many organic compounds, as well as water. It's the most abundant element on the Earth. But it doesn't occur naturally as a gas. It's always combined with other elements, such as with oxygen to make water. Once separated from another element, hydrogen can be burned as a fuel or converted into electricity. Because energy is always needed to produce hydrogen, hydrogen is not in itself an energy source, but rather a way to store and transport energy, so it is often referred to as an energy carrier.*

Geothermal: *Not all renewable energy resources come from the sun. Geothermal energy taps the Earth's internal heat for a variety of uses, including electric power production and the heating and cooling of buildings.*

Ocean: *The ocean can produce thermal energy from the sun's heat and mechanical energy from the tides and waves. Tides are driven by the gravitational pull of the moon and sun upon the Earth, while waves are driven by winds blowing over the ocean's surface.*

Hydropower: *Flowing water creates energy that can be captured and turned into electricity. This is called hydroelectric power or hydropower.*