

# Private-Public Partnership for access to renewable energy in rural areas of Vanuatu

Final Report

16 August 2012





**Private-Public Partnership for access  
to renewable energy in rural areas of Vanuatu**

**Activity No WP1.10.1-6.072**

**Region: Vanuatu/Pacific**

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## REPORT COVER PAGE

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## Abbreviations

AC	Alternating Current
AC	Air Conditioning
DC	Direct Current
EC	European Commission
EIB	European Investment Bank
ETC	Evacuated Tube Collector
EU	European Union
FPC	Flat Plate Collector
GDP	Gross Domestic Product
GEF	Global Environment Fund
ICT	Information and Communications Technology
LPG	Liquefied Petroleum Gas
NGO	Non-Governmental Organisation
PEEP	Promotion of Energy Efficiency in the Pacific project
PV	Photovoltaic
RE	Renewable Energy
SWH	Solar Water Heaters
VERD	Vanuatu Electrification for Rural Development
VIT	Vanuatu Institute of Technology
Vt	Vatu (Unit of Currency of Vanuatu)

## I. EXECUTIVE SUMMARY

### ES-1. Study Objectives

The project "Private-Public Partnership for access to renewable energy in rural areas of Vanuatu" (the Rural Tourism and Renewable Energy) project "aims at empowering key stakeholders (in terms of knowledge, capacities and analysis) in undertaking business environment reforms and creating a more favourable business and investment conditions. More specifically, the project aims at defining a framework for enabling rural tourism operators to access renewable energy."<sup>1</sup>

### ES-2. Summary Status w.r.t. Attainment of Study Results

The Project is tasked with achieving four results (as elaborated on in Section 2.3, p. 4 of the ToR), and set out in the table below.

*Summary of Study Results Status against Target Outcomes*

Study Target Result	Status
<b>Target Result 1:</b> Develop a typology of rural tourism and define appropriate models of renewable energy access (financial and technical).	<b>Completed.</b> The typology was developed during the inception phase and has been confirmed during the field phase.
<b>Target Result 2:</b> Focus on meeting the needs of rural tourism based on Rural Electrification programmes; including integrating with current activities <sup>2</sup> .	<b>Completed:</b> See also under Result 3 below. A key strength of the recommended PPP model is that it dovetails completely with current RE programmes (e.g. particular the Vanuatu Energy Road Map) and specifically proposes implementation scenarios on key existing initiatives such as the Vanuatu Energy for Rural Development (VERD) initiative and the Lighting Vanuatu initiative.
<b>Target Result 3:</b> Develop a PPP	<b>Completed.</b> A 4-component PPP Model has been

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<sup>1</sup> Overall objective of the project as stated in the consultancy Terms of Reference.

<sup>2</sup> Complete ToR Reference: "...In particular the Vanuatu Electrification for Rural Development (VERD) project that is now awaiting its implementation, and the development of a Vanuatu Energy Road Map (VERM) exercise that is now underway".



Study Target Result	Status
mechanism to link private renewable energy suppliers with rural tourism operators, and with donor projects and programs.	developed, based on the desk research and interview programme. The model takes into account past experience in Vanuatu. Key PPP stakeholders have expressed strong interest in the recommended model during the study validation workshop, and in progressing quickly to a post-study formulation and implementation stage.
<b>Target Result 4:</b> Disseminate the project's results	<b>Completed:</b> Government, donor and other stakeholder feedback from the study validation workshop has been taken into account in the recommendations and in the enclosed study report. Summary descriptions of the recommended PPP Model and its components have been developed and have been disseminated to key Government Stakeholders and relevant donors.

**ES-3. Methodological Approach**

The methodology follows that described in the Inception Report. A detailed typology of rural tourism was completed before undertaking the extensive rural field missions, as this facilitated better targeting of these field missions. From the tourism typology developed the most significant rural tourism operators were identified and targeted for case study visits and analyses. With this information, suitable broad technical models were developed to supply rural tourism facilities with appropriate renewable energy packages, cost estimates for the packages were developed, and existing delivery mechanisms were identified to avoid the need for new delivery mechanisms to be developed or implemented in Vanuatu.

**ES-4. Key Findings**

The field work has confirmed the typology of rural tourism operators as a useful working categorisation and sought to identify needs (including energy needs) for each category. Stakeholder interviews during the phone survey and site field visits have highlighted that although a lack of available renewable energy is important, the main barriers to the growth of rural tourism in Vanuatu are a lack of specific promotion, poor communications in rural areas to book accommodation, poor local roads and other transport infrastructure, a lack of owner and staff training, limited restaurant menus and food availability, and competition from other better organised tourist destination to major and growing world tourist origination markets such as Europe, North America and East and South Asia.

At a policy level, the rural development and renewable energy policies that are generally necessary in any PIC (Pacific Island County) in principle already exist in Vanuatu, although implementation lags occur due to lack of implementation capacity. The regulatory environment has also been reviewed, and there are no additional issues to be addressed under this study, while the lack of any significant experience in conventional Public Private Partnerships was noted.

In common with the situation in other PICs, the understanding of the energy situation obtained during this project's field phase has highlighted the critical need to coordinate any recommendations of this project with other renewable energy programmes and initiatives to avoid duplication, confusion, and in particular to avoid further time demands on already overburdened government ministry staff. Any renewable energy approaches that are proposed to assist the rural tourism sector in Vanuatu must be simple, easy to administer, compatible with other existing and proposed projects by other donors, and have a realistic view of the actual role of the private sector vis-à-vis the growing role of various donors.

A limited number of carefully targeted interventions have therefore been proposed that would be simple to implement alongside existing interventions that are underway or proposed. The broad parameters of the proposed interventions were proposed and discussed at the validation workshop and any necessary refinements made.

### **ES-5. Recommended PPP Models for Sustainable Energy Access for Rural Tourism**

Given the broad range and geography of rural tourism operators the recommendations below break the spectrum of tourism operator type and energy use into three categories, and three recommended PPP components for provision of sustainable energy services (Components 1-3) and a 4<sup>th</sup> Component for a rural tourism development support programme.

1. **PPP Component 1** - Lighting and phone charging renewable energy access services for Low-End (Unorganised) Bungalows
2. **PPP Component 2** – Renewable Energy Access for Organised Bungalows and Higher End Resorts (Full Range of Energy Uses)
3. **PPP Component 3** – SWH Hot Water (All Rural Tourism Operators)
4. **PPP Component 4** - Rural Tourism Development Support Programme

These PPP components are summarised below:

- **PPP Component 1 - Lighting and phone charging renewable energy access services for Low-End (Unorganised) Bungalows:** This renewable

energy package is aimed at the large number of low-end (un-organised and semi-organised) bungalows with low and volatile incomes. The aim is to provide cheap lighting and mobile phone charging solutions using the recent successful approach of the *Lighting Vanuatu Project*. The recommended PPP model would provide funding to allow local suppliers to import equipment in bulk and then assist in marketing. This represents a simple low overhead approach with proven local success, and has another important advantage in that does not impose unnecessary demands on local organisations. Regarding the public subsidy and financing aspects, under this component rural tourism bungalow owners would pay for at least part of the solar lantern/basic system costs, in order to filter out the very low occupancy bungalow operations and to help facilitate the development of a proper commercial renewable energy supply and purchase/ownership by the bungalows and to maximize the chances for sustainability. The implementation approach would be to expand the successful Lighting Vanuatu initiative to include lighting and phone charging products suitable for low end bungalows. This project is simple with low overheads and minimal demands on limited government capacity. As per the Lighting Vanuatu programme, we recommend that this PPP component would be managed by the Department of Energy of the Government of Vanuatu, with input from the Department of Tourism. Based on the above component scope, we would estimate the indicative budget to be approximately \$100,000.

- **PPP Component 2 – Renewable Energy Access for Organised Bungalows and Higher End Resorts (Full Range of Energy Uses):** This component would cover the broad range of tourism operators given its demand driven approach. This approach would incorporate a tourism component into the existing VERD program with assistance of the department of Tourism accreditation programme, as the VERD programme also has the support mechanism required for more complex renewable installations. Under this component rural tourism operators would pay for at least part of systems installed costs, in order to help ensure proper commercial renewable energy system relationships and a strong focus on the PPP scheme's sustainability. 20% additional funding for project management, awareness, training, accreditation, technical standards, establishing & policing extended warranties, etc. would also be provided. Regarding the supplier based, efficiencies would be gained by using the existing Vanuatu based renewable energy suppliers that will be accredited by the VERD programme. Regarding implementation and management arrangements, it is recommended that this PPP Component would be implemented via the VERD programme in the form of a dedicated arm of that programme to supply rural tourism. As in the case of component 1, this component would be managed by the Department of Energy with input from the Department of Tourism. Based on the above component scope, we would estimate the indicative budget to be approximately \$300,000.

