

**REQUEST FOR PROPOSALS**  
**PROVISION OF SERVICES FOR A FEASIBILITY STUDY ON SOLAR ENERGY SYSTEM FOR A  
COCONUT PROCESSING FACTORY IN PAPUA NEW GUINEA**

DESCRIPTION	DATE / DETAILS
Deadline for submissions:	<b>Close of Business, Wednesday 12 July 2023</b>
Mode of submission:	Electronic Only
Address for submission and questions:	Nicola Dowsing (PHAMA Plus Operations & Finance Manager) <a href="mailto:n.dowsing@phamaplus.com.au">n.dowsing@phamaplus.com.au</a>
File Format for submissions:	An electronic copy of the proposal (to include the methodology and financial proposal) must be emailed as a single file in .pdf format with the subject line: "COMPANY/INDIVIDUAL NAME. Proposal for: Provision of Services for a feasibility study on solar energy system for a coconut processing factory in PNG".  PHAMA Plus will send a confirmation of receipt email in response to your electronic submission. If you do not receive a confirmation of receipt email within two working days your response has not been received. DT Global and DFAT bear no responsibility for, and make no guarantees, as to the successful receipt of your response. In all circumstances it is your responsibility to ensure that your response has been received.

## 1. BACKGROUND

It is estimated that 460,000 households are involved in PNG's coconut sector. The commercial coconut sector in PNG includes three sub-sectors:

- The largest is the traditional copra/coconut oil sub-sector which includes copra producers, copra millers and exporters who produce and export copra and/or process copra into coconut oil (CNO) and copra meal as a by-product for exports.
- There is also a substantial but largely informal sub-sector engaged in the production and domestic sale of coconuts for consumption and drinking, including transport of nuts from coastal areas to the highlands.
- The third sub-sector is based on high value coconut products (HVCPs) including virgin coconut oil (VCO) and other value-added products.

Apart from these, an unknown but possibly significant portion of coconuts produced are used for livestock feed (pigs and poultry) at village level or are not utilised at all, especially in more remote areas with poor transport infrastructure. Utilisation of by-products such as coconut fibre (coir) and coconut stem are minimal, except for local building materials, handicrafts and mulch.

While still important, the copra sub-sector has been long in decline due to the low returns to labour compared with other rural income generating opportunities, further accentuated in recent years by falling prices for coconut oil and copra. As a result, production of HVCPs, especially VCO, has gained popularity with micro, small and medium-sized enterprises (MSMEs) producing for the local market. Women play a leading role in many of these enterprises as owners of small businesses. HVCPs remain a very small part of the sector but with significant potential for development.

Kokonas Industri Koporesen (KIK) is the coconut industry's regulator in PNG. It plays a key role in defining and promoting quality and processing standards, and ensuring market access for PNG coconut businesses into overseas markets. In the first phase of PHAMA Plus, our partnership with KIK focused on the development, and roll out of the VCO Quality Standards, enabling the testing of different locally produced VCO products from eight small processors against the KIK adopted standards from the International Coconut Community (ICC) and gave 16 small VCO producers knowledge on the VCO standards, general food safety standards, coconut varieties and suitability of these varieties for production of different coconut

products, and effective coconut farming systems. In December 2022, PHAMA Plus signed a new Memorandum of Understanding with KIK focusing on the HVCP sub-sector, aiming to improve product quality and increase volume of high quality VCO.

Of the 14 MSMEs registered with KIK, Tropic Frond Oils Ltd (TFO) is by far the largest processor of VCO in PNG. It is a 100% locally-owned business based in Keravat, Gazelle District, East New Britain Province. This more-than-20 year old business is the largest exporter of VCO and VCO based products from PNG. Its line of products includes bulk VCO (for exports only), packaged VCO, coconut soaps, hair and body care products, such as hair and skin moisturisers, and hotel soaps. Its main export destinations are Australia and New Zealand.

The company and its coconut suppliers are certified organic (producer and processor) since 2012, and its processing facility has been HACCP (Hazard Analysis and Critical Control Points) certified since 2015. TFO currently processes 120,000 coconuts per month which is approximately 10,000 litres of VCO per month. These dry de-husked coconuts are supplied by 124 smallholder farmers from nearby villages. TFO's business model is solely dependent on local farmers to supply coconuts for processing. An additional nine farmers will start to supply TFO after the next organic audit.