- **PPP Component 3 –SWH Hot Water (All Rural Tourism Operators):** This component would be focussed on providing rural tourism operators with a Solar Hot Water subsidy, using the existing Asian Development Bank GEF PEEP programme (Global Environment Facility ‘Promotion of Energy Efficiency in the Pacific’ project) as an implementation vehicle (see further below). This component would also cover the broad range of tourism operators given its demand driven approach. Under this component rural tourism operators would pay for at least part of systems installed costs, in order to ensure proper commercial SWH supply arrangements and a suitable SWH system sense of ownership for on-going SWH system sustainability. As with Component 2 above, we recommend a 20% additional funding for project management, awareness, training, accreditation, technical standards, extended warranties etc. The supplier base would need to be built as the heat pipe ETC market is not yet established. However, the scheme could easily arrange to use the same vendor roster and accreditation as the VERD scheme.

Regarding implementation and management arrangements it is recommended that this PPP Component would leverage the ADB-GEF PEEP-2<sup>3</sup> project as a delivery vehicle, as it already includes a suitable SWH TA (Technical Assistance) component but it lacks significant SWH hardware funding support to achieve its full potential impact. Thus, there would be a benefits on both sides, for the Bizclim-sponsored model by securing an existing implementation vehicle and not having to develop a greenfield implementation capacity, and for the ADB-GEF PEPP2 project by benefitting from an a wider service offering that would make for increased impact. Should this implementation option not prove possible, a second option would be to house this component under the VERD arm proposed under Component 1 above. As in the case of component 1, this component would be managed by the Department of Energy with input from the Department of Tourism. Based on the above component scope, we would estimate the indicative budget to be approximately \$300,000.

- **PPP Component 4 - Complementary Tourism Development Component:** This component would be focussed on addressing some of the rural tourism development challenges identified by the study, which is necessary in order to further ensure the sustainability and optimal impact of Components 1-3 above. The primary focus of the rural tourism support programme would be rural tourism operators in unorganised and semi-organised bungalows, as well as rural citizens (in particular women) interested in developing a rural tourism activity. The tourism support programme proposed would be a donor-funded technical assistance and

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<sup>3</sup> The Asian Development Bank (ADB) run Global Environmental Facility (GEF) co-funded Promoting Energy Efficiency in the Pacific Phase 2 (PEEP-2) project that is now underway in Vanuatu for four years

services support programme. However, as part of the detailed programme design and formulation, a small-scale capital subsidy component could be considered – for example providing a matching public subsidy to match an own contribution (in cash and/or in kind) from rural tourism operators to upgrade their bungalow's attractiveness and tourism offer. Services and support that could be considered under this component could include a) **common (central) group support/services to rural tourism operators**, such as enhanced online presence to increase exposure to would be visitors and reservation support and online reservation/booking support<sup>4</sup>; and b) **individual support to rural tourism operators**: This could include a wide variety of support measures including i) onsite audit of bungalow with recommendations for improving the tourist/visitor offer and experience; ii) support for bungalows to upgrade their rural tourism offer (e.g. developing an action list of steps and improvements); iii) accreditation of bungalows that meet required standards; iv) possibly offering small subsidies to incentivise rural tourism operators; v) bungalow visits to well-run facilities to provide hands-on demonstration of required standards etc. etc. It is recommended that such a rural tourism support programme would be implemented by the Department of Tourism.

All of the above examples of potential actions are recommended in part with the view of increasing occupancy rates and improving cash income regularity of rural tourism operators – which will increase their capacity to take-up support from the renewable energy access solutions under Components 1-3 of the PPP Model. Secondly, it is important to note that some of the above actions are already being implemented by the Department of Tourism in some locations<sup>5</sup>. It is key that such a tourism support programme builds upon existing work in the TVET area with AusAid support, as well as related EU tourism development project. The budget requirement would depend on a number of variables and is difficult to estimate<sup>6</sup> - however in order to provide some working guideline for Bizclim and donors we would tentatively put the budget requirement at between EUR 0.5 million and EUR 1 million. Again, all donors might consider funding this component, although it might be of particular interest to the EU given its past work in support tourism development.

It is also recommended that the Department of Tourism dialogues as a matter of priority with the relevant line Ministries to address other key constraints to rural tourism development. These constraints, as mentioned earlier, include in particular infrastructure and communications development needs, in particular

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<sup>4</sup> Other possible support services could include support in developing websites using standard templates to reduce costs.

<sup>5</sup> For example in Malekula, the AusAid-supported TVET programme has been providing support to rural tourism operators

<sup>6</sup> Such variables include the final range of services agreed, whether the programme would provide small investment grants, the amount of technical assistance support, delivery mechanism, and the scale of geographical coverage

improving the main roads in the outer islands. Regarding communications, the Department should seek to work to secured an upgrading in connectivity to wireless services in Vanuatu (phone and Wi-Fi), and in particular extension of coverage to coastal areas on the islands and build upon progress in recent years. With a large number of Ni-Vanuatu rural tourism operating close to beaches on the coast, this would increase the attractiveness to tourists of staying in more remote locations for longer. A medium-to-long term recommendation would be to consider development and implementation of a complete eco lodge facility in a pilot area (e.g. in a marine conservation area, targeting high-end EU tourism). This recommendation is made outside of the main recommendations and not covered by Component 4 above.

### **ES-6. Stakeholder Validation Workshop on Study Findings & Recommendations**

As per the study Terms of Reference, a Validation Workshop was organised to present the study's findings and recommendations to a selection of key stakeholders in Vanuatu, and to obtain feedback and recommendations from these stakeholders. The workshop was organised on 21<sup>st</sup> June last and attended by key Government stakeholders and with representatives of the private sector, including representatives of the Department of Tourism, Department of Energy, EU Delegation, AusAID, NZAid, Chamber of Commerce, Vanuatu Investment Promotion Authority, and Local renewable energy suppliers.

### **ES-7. Strong Stakeholder Support for Recommended PPP Model**

Overall, the feedback to the workshop presentations from the study team was very positive<sup>7</sup>. There is strong support for the study findings and recommendations among Government Stakeholders that will be central to any post-study implementation of the PPP model recommended, in particular the Department of Energy and the Department of Tourism.

The **Department of Energy** has expressed support for the core assumptions underlining the design of the PPP model and making it appropriate the local Vanuatu context, including avoiding new greenfield initiatives and in particular building upon current Island policy as set out in the VERM, and in particular support targeted simple initiatives that have started on a small scale and proven their worth (e.g. support provided for the Lighting Vanuatu initiative) for basic rural tourism operators' needs) as set out in the proposed PPP Model's Component 1; and with more complex needs (and more complex RE solutions)

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<sup>7</sup> The Validation Worksop Report in Annex 2 summarises the workshop discussion and feedback.

building upon the VERD initiative. The Department of Energy has expressed its support and availability to contribute to developing the study recommendations into proposals to donors in a post-study follow-up phase (see Annex 1 Letter of Support).

The **Department of Tourism** has also welcomed the study findings and the PPP approach and the focus on private sector development. It underlined the importance of integration of any new PPP project with the training aspects currently being undertaken by the TVET programme and the importance of accreditation of tourism operators in improving the sector – in this regard linking subsidies proposed under the study's PPP model to this process would give an important incentive and was welcomed by the Department. The renewable energy needs of rural tourism operators identified in the study were also endorsed, and the Department has expressed its willingness to work closely with the Department of Energy to help bring the study recommendations into operation.

Feedback from donor representatives present at the validation workshop was positive, with all donors present expressing their willingness to consider funding support for the finalised PPP model and study recommendations. For example, the EU Delegation stated that it would consider direct requests from the Vanuatu government following on from the study's recommendations, (even if no funds had of course been earmarked for this study's follow-up), while the representative from the NZ Aid programme stated that they were very interested in the study's results and supportive of the PPP approach, while NZ Aid was looking to expand its work in tourism and renewable energy.

## **ES-8. Post Study Implementation of the Recommendations**

As mentioned above, there is strong interest among key Government ministries to move forward and ensure that the study's recommendations are implemented, while donor interest at the stakeholder workshop was encouraging. As part of the study's Phase III programme, work has been done on developing summaries of the recommended PPP Model and associated components, to be used in approaching donor organisations.

In the post study phase, a formal project formulation phase may be required, the work for which would in part be determined by the formulation and programming requirements of interested donors.

## II. ABOUT THE STUDY

### 1. Study Objectives

The project "Private-Public Partnership for access to renewable energy in rural areas of Vanuatu" (the Rural Tourism and Renewable Energy) project "aims at empowering key stakeholders (in terms of knowledge, capacities and analysis) in undertaking business environment reforms and creating a more favourable business and investment conditions. More specifically, the project aims at defining a framework for enabling rural tourism operators to access renewable energy."<sup>8</sup> With this objective, the Project is tasked with achieving four results (as elaborated on in Section 2.3, p. 4 of the ToR):

- Develop a typology of rural tourism and define appropriate models of renewable energy access (financial and technical).
- Focus on meeting the needs of rural tourism based on Rural Electrification programmes; including integrating with current activities, in particular the Vanuatu Electrification for Rural Development (VERD) project that is now awaiting its implementation, and the development of a Vanuatu Energy Road Map (VERM) exercise that is now underway.
- Develop a PPP mechanism to link private renewable energy suppliers with rural tourism operators, and with donor projects and programs.
- Disseminate the project's results

### 2. Work Programme & Methodology

#### 2.1 Inception Phase

The inception phase comprised mobilisation of the study team, initial scoping interviews with key study counterparts in Port Vila and with the Vanuatu Embassy to the EU in Brussels. The proposal methodology was further developed and submitted to the BizClim PMU in the inception reporting.

#### 2.2 Desk Research

Desk research continued during Phase II, and included review of relevant tourism policy documents, review of the relevant policy and regulatory frameworks governing the energy and tourism sectors, and review of the local renewable energy supplier industry in Vanuatu.

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<sup>8</sup> Overall objective of the project as stated in the consultancy Terms of Reference.



### 2.3 Field Visit Programme

Initial site visits were carried out in Efate during Phase I, and the main part of the field work programme continued during Phase II to include further stakeholder interviews and site visits in Efate, as well as visits to rural tourism operators on the islands of Santo and Tanna. The list of stakeholder interviews during Phases I and II is enclosed in Annex 3.

### 2.4 Analysis & Validation Workshop

The validation workshop was held in the Chantilly Hotel in Port Vila on Friday 21 June, and is reported in detail in the next section. The Validation workshop report is contained in Annex 2 to this report.

### 2.5 Phase III – Validation workshop Follow and Report Development

Since early July the study team and New Frontier Services staff have been working on Phase III tasks, including:

- Follow up meetings to the validation workshop
- Follow up contact with selected donors and tourism operators
- Developing the study analysis, findings and recommendations, and developing the detailed PPP model, including taking into account validation workshop feedback.
- Development of the Draft Final Report

## I. TOURISM & ENERGY POLICY AND REGULATORY ENVIRONMENT

This section sets out the findings from the study research and field work with regard to national energy policy and tourism policy, key policy initiatives and programmes of relevance for this study, and the key government and non-government stakeholders, as well as past experience with PPPs. First, however, a short section summarises the socio-economic context of Vanuatu, which has important implications for any study recommendations.

### 1. Socio economic context in Rural Vanuatu

As per the study inception report, we have worked with the following definition of 'rural' for the purposes of this study: *"Any outer island area (not on the main island of Efate), and not yet and unlikely in the near future, to be connected to the electricity grid"*. Almost 80% of the population of Vanuatu live in rural areas and have livelihoods in agricultural production, and to a lesser extent, fisheries, forestry and small scale tourism. The considerable constraints and issues affecting rural development in Vanuatu include:

- Deficiencies in infrastructure such as roads, wharves, telecommunications, and airstrips particularly in the outer islands;
- Property rights, in particular land tenure represents a critical issue in any discussion of productive sector growth in Vanuatu.
- The relatively small size of the rural areas ensures that Vanuatu benefits from none of the economies of scale of inputs (including fuel and utilities), processing or markets enjoyed by competitors;
- The considerable geographical fragmentation, which leads to high internal transport and communication costs;
- Geographical and economic isolation from large markets;
- High fixed costs of providing governance and essential services per unit of population;
- Unique economic and social challenges in the interface between the 'traditional economy' and the 'modern economy';
- Perennial cyclones, which produce occasional economic and societal shocks and restrict the range of viable crop and tree species.

As mentioned in the study inception report, it is important that the study takes account of these constraints, in order to develop study recommendations that are realistic and feasible in the local context.

## 2. Tourism Policy and Regulatory Environment and Key Stakeholders

### 2.1 Tourism in Vanuatu– Key Figures

The tourism sector accounts for 19% of the GDP (Gross Domestic Product) of Vanuatu, and comprises more than 500 businesses, with approximately 4,000 full time employee equivalents. In 2010 a total of Vt20.7 billion (€162 million<sup>9</sup>) was generated by the tourism sector in Vanuatu in 2010, 85.5% of which came from international tourists. Out of this Vt20.7 billion, approximately Vt 10.6 billion (€83 million<sup>9</sup>) in direct added value to the country was gained. 32% of tourism income leaves Vanuatu, with the resort-hotel area the main contributor to the leakages. This 32% can be broken down into i) 29% imported goods; ii) 2% profit remissions; and iii) 1% expat remission.

Over 80% of visitors to Vanuatu over the last 6 years have come **as tourists on holidays** (as opposed to for purposes of visiting friends or relatives). An average of 150,000 visitors arrive each year by cruise ship, 330 people per year by yacht, with 75,000 tourists arriving by plane<sup>10</sup>. The majority of tourists come from Australia, accounting for 51%, with New Caledonia (17%), other Pacific Island Nations (9%), and New Zealand (8%) also contributing considerable tourist numbers annually. Tourists visiting Vanuatu on cruise ships stay an average of one day, with their accommodation already provided on board the ship<sup>11</sup>.

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<sup>9</sup> Using the European Commission exchange rate from December 2010.

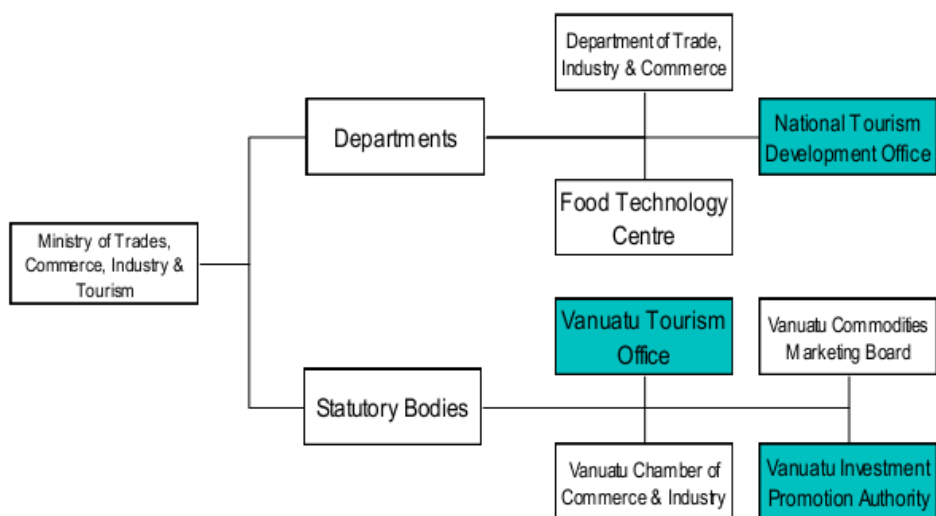
<sup>10</sup> After several years of rapid growth Vanuatu has seen recent declines in arrival numbers. In 2011 Vanuatu received 93,960 tourist air arrivals (not including cruise ships)<sup>10</sup>, a decline of 3% on the previous year. Holiday arrivals also declined from 80,681 in 2010 to 75,821 in 2011, a second consecutive decline of 5% over the previous year. Visitor arrivals over the four years to 2009 had increased at an average rate of 9% per annum, with holiday visitors growing at a faster rate of 11% per annum. This compares favourably with a Global Average of 2.75% over the same period.

<sup>11</sup> Similarly visitors on yachts generally stay on board their vessels, although the average length of stay (at 40 days) is considerable longer. This also means that they get to visit more of the islands and hence more of rural Vanuatu, with 69% visiting islands other than Efate. Visitors arriving by air stayed on average 9.9 days during 2011, with the first two months of 2012 following the same trend.

## 2.2 Key Actors

The **Ministry of Trades, Commerce, Industry & Tourism** is the most important Ministry for the tourism sector, including as it does the National Tourism Development Office (NTDO), the Vanuatu Tourism Office (VTO) and the Vanuatu Investment Promotion Authority. The chart below provides an overview of its organisation structure.

*Overview Organisational structure of the Ministry of Trades, Commerce, Industry & Tourism*



The **Vanuatu Tourism Office (VTO)** was established by an Act of Parliament as a Government Statutory body. The main function of the Office is “to encourage and assist the sustainable development of the tourism industry within Vanuatu by undertaking coordinated tourism marketing in overseas and domestic markets”. The VTO is also charged with monitoring and accrediting accommodation standards and this aspect of their work is expanding. The **National Tourism Development Office (NTDO)** was established in 1998 under the Ministry of Trade Industry and Tourism. The Office provides training, advice, assistance with funding, support with printing and promotion, and has a somewhat limited operating budget of approximately VT 17,000,000. A core focus of NTDO activities is to develop a viable and equitable tourism industry for ni-Vanuatu citizens looking to develop tourism activities.

The **Vanuatu Investment Promotion Authority (VIPA)** is a key organisation in the process of attracting inward investment into the Vanuatu tourism sector. Priorities for investment are i) accommodation supply; ii) recreational services; iii) inter-island cruises; iv) game fishing and scuba diving; v) ecotourism projects; and vi) general joint venture tourism projects. In the tourism sector the following investments are reserved for ni-Vanuatu operators: i) Guest houses with fewer than 50 beds; ii) 10 units or turnover is less than VT20m; iii) bungalows with turnover less than VT30m; iv) motels and hotels where annual turnover is less than VT20m or the total value of the Investment is less than VT10m; v) local tour operators/agents (investment less than VT50m or turnover

less than VT20m); and vi) commercial cultural feasts, handicraft manufacture, and road transport operators (e.g. taxis, buses). A range of NGOs have been involved in the tourism development process, such as the Vanuatu Association of NGOs (VANGO) and the Vanuatu Island Bungalows Association (VIBA), which was established in 1996 to assist the smaller ni-Vanuatu owned bungalow resorts<sup>12</sup>. In each of the Provinces there are similar organisations characterised by varying degrees of formality.

### 2.3 Vanuatu Tourism Priorities and Initiatives

Tourism has been identified as one of the key productive sectors by the Government of Vanuatu in the Priorities and Action Agenda (PAA). The Government's key policy document the Priorities and Action includes six key areas of action on the tourism front, including i) a doubling of the NTO budget; ii) an increase in airline capacity; iii) the development of investor incentive packages by the NTDO; iv) and the development of tourism infrastructure in rural areas.<sup>13</sup>

- **Vanuatu Tourism Development Master Plan 2004-2010:** The Vanuatu Tourism Development Master Plan 2004-2010 contains a range of strategic initiatives. The core objectives of the strategy are to: i) promote strong economic growth through sustainable tourism development; ii) generate substantial foreign exchange, local income and employment; iii) promote balanced regional tourism development; iv) promote greater participation of local people; v) sustain local cultures/customary practices; vi) promote greater community awareness of tourism benefits; and vii) promote national integration through tourism. However, the plan is considered long (250 pages), and is not easily available, and while it is considered as containing many good ideas many Vanuatu stakeholders do not present a practical way forward, while it also needs to be updated to take account of how the internet has influenced international tourism<sup>14</sup>.
  
- **Provincial Tourism Strategies:** Each province has a tourism strategy and even some local areas tourism strategies and plans are also in place, although resource constraints are an issue. Provinces have looked closely at strategy

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<sup>12</sup> VIBA's aims and objectives are to i) represent members in any statutory or business matters; ii) develop business opportunities for all members; iii) improve quality, service and skills; and iv) improve the marketing of small rural bungalows. Some stakeholder feedback suggested that VIBA may not be as active as it has been in the past. Other NGOs include VANWODS (a micro-finance body); the Vanuatu Rural Development and Training Centres Association (VRDTCA); Vanuatu Hotels and Resorts Association (VHRA); Vanuatu Tour Operators Association (VTOA); Vanuatu Scuba Operators Association (VSOA); and Vanuatu Land Transport Association (VLTA).

<sup>13</sup> Vanuatu's Diagnostic Trade Integration Study.

<sup>14</sup> For example, the 2004-2010 Master Plan was released only as the internet was beginning to change the way people gather information on Vanuatu and purchase their holidays—making much of the document needing updating.

development, in some cases with donor or NGO assistance. The land situation and regular land disputes will make the implementation of planning difficult and complex.

- **Tourism Action Plan:** The Tourism Action Plan (TAP) provides a detailed road map which provides more detail on the sectorial actions and activities deemed necessary to achieve the Strategic Priorities of the Tourism Master Plan. The National Tourism Development Office (NTDO), has worked with other key stakeholders to develop this Tourism Action Program (TAP) which establishes development priorities and a process for implementation. The plan set specific goals for the sector in Vanuatu by encouraging development which supports the following vision of tourism: i) sustainable and responsible tourism which delivers economic, social and environmental benefits for the people of Vanuatu; ii) tourism which engages with local communities and provides opportunities for participation across all the islands of Vanuatu; iii) tourism which is built on a partnership approach and which encourages both international and local investment; iv) tourism which is underpinned by adventure-based products which delivers a high quality visitor experience that builds on Vanuatu's reputation as the 'Happiest Place on Earth.

Importantly, institutional capacity is considered to be a constraint at nearly every level in tourism. Both of the key Government institutions (VTO and NTDO) have been identified by several authors as being under resourced and lacking in technical capacity. Key policy documents are however well overdue for updating and prioritisation of objectives and actions. The Department of Tourism has developed detailed tourism plans for each of the islands, though in practice each province employs only one tourism officer and budgets are very limited.

## 2.4 Donor Tourism Development & Support Initiatives

As part of the desk research work, the team reviewed current tourism development and support initiatives in Vanuatu. This section summarises a number of initiatives have been identified as the most relevant to the current EC BizClim study.

Significant levels of donor assistance were provided to Vanuatu's tourism sector between 1991 and 1998 when the EU allocated a range of funds through the Pacific Region Tourism Development Program (PRTDP). In recent years the focus has been education, SME development and awareness. Recent donor-supported tourism-related initiatives and projects in Vanuatu include:

## 2.5 Support for Tourism Sector Capacity and Institutional Development

A number of initiatives have been launched to develop educational and vocational skills in the tourism sector. The EU Commission has had a major role in tourism through the **VATET project** which is based at the Vanuatu Institute of

Technology (VIT) and aims at developing a Centre of Excellence (CoE) for the tourism sector in the South Pacific & Vanuatu. VATET funding has also integrated a Rural Tourism Training Program aimed at increasing pre-service & in-service training capacity in the rural context, in particular in the outer islands. The Rural Tourism Training Program includes activities such as i) training needs assessment, ii) development and piloting of training modules and materials; iii) identification, selection and recruitment of a number of experts to train selected rural trainers; iv) support and mentoring in the implementation of the training plans in each province.

While AusAID's current Australia–Vanuatu Joint Aid Strategy (2005-2010) did not feature the tourism sector for targeted Australian assistance, one of its regional initiatives has focussed on the tourism sector. The **Australia-Pacific Technical College (APTC)** aims to deliver vocational training across the Pacific to a standard accredited in Australia. It is anticipated that this project could complement the training delivered by the EU/VATET funded HTLTC/VIT as it will address a higher level of qualification. It is agreed that APTC will utilise the HTLTC facilities. This four-year regional initiative commenced in the second half of 2007 and is delivered through partner institutions in Samoa, Fiji, PNG and Vanuatu (EC 2006). Students from other countries in the region can decide to study at the APTC either in Fiji, Samoa or Vanuatu. The VTO finally mentioned that AusAID may be providing some future support to give Technical Assistance for international marketing.

New Zealand Aid (NZ Aid) support to Vanuatu contains a number of actions with relevance to tourism, including: i) a focus on increasing economic growth, growing private sector investment, strengthening livelihoods and increasing employment opportunities particularly in rural areas; the ii) Pacific Islands Trade and Investment Commission (PITIC) which has provided limited funding for a survey of the NZ market for Vanuatu tourism; iii) on-going support for the Vanuatu Chamber of Commerce and Vanuatu Investment Promotion Authority; and iv) co-funding with AusAID a 2006 study 'Vanuatu Economic Opportunities and Fact Finding'<sup>15</sup>. Significant support has also been provided for the Rural Economic Development Initiative as a means of ensuring additional assistance reaches the provinces. NZ Aid (along with AusAID) has also implemented small grants projects to support small businesses, a limited number of which have come from the tourism sector.

Regarding **bilateral donor support**, the Government of France is involved in funding a small number of tourism related activities. It has assisted with new airport developments in Ambae, Pentecost, Malakula and Santo. It is also funding a basic review of the tourism sector. The Japan International Cooperation Agency (JICA) has provided the NTDO with a limited amount of funding for technical assistance in the area of tourism awareness building. The Commonwealth Secretariat is also funding a review and update of the current tourism master plan.

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<sup>15</sup> Bazeley and Mullen, 2006.

Infrastructure improvements under the US-funded Millennium Challenge Account (MCA) have the potential to spread the economic benefits of tourism. One recent initiative supported has been the completion of the ring road around the island of Efate and the east road in Santo. Furthermore, the Government of France has provided some limited assistance with new airport developments in Ambae, Pentecost, Malakula and Santo. The Asian Development Bank (ADB), in partnership with the National Bank of Vanuatu (NBV), has successfully pioneered a project to create sustainable, profitable, rural micro-lending in Vanuatu. Two technical assistance grants amounting to US\$500,000 provided by ADB in 2002-2006 supported the expansion and enlargement of rural micro-finance services. As of September 2006, NBV had approved about 1,480 loans. According to the NTDO, tourism-related activities have received only a small percentage of the funding allocated.

The International Finance Corporation (IFC) technical assistance has been received in the form of the Pacific Enterprise Partnership (formerly known as Pacific Enterprise Development Facility) which has been providing support to individuals and intermediaries to allow them to deliver quality services in-country. Two initiatives are under way in Vanuatu; one is working with the Melanesian Co-operative Savings and Loans Society, and another with a tourism association. IFC has also supported the [worldhotel-link.com](http://worldhotel-link.com) website designed to enhance access to the market place and increase business-to-business networks.

### 3. Review of Vanuatu Energy Policy & Regulatory Framework

This section sets out a short review of the energy policy and regulatory framework in Vanuatu, with regard to how it may influence recommendations for a PPP model for rural energy access for rural tourism in Vanuatu. Extensive policy work has already been completed or is currently underway in the energy sector in Vanuatu including the work completed by the VERD programme and the currently underway World Bank supported 'Energy Road Map'. Thus this section describes the regulatory framework but makes no new recommendations.

#### 3.1 Energy Regulatory Environment

Only a few pieces of legislation have a direct impact on rural electrification especially the Demand Driven Subsidized Vendor Sales (DDSVS) model described later in this report. Legislation in the electricity sector is briefly described below.

The **Electricity Supply Act** governs the electricity industry in Vanuatu, and focusses primarily on concession-based electricity supply. The Act empowers the Minister of the day to establish new concessions, as well as allowing a person who is not the concessionaire to generate electricity and supply electricity outside a concession area or sell electricity to a concessionaire. Other than for own generation purposes, no one within the concession can supply electricity,



with infringers being liable to fines. The Act governs all concessions and others who may supply electricity, but if there is a conflict between the Act and an existing concession agreement, the concession agreement prevails. Given the scale and supply solutions envisioned for rural tourism the Electricity Supply Act has little of no implications for the study recommendations.

The **Utilities Regulatory Authority Act** is intended to ensure safe, reliable and affordable electricity and water supply (“regulated services”), to maximize access to these services and to protect the long term interest of consumers. A “utility” is deemed to exist wherever a person provides a regulated service to another in return for payment. The URA is established as an independent agency, but must take into account Government policies.

URA scope of intervention includes i) requesting information or documents from a utility related to the regulated service, corporate structure, finance or accounts of the utility; ii) issuing reliability and safety standards, and iii) determining the maximum price in relation to any aspect of a regulated service in any place.

From the study team’s contact with the URA, the team has understood that although URA has the power to set price and standards for rural electrification to date it has not done so to-date, and intends to have a light handed approach to regulating this sector given its limited resources.

### 3.2 National Energy Policies & Initiatives

This section describes key government policy documents and how they relate to energy and specifically to rural energy and renewable energy. The overarching policy document for the Vanuatu Government, its *Priorities Action Agenda 2006 – 2015*. It has the following objectives relating to the energy sector: i) improving lives of people in rural areas by improving service delivery... and ensuring sustainable use of natural resources; ii) increasing equity in access to income and economic opportunity by all members of the community; iii) extending coverage of rural electrification by most cost efficient means; and iv) promoting use of renewable energy, especially where renewable energy can be used effectively in remote locations.

The strategic priorities for the energy sector in the Government’s planning document **Planning Long, Acting Short, The Government Policy Priorities for 2009-12** include: i) ensuring that power is more widely available at a fair price, and ii) exploring/expanding and investing on renewable energy sources.

There have been numerous draft national energy policies and plans, but most have not been formally adopted by the Government. In 2007, the Council of Ministers endorsed the National Energy Policy Framework (NEFP) but there has been few follow up activities and no budget allocated. The NEFP was meant to be a live document, annually updated by the National Advisory Committee on Climate Change (NACCC) but this has not occurred. The NEFP is aligned with priorities as identified above, i.e. commitment to increase use of renewable

energy technologies in both rural and urban electrification and improving electrification rates in rural areas.

Supported by the World Bank the Vanuatu Government is currently developing the **Vanuatu Energy Road Map (VERM)**. The Roadmap is a planning document that identifies the investment needs of the energy sector over the next 10 years, and the policy direction needed to support the required investment. The Roadmap will serve as a guiding document providing detailed recommendations of actions for sector stakeholders to better coordinate and align resources in the energy sector.

The Roadmap will evaluate where the energy sector currently is, and clearly defining the priorities and objectives that describe where the energy sector aims to be in the future. The Roadmap will then draw on a number of studies, and with input from sector stakeholders will develop recommendations to define a pathway to achieve the Government's vision for the energy sector. The VERM Inception Report states that the objective of the Roadmap is to present a clear vision for the Vanuatu energy sector, and to provide a framework that helps stakeholders and development partners to participate in the sector in ways that help to achieve the vision.

### 3.3 Energy Policy Development and Implementation – Institutional Aspects

The energy unit was re-organised under a new **Department of Energy, Mines and Mineral Resources**, in order to address past weaknesses of insufficient focus on rural energy policy, rural energy regulation issues, detailed forward planning for rural energy development and proactive project development<sup>16</sup>. While funding and staff position approval is still pending for this new structure, once fully implemented the new structure would strengthen the department's ability to effectively deliver rural electrification services.

### 3.4 Vanuatu Energy for Rural Development (VERD)

The VERD program is an initiative developed jointly by the Government of Vanuatu and AusAID. VERD is to be the flagship program to address rural electrification as part of the Energy Roadmap and all future donor funded rural electrification projects will come under its umbrella. In this respect, it is of key interest for this study' work. The programme is driven by the demand from households, public services and rural business and supplied from local renewable energy business. The key components of the VERD are:

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<sup>16</sup> In the past most of the Energy Unit's activities have been dictated by donor project requirements and donor developed project concepts.

- Component 1: Electrification Funding Mechanisms: Appropriate Rural Electrification Funding Mechanisms developed, approved and operational.
- Component 2: Vendor Accreditation: Accreditation of electrical system vendors.
- Component 3: Consumer Protection Standards: Participatory establishment and management of technical and quality standards for equipment and services
- Component 4: Skills Development: Enhancement of core skills through strategic partnerships, both local and national.
- Component 5: Awareness Raising: Promotion and responsible use campaigns for public, civil and private users of rural electricity systems.
- Component 6: Institutional Development: Rural Energy Unit vision, institutional roles, staffing and resourcing agreed and in place

In this respect, the VERD contains numerous components of significant relevance and interest to this BizClim study, and offers an interesting point of leverage in order to provide renewable energy access to rural tourism. It should also be noted that the VERD program has been heavily involved in strengthening the Government's capacity in rural electrification and plans to fund several technical assistance roles as part of the programme.

#### 4. **Vanuatu Experience with Public Private Partnerships (PPPs)**

Vanuatu has no experience with implementing a PPP model in terms that it is typically understood from PPP literature. The findings from the desk research and fieldwork, in particular the tourism survey, where the size of the rural tourism sector market (of rural tourism operators)<sup>17</sup> is counted in the hundreds of operators (and with generally limited financial capacity) the costs of the institutional, legal, and administrative overheads of a typical formal contractual PPP model would likely be out of all proportion with the benefits that could be provided.

This understanding has highlighted the need for this project to coordinate any outcomes of this project with existing rural energy programmes such as VERD in order to take advantage of the required government capacity building, and also to not burden the small Vanuatu economy and its low capacity government sector with further administration overheads and tasks. In other words, the inception phase stakeholder feedback suggests that developing a PPP model (or

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<sup>17</sup> A key consideration for this program design is that the Vanuatu market is extremely small, 28,000 households, 3,000 institutions locations (eh schools, clinics), and that the rural tourism market is extremely small <300 operators.

models) that are appropriate to, and feasible in, the Vanuatu context will be a key success factor.

In the widest sense of public-private participation, the VERD Programme is significant in Vanuatu as it represents a publicly-supported initiative (Government of Vanuatu and AusAid) with a clear focus on stimulating the private sector market (renewable energy suppliers market) to address the energy access challenge in the country. Prior to the VERD program, what was missing from the Vanuatu electrification landscape was a private sector participation project model – i.e. a model that focuses on incentivising/facilitating private markets to participate in the delivery of electrification services. Many emerging best practice rural electrification programs are targeted at stimulating/establishing private sector investment and involvement and address commercial risk/affordability issues through the use of subsidy payments and the development and provision of financing mechanisms. Such a project approach is an essential part of the required mix of electrification options in enabling effective wide scale electrification of rural tourism operators in Vanuatu.

## 5. Vanuatu Energy Policy and Regulatory Environment Review - Conclusions

The conclusions from the policy and regulatory review of Vanuatu's energy policy and regulatory environment can be summarised as follows:

- **Regulatory conclusions:** The regulatory conclusions are:
  - Vanuatu has a well-functioning independent, regulatory authority. The Electricity Supply Act has been deemed has having little or no implications for the study recommendations, given the scale and supply solutions envisioned for rural tourism.
  - Only a few pieces of legislation have a direct impact on rural electrification especially the Demand Driven Subsidized Vendor Sales (DDSVS) model described earlier.
  - Although Utilities Regulatory Authority Act (URA) has the power to set price and standards for rural electrification to date it has not done so to-date, and team contact with URA intends to have a light handed approach to regulating this sector given its limited resources.
  - The policy review work has confirmed the relevance of this study's focus and recommendations to key Vanuatu government policy declarations. From the policy initiatives and programmes reviewed, **the VERD programmes stands out as the key programme which must be taken fully into account by this study's work, in particular in terms of the study recommendations and design of a PPP Model, for a number of reasons:**

- Reason 1: VERD programme aims are highly complementary with the focus of this study, and represents a comprehensive programme that encompasses many areas of action relevant to this study, including Electrification Funding Mechanisms. Accreditation of electrical system vendors, Consumer Protection Standards, and an emphasis on skills enhancement through strategic local and national partnerships.
  - Coherence with current institutional development plans, in particular the Rural Energy Unit vision within the Department of Energy, institutional roles, and requisite staffing and resourcing.
  - It key that this study avoids recommending stand-alone initiatives that do not integrate with existing initiatives, in particular give the often insufficient co-ordination between donors in the past and in particular due to limited capacity levels with the country.
- **PPPs experience in Vanuatu:** There has been no experience in Vanuatu in implementing PPPs in the classical sense of PPPs, and this, allied to the significant capacity levels demanded by conventional PPPs and the limited capacity levels in Vanuatu – raise serious doubts as to the appropriateness of any conventional PPP approach. However, the VERD programme does have an important private sector participation dimension that is also highly relevant to the outcomes ought this by the follow up to this study.

## II. RURAL TOURISM FINDINGS BY TYPOLOGY MODELS

### 1. Rural Tourism Findings by Typology Models

A draft hypothesis for a typology of rural tourism was developed during the inception phase. The field work confirmed the validity of this typology, allowing the team to confirm the different categories of rural tourism: i) **Luxury Resort hotels**, ii) **Mid-Level Resorts Hotels**; iii) **Organised Bungalow**, and iv) **Unorganised and Semi-Organised Bungalows**.

#### 1.1 Category 1 - Luxury Resort-Hotels

At the upper-end of the scale of tourism options are luxury resort-hotels, of which there are roughly 20 in Vanuatu. The most important aspect of the luxury resort is an international standard of quality. Key features of this model are summarised below:

- a. **General Characteristics, Target Market and Service Offer:** The attractiveness of these resorts is based on the luxurious, air conditioned bungalows with comforts such as king-size beds, flat screen TV & DVD, I-pod docking stations, 24/7 WIFI availability and outside day beds. Meals are offered by gourmet cuisine with the freshest of local ingredients and also a selection of international wines. Furthermore Day-SPA's are available offering a range of treatments and massages. Easy access to the seaside with private beach is also generally available with luxury resorts. The activities offered by the luxury hotels in Vanuatu on the other hand are somewhat limited. Excursions and sport activities have been provided on request with local vehicles and guides. In some cases, snorkelling and scuba diving is organised to the reef. Generally, the customers' focus priorities relaxation and sampling good cuisine. Normally in Vanuatu the luxury hotels are on the seaside, with a beautiful sandy beach at their disposal. Furthermore it is important for the hotels to ensure a neat and well maintained garden with paths and hedges. Essential requisite is a tranquil and serene atmosphere. Finally, ideally the distance from the airport should be no more than a 30 to 40 minutes taxi ride, and the road must be accessible in all seasons.
- b. **Marketing and Occupancy Levels:** Marketing in this specific segment is well organised under every aspect e.g. website, national & international travel agencies (in particular in Australia and New Zealand), publicity & advertisements in the newspapers, tourism magazines, airline companies etc. The daily rate of stay is between \$250 and \$720 per night for a bungalow/room. Long stay rates are non-negotiable because the occupancy rate is high, at above 50% all the year round.

c. **Ownership and management:** The ownership of luxury hotels can be individual or that of a company. In most cases, the ownership of a luxury hotel belongs to a non-native i.e. Australian or New Zealander. The management role is delegated to an expert with significant international experience in the hotel sector. The manager organises the hotel in various services such as cooking, linen & laundry, maintenance, supplies, etc. The staff in these resorts consist of approximately 30 - 45 personnel which are broken down into sectors where each has its own specific duties i.e. reception, room-services, restaurant, gardeners, etc. Staff salary is determined by the type of job and skills required to carry out duties. Payment ranges between 2-5 Australian dollars per hour. It is important to highlight the fact that staff are mostly required to have 3 years relevant experience before the recruitment process and so they have already been involved in work with other hotels, resorts or tourism oriented activities.

**Contribution of Luxury Hotels to Developing Rural Tourism:**

Luxury hotels play an important role in increasing the quality of tourism standards in Vanuatu. For example, by recruiting local personnel and improving their skills. Luxury Hotels improve and disseminate higher-level management and work standards to other tourism sub-sectors in Vanuatu.

d. **Development Plans and Prospects:** Plans for increasing the business are limited to more luxuries and increasing the number of bungalows, as well as increasing the number pampering equipment and services available such as hydro massages, sauna, and swimming pools. The luxury hotels need only fine views around the buildings and the space occupied by the resort.

*Velit Bay Plantation: View of access to private beach*



*Erap-Lodge: View of the main hall of the lodge*



*Havanna H Lodge - Garden Path*



*Havanna H Lodge – Bar & Dining Area,*



## 1.2 Category 2 – Mid-Level Resort-Hotels

This tourism model is cheaper and more common than the luxury resort-hotel. There are about 50 of these hotels in Vanuatu.

- a. **General Characteristics, Target Market and Service Offer:** This specific tourism model is primarily oriented towards family groups coming from Australia and New Zealand during the period July-October. Accommodation is designed for 3-5 persons and the period of stay is on average 7-10 days. The type of amenities to offer include 24/7 WiFi, high quality LPG hot water, room fan or air conditioning, and 24 hour lighting. The activities available for the customer are generally based on snorkelling and scuba as well as kayaking. The family groups are limited to the sea & beach with some excursion to the coral reef. Excursions through the various rural areas with 4 wheels-drive cars by a guide are also organised. Some resorts also provide their own vehicles on request.
- b. **Marketing and Occupancy Levels:** Mid-level resort's tender to display a relatively efficient marketing function. Similar to luxury resorts, websites and online booking is generally available and also important for gaining customers. Overnight rates in these resorts are typically around \$45-\$168/night per room and the average rate of occupancy during the year is 40-60%. During the winter period (June – October) most organised hotels are overbooked but this is counter-balanced by a strong decrease in the flow of tourists during Vanuatu's low season. A significant factor in the marketing strategy of mid-level resorts is direct contact with tour operators abroad, especially in New Zealand and Australia. Tour operators abroad make a significant difference in organising groups during the low season.
- c. **Ownership and Management:** In this type of model, the management can be run by both local and foreign professionals. In some cases a partnership is established between the owner and the manager. The manager is partially



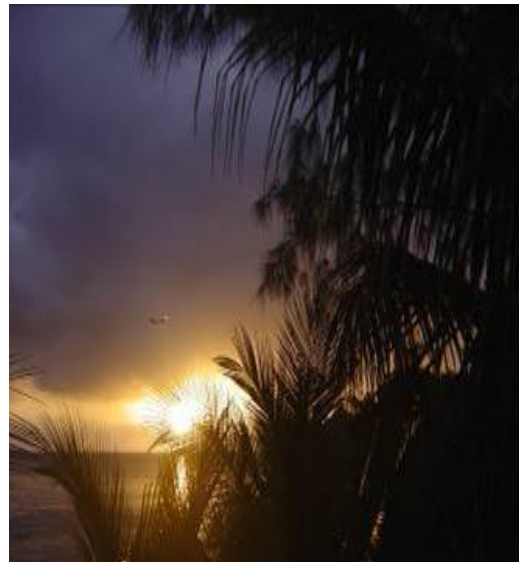
paid according to the total annual profits. An important factor in the management is the marketing aspect where, as mentioned previously, contacts abroad are important. The number of persons as staff is between 10-20 units.

- d. **Development Plans and Prospects:** Conventional fuel, as well as grid electricity is expensive and so plans for alternative energy sources based mainly on PV systems should be explored For mid-level resort hotels, notwithstanding the exceptional natural surroundings that are often nearby, services such as organised excursions to both marine conservation areas as well as the jungle are not particularly demanded by visiting clientele.

*Erakor island Resort (Efate) - View of the Beach*



*Evergreen Resort (Tanna) - View from a Guest Bungalow*



*Island Aore Resort (Santo) - Resort's Private Wharf*



*Island Aore Resort (Santo) - Main hall and Beach Pathway*



### ***Evergreen Resort - A Successful Bungalow***

This successful model is situated in Tanna island. The Evergreen Resort was set up in 2001 by a local couple. The general manager, Merian Nunake, is well known in the Vanuatu tourism sector and holds a background in accountancy. The resort has also received key support from foreign consultants. This allows the resort to enjoy the basic elements of a well-managed resort in terms of financial budget and running costs. The hotel's daily rate of stay is \$45-\$70 per bungalow and the annual occupancy rate is 50%. The resort's marketing strategy benefits from contacts with tour operators in Port Vila, a resort website and features in international tourism guides for the South Pacific. The typical customers to this resort are families from Australia and all people visiting the volcano.

Regarding management and staff, two outside consultants have been engaged by Mrs Nunake for the staff 's training and to increasing the quality of the services as a whole. Staff consists of about 20 employees whom are all recruited locally. The resorts calm and restful atmosphere makes it ideal for a relaxing vacation, and it is also not too difficult to access as it is located quite close to Tanna airport. The services and activities provided by the resort include a community based Yacht club, restaurant and bungalows organised by the local chief. The setting of this resort provides an excellent location for yacht anchorage, and the accommodation areas of the resort contain tasteful, well organised and simple furniture and decoration.

### **1.3 Category 3 – Organised Bungalows**

Although bungalows represent a cheaper and less developed model to hotels, they are crucial for the rural tourism in Vanuatu and represent a benchmark for the evolution of future tourism run mainly by the local people. There are an estimated 100 organised bungalows in Vanuatu.

- a. **General Characteristics, Target Market and Service Offer:** Organised bungalows offer accommodation with just the basic services such as 24h hot water for showers and fans in the rooms. A general characteristic is the use of mostly traditional materials. There are some AC & DC fridges and good simple meals made with local meat or seafood are served to the customers. Activities for the tourists are mainly based on the beaches and snorkelling. Occasionally the management organises specific activities such as horse riding, bush walking, hiking, and culture & heritage events. In this case, local guides are available on request for groups. In Tanna island visits to the volcano are organised.
- b. **Marketing and Occupancy Levels:** Marketing is generally adequately organised: the resort is featured on a website, as well as on Pacific tourism guides. There is usually no online booking service but a working phone

number is provided to make reservations. In some cases airport transfers are organised by the manager of the reservations. Overnight rates are typically \$15-\$30 per night, with variations in rate determined not just by the services offered but by other factors such as the location of the bungalows and proximity to communication axes and amenities such as beaches.

- c. **Ownership and Management:** Both the ownership and the management of the organised bungalows consist mostly of local people and the staff is the family as a whole with some external help.

### *The Organised Bungalow as the Pillar of Rural Tourism*

The keystone of the rural tourism in Vanuatu is the organised bungalow. The local owners and managers of these models, particularly young middle aged couples, have succeeded in exhibiting a distinguished experience for tourists. The innate sensitivity in their welcome to guests, the sense of cleanliness and hygiene and simple décor and furniture with traditional materials are unique to the industry. These owners have enhanced their marketing success by developing websites and contacts with international guides, in particular Lonely Planet. However much potential still exists for further development. Basic elements of development such as RE access, vehicles, and technical assistance should speed up the positive growth of organised bungalows.

- d. **Development Plans and Prospects:** Development prospects for organised bungalows are driven in part by improvement in the quality of services and increase in the number of the bungalows. Typical ecosystem dimensions settings are proximity to beaches /mangroves.

*Little Paradise Bungalow (Santo) - Restaurant*



*Lonnoc Bungalow (Santo) – Conference Room*



*Rocki Bungalow (Tanna) - Main Hall with Library, Seating and Dining areas*

*Yacht Club Bungalow (Tanna) - View of the Bay from Guest Bungalow*



#### 1.4 Category 4 – Un-organised & Semi-Organised Bungalows

Unorganised and Semi-organised bungalows are by far the most common type of tourism model in Vanuatu. It is estimated that there are between 200-500 of these bungalows in Vanuatu - the lack of known phone numbers creating the difficulty in identifying a large number of them. Owners of these resorts generally built 2- 3 bungalows with no idea of the basic requisites of comforts required for tourism and so custom is lacking for this model and so the model remains relatively under developed.

- a. **General Characteristics, Target Market and Service Offer:** The service offer is the most basic in the industry providing just the essential roof and bed for tourists. The characteristics of the bungalows are based on the use of all traditional materials. In most cases there is no hot water or refrigeration and a basic menu may be provided but with often no meat or fish available. There are no particular activities offered apart from access to local beaches.
- b. **Marketing and Occupancy Levels:** No marketing is arranged and there is often no working or known phone numbers for bookings. The rate of occupancy is \$9 - \$20/night, including breakfast. The occupancy rate is sometimes only 3 visitors per year.
- c. **Ownership and Management:** The ownership and the responsibility of the management belong to the local people and their family. In general no staff is hired and the services are provided by the family as a whole.

*Muele Guest house (Malo Island, Santo)*

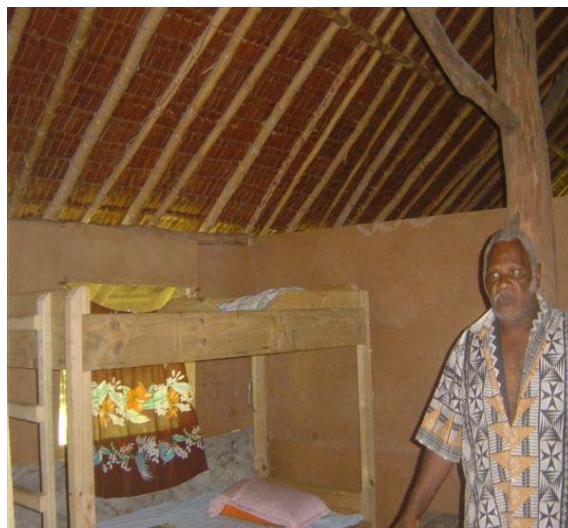
*Bamboo Beach (Efate)*



Paunvina Guesthouse (Nguna-Tikilas) - Toilet Facilities



Nam Bunga (Santo) – Bungalow Interior



- d. **Development Plans and Prospects:** No prospective plan is in place but owners hope to have at least 50 tourists/year. Regarding ecosystem aspects, unorganised bungalows are generally situated in villages near the sea.

### 1.5 Category 5 – Rural Tourism Niche Models with Development Potential

In the present development level of the rural tourism, local tour operators and public tourism organisation such as Vanuatu Tourism Office (VTO) are aware of the importance of two basic elements; i) culture & heritage and ii) nature & adventure. New aims of the Province Plans are particularly addressed towards an innovative approach based on the ecosystem & nature as a whole. ***At present, these specific segments are irrelevant.***

In Vanuatu, niche models are a small but vibrant tourism sub-sector, which has until recently been almost exclusively based on volcano, custom villages cultures and mystery island. Opportunities exist to build on this market and to propose Vanuatu as an exciting adventure destination through broadening the activities, services, and facilities available. International tourism trends require more and more flows of high quality tourism towards original experiences based on local heritage and the surrounding ecosystem.

### **What Is a Tourism Experience in a specific ecosystem?**

International tourism trends indicate that most current travellers do not visit places simply to see the sites but rather to be integrated with the country by interacting with its people, places, traditions, etc. Visitors seek a personal experience of a vacation which will remain significant to them long after they have left. Vanuatu therefore must focus on building unique visitor experiences around their key attributes in order to set themselves apart from other places and attract visitors. Experiences can be developed through involving complementary activities in such a way that they engage the visitor's

Vanuatu is particularly rich in these potential niche models which can be managed and developed in accordance with the quality standard required by this specific international demand. Four potential niche models are analysed in this report: i) excursion & adventure oriented, ii) nature-culture-heritage, iii) village-based on MCA (Marine Conservation areas) and iv) potential basic eco-tourism.

The study interview programme has shown that local tour operators and public tourism organisations such as Vanuatu Tourism Office (VTO) are aware of the importance of two of these models - culture & heritage and nature & adventure. New aims of the Province Plans are particularly addressed towards an innovative approach based on the ecosystem & nature as a whole, elements that currently are absent in Vanuatu's rural tourism offer. No niche models with international-level services & comforts have been noted by the consultants during the field visit programme. Limited and rudimentary examples of eco-culture oriented resorts have been identified, such as the "Blue Hole" in Santo, the "Esum Eco-Multi cultural Village" in Efate, and Lanakel Core Resort in Tanna.

## **1.6 Excursion and Adventure Oriented**

- a. **Summary of Key Features:** Excursion and adventure oriented experiences include the basic comforts. The offer description includes the provision of accommodation, basic meals, low level of ICT connections, reasonable hygiene services, cold beverages and air fans. This service/experience requires 3-6 staff whereby expert tour operators require careful organisation and management. Characteristics of the activities include well-organised and local expert guided trekking and hiking through areas with volcanoes, lakes, rivers, jungle safari, cascades, uncontaminated beaches, etc. Activities require moderate to high levels of physical effort and **some level of risk** is

associated with activities. The primary target group for these types of niche models is that of high to middle class tourists aged 45-65 years old and young couples and the cost level is high. Energy access with these services is lacking, whereby there may be just one small generator or PV system.