The company operates on a 24 hours per day, 7 days per week schedule and the need for constant power supply to the factory is fundamental to good quality and great products. Over the last few years, electricity supply through the main grid has been unreliable and inconsistent and consumers are faced with constant power blackouts on a daily basis and for prolonged periods of time.

In 2022, TFO's power usage was at an average of 5067 kWh per month which equates to about K5,000 month. Generator usage for the same year amounted to 7,384 litres of diesel which is about K2,460 per month at an average price of K4 per litre. A total of about K7,460 per month for electricity alone.

Making savings in this area would enable the company to increase production and also pay more to the growers for their coconuts. Furthermore, the company is motivated to improve its ecological footprint and be more environmentally friendly. This is in line with the management's vision for the company.

## 2. SCOPE OF WORK

PHAMA Plus is seeking to engage a consultant to undertake a feasibility study on solar energy for TFO. There are two elements to the scope of work:

- Conduct an energy audit and determine TFO's energy requirement based on current capacity and future development plans.
  - Conduct an energy audit of TFO's current energy usage and determine its energy supply capacity based on the grid and standby diesel generator. Also include Energy Efficiency audit to identify and assess opportunities to reduce and/or optimize electricity and fuel consumption and provide all costs, forecast savings and a return on investment.
  - Assess suitable space for solar panels (arrays), identify suitable locations and take into consideration factors such as when using ground mount arrays land ownership is confirmed or alternatively if roof space is preferred, structural assessments to ensure the roof has sufficient loading capacity and undertake array shading analysis.
  - Determine the cost of energy and sustainability based on current supply and generation.
  - Produce a written report documenting the results from the energy audit and provide recommendations for alternate energy source(s). These recommendations could consider energy supply replacement or supplementation of current supply.
  - Conduct a financial and technological assessment for energy storage in lithium batteries.

- Based on the recommendation(s) above, conduct a feasibility study of the energy needs of TFO:
  - Evaluate the technical, operational and financial feasibility of alternate energy sources recommended above.
  - Conduct a technical, operational and financial feasibility study of installing and operating a solar energy system to support or supplement TFO's factory energy requirements. The feasibility study should project future needs of the company and its ambitions to be environmentally friendly (carbon neutral).
  - Assess the risk of the system (i.e. environmental damage, injury to workers from solar panels, ergonomics, natural disasters) and recommend appropriate mitigation measures.

#### *Other considerations*

- Gender Equality, Disability and Social Inclusion (GEDSI): highlight the involvement of women, youth and persons with disabilities in improving the quality of Pacific agricultural produce and exports.
- Environment, Climate Change and Disaster Resilience (ECCR): ensure relevant elements of ECCR are recognised throughout feasibility study and implementation.
- Ensure that PHAMA Plus processes and procedures are effectively implemented in accordance with DT Global policies and procedures including, but not limited to the DT Global Code of Conduct, Fraud and Anti-Corruption Policy, Confidentiality, Child Protection and Health and Safety, as well as being compliant with the requirements of relevant Australian and Pacific Island country laws.
- Ensure the efficient delivery of activities, with a zero-tolerance approach to fraud.
- Provide client-focused, responsive technical support to the PHAMA Plus program and achieve a high level of internal and external customer satisfaction.

### **3. QUALIFICATIONS AND KNOWLEDGE REQUIRED**

The service provider requires:

- Degree in electrical engineering or a similar discipline.
- Ten or more years' professional experience (preferably in engagement with the private sector).
- Strong networks and connections in the PNG energy sector.
- An excellent understanding of GEDSI issues in relation to PNG.
- An understanding of ECCR issues related to agriculture in PNG.
- Excellent written communication skills in English and the ability to contribute to analytical documents and reports.
- Experience in conducting solar energy feasibility studies.
- Have an experience or working knowledge of the regulatory requirements in procurement, construction and operation of energy generation in PNG.
- Experience in Battery Energy Storage Systems.
- An energetic and self-motivating approach to work.

### **4. KEY RELATIONSHIPS**

- Report to the PHAMA Plus PNG National Facilitator, with overall supervision provided by the PHAMA Plus PNG Country Manager.
- Work with Managing Director of Tropic Frond Oils Ltd to complete deliverables.