- b. Current Examples and Good Practice:** At the international level, a good example of this model is lodge accommodating offered in National Parks particularly in Europe, USA, Africa, and even in New Zealand. These lodges should ideally be located in unique settings and found along the safari/adventure trails. At the moment, no significant examples of such resorts for excursion and adventure have been identified in Vanuatu. Light day-time activities concerning eco-tourism are being only offered by travel agencies for all types of tourists, including activities such as cruise safaris, cascade abseiling (Mele cascades), cavern diving, bush walking, volcano excursion (in Tanna), off-roads adventure, and horse trekking (Lanakel Core Resort, Tanna). Generally such excursions or trekking do not last for more than a few hours so accommodation is not required.
- c. Development Potential:** Given Vanuatu's exceptional environmental and ecosystem resources this type of ecotourism offers significant development potential, although important investments, organisation, and technical assistance will be required if such potential is to be harnessed.

## 1.7 High-Level Nature, Culture and Heritage Focus

- a. Summary of Key Features:** This model concerns the ecosystem as a whole involving culture and heritage visits guided excursions in the local environment by qualified expert naturalists and biologists, traditional cooking, etc. Guests require minimum fitness levels for activities. The touristic attraction involves tastefully designed and furnished accommodation, comfortable sleeping arrangements and a healthy ample breakfast, low level of ICT connections, reasonable hygiene services, cold beverages, quality coffee and air fans. This service/experience requires 3-6 staff whereby expert tour operators require careful organisation and management. The target group consists of mainly high to middle class tourists aged 50-75 years old and the cost level is high. Energy access with these services is lacking, whereby there may be just one small generator or PV system.
- b. Current Examples and Good Practice:** To date, no significant examples of this type of niche rural tourism have been developed in Vanuatu. A type of pilot project for a culture & heritage project (*Esum Eco-Multi Cultural Village*) is foreseen five kilometres from Port Vila, based on an idea to bring together the principal cultural themes of the Vanuatu Islands in a thematic village, in terms of constructions and bungalows made with traditional materials, ancestral ceremonies, dance, and even black magic rituals.

- c. **Development Potential:** Vanuatu offers significant nature attractions in flora & fauna both along the shore and in the forests in the island hinterlands. Culture & heritage-based tourism could form part of guided visits along a number of thematic stages linking different environmental settings. Furthermore, visits in marine conservation areas can be organised with tourist groups for a number of activities such as coral reef scuba, whales and dolphins watching etc.

## 1.8 Community-based Marine Protected Areas (MPAs)

Marine Protected Areas (MPAs) have experienced a notable development during the last decade in the South Pacific Area (*N. Pascal: Cost/Benefit Analysis of MPA*). MPAs usually form a part of a larger management scheme named Marine Managed Area (MMA) and more than 550 documented MMAs now exist in the South Pacific. An MMA is defined as an area of near shore waters and coastal resources that is largely managed at a local level by the coastal communities, land-owning groups, partner organizations, and/or collaborative government representatives who reside or are based in the vicinity of the area. Community-based management (CBM) starts from the basic idea that *people have the innate capacity to understand and act on their own problems*. CBM is built on what the community thinks and allows each community to develop a management strategy conveying its particular needs and conditions. The core of CBM is community organization, where empowerment is the primary concern. The management is carried out primarily by the community through the relevant user groups and also involves the locally and nationally institutional and private stakeholders.

- a. **Summary of Key Features:** The service offers bungalows which are suitable for the niche of adventure & nature travel. The standards are set on an adventure lodge model (bush toilets, no electricity and no hot water) with a capacity between 2 to 6 beds. They are generally developed with the savings of the owner and his family (with the exception of occasional donors) and can survive even with low-occupancy rates. Very low-level running costs are involved and owners have little training in business and management. Marketing is generally unorganised and sporadic.
- b. **Current Examples and Good Practice:** Appropriate rural tourism activities could take place in every village around the MPAs. The tourism activities can include (i) day tours, (ii) snorkel tours, (iii) scuba diving, (iii) guesthouses, (v) scientific tourism, and (vi) others. At present tour operators (e.g. Pele Island by Evergreen) organise such activities and a fee is paid to the village for each visit. The snorkel tours are realised in the MPA and a fee is charged to visitors to get inside the MPA with a guide. All the scuba diving clubs are based in or near the Port-Vila city, and the average capacity for each club varies from 12-40 dives per day.



- c. **Development Potential:** Community-based Marine Protected (MPAs) have recorded significant developed during recent years. MPAs generally form part of a larger management scheme, termed MMAs (Marine Management Areas). At present, approximately 600 documented MMAs exist in the South Pacific Area<sup>18</sup>. Unofficial data obtained from International Tour Operators estimates an annual average increase of some 20% in this type of high-quality tourism<sup>19</sup>. Potential for development of this eco-model in Vanuatu is likely to be significant, but will require significant investment and technical assistance in selected rural communities.

## 1.9 Basic Eco Tourism

- a. **Summary of key features:** This model is a simple and basic way of allowing the tourist to experience the environment around them. Guests do not require any physical effort as the model allows for a stay or dining experience in a natural tropical environment. Basic comforts are provided and activities are minimal.
- b. **Current examples and good practice:** Blue Hole Resort is a recently finished resort located on a fresh water spring in the middle of the jungle. The activities offered are rudimental but entertaining. Tourism flow comes from the adjacent main road, which generally consists of visitors dropping in for lunch or even for dinner which on special occasions is served to the accompaniment of Sound & Light. Traditional & basic food is prepared and served with cold drinks, local fresh fruits, and good Kava. The contact with the nature is strong and this experience is available for visitors since no physical effort is required. In this particular case, there are only 2 bungalows available for people wishing to sleep in the tropical environment. The owner is a local middle-aged man helped only by his whole family.

### *Potential Basic Eco-Tourism*



An example of base eco-tourism potential is the **Blue Hole Resort** near Luganville (Santo). Under local family ownership, this resort required limited investment and comprises 2 bungalows which are under construction and a restaurant serving fresh fruit, coffee, cold drinks, traditional food and good clean kava. Facilities include access to showers, toilets, and mobile connectivity. Key attractions of this resort are the Blue Springs, luxury vegetation and exceptional wildlife, (e.g. birdlife and fresh water fish), and swimming and rope swinging in the Blue hole.

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<sup>18</sup> Golan '09; N. Pascal 2011.

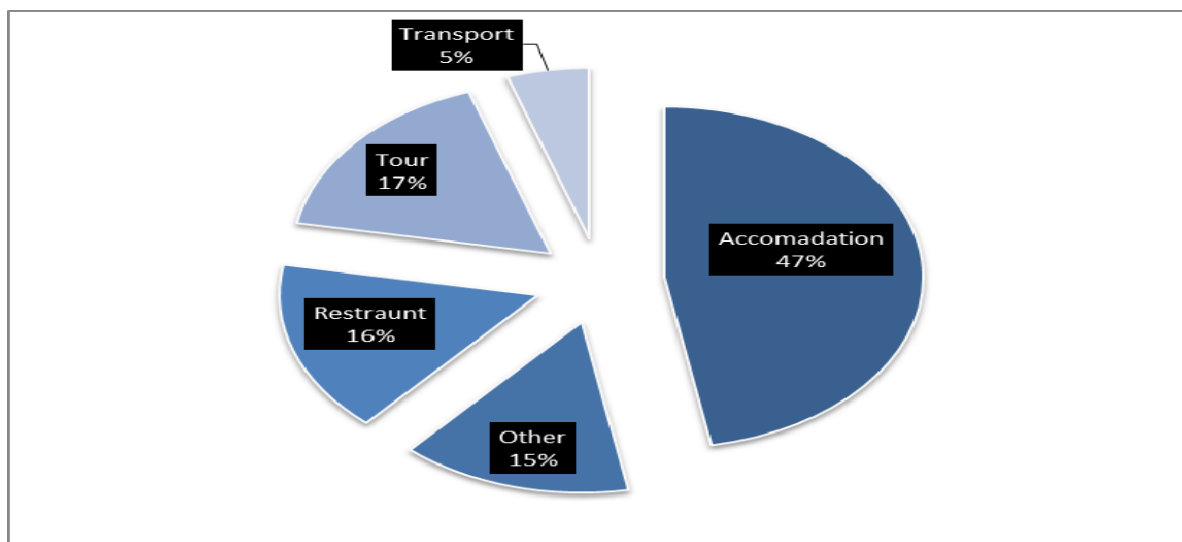
<sup>19</sup> Zegrahm-Seattle, USA.

- c. **Development Potential:** For Vanuatu, ecosystem-oriented niche models could mean an economy equivalent to that of the National Parks' resort /lodges in Africa. This would involve the cooperation of international & national tour operators and expert guides. It is important that the local labour force for the management of the lodges and the environment is fully involved in such a development, which would require a significant provision of technical assistance to the local target population. Such technical assistance would help guarantee a minimal standard level in handling tourism requirements in terms of food quality, hygiene, comforts, cleanliness, health assistance