### **5. DELIVERABLES AND TIMEFRAME**

The service provider will submit:

- A full proposal of how the work will be undertaken including a draft program and who would be involved.

- An itemized list of proposed equipment, quantities and estimated costs (supply & installation) which will assist the project owner obtaining quotes in the event they decide to proceed with recommendations. Forecast solar array output (kWh per annum) with corresponding electricity/fuel savings should also be provided.
- A final report, following the feasibility study and documenting the all aspects of the scope of work and capturing the following:
  - Determine what structural changes – if any need to be made to the existing roof to install solar PV.
  - Suggest a ‘maximum recommended capacity’ (KW of solar power that could be installed), depending on available, structurally sound roof space.
  - Determine the monthly predicted energy production based on orientation of the roof, solar irradiance, and ‘maximum recommended capacity’.
  - Determine the list of components needed to meet the ‘maximum recommended capacity’ and the various standards as required by PNG Power. Include a wiring diagram to show how these components should be wired and installed.
- Other updates as required by PHAMA Plus.

The project is expected to be complete by 30 November 2023.

## 6. FEE AND PAYMENT SCHEDULE

The service provider will be paid upon completion of satisfactory deliverables submitted to deadlines agreed at the start of the work. Failure to meet the agreed due dates could result in payment of the service provider fees being withheld pending further discussions with Hiring Manager or a renewed due date for deliverables being agreed upon.

Schedule of Payments: Fees will be paid in arrears, upon submission of a correctly rendered invoice supported by a timesheet, and provision of any agreed and approved deliverables due during the invoicing or input period. Timesheets and deliverables are to be approved by the Hiring Manager.

## 7. SUBMISSION GUIDELINES

Proposals must include the following:

- 1) A brief methodology** for the achievement of the services above, to be provided, outlining how the activities will be delivered (**No more than 2 x A4 pages**). The methodology must address why the service provider is suited for this activity, including but not limited to:
  - A description of senior personnel (e.g. lead person) who will be available for PHAMA Plus, including CVs and project references;
  - An overview of similar projects consultants have undertaken recently.
  - Consultant’s approach to health, safety and security, child protection and environmental safeguards;
  - How the consultant will achieve value for money.
- 2) A financial proposal.** This should include a daily rate in **PGK** for the personnel available and suited to the assignment. Any management fee charged must be included in the daily rates for each person. Other expenses including travel costs may be required and will be negotiated with the preferred supplier. **They should not be included in the financial proposal.**

Additional information on proposed site layout, Historical electricity load profile and forecasts and existing site electrical line diagrams, size (kVA), type, age of existing generator and fuel storage facilities, can be provided upon request.

Note: it is preferable that service provider has their own Public and Product Liability insurance and Professional Indemnity Insurance. DT Global will cover medical and travel insurance (for travel over 50kms away) while providing the services to DT Global, including emergency assistance if required. Furthermore, in

line with DFAT’s due diligence framework, the service provider will be required to comply with DT Global’s requirements for due diligence and safeguards.

### 8. EVALUATION CRITERIA

PHAMA Plus will evaluate all quotes against the following criteria. Proposals should address the following criteria in their brief methodology:

No	Assessment Criteria	Weighting
1	Degree in electrical engineering or a similar discipline	10%
2	Ten or more years’ professional experience (preferably in engagement with the private sector)	10%
3	Strong networks and connections in the PNG energy sector	15%
4	An excellent understanding of GEDSI issues in relation to PNG	10%
5	An understanding of ECDR issues related to agriculture in PNG	10%
6	Excellent written communication skills in English and the ability to contribute to analytical documents and reports	10%
7	Experience in conducting energy feasibility studies	10%
8	Experience in Battery Energy Storage Systems	15%
9	An energetic and self-motivating approach to work	10%

The technical score will account for 80% of the overall score using the following formula:

$$\text{Technical Score} = \frac{\text{Service Provider Weighted Technical Score (out of 100)}}{\text{Highest Weighted Technical Score (out of 100)}} \times 80$$

The financial score will account for 20% of the overall score using the following formula:

$$\text{Price Score} = \frac{\text{Price of Lowest Technically Suitable Bid}}{\text{Service Provider Bid Price}} \times 20$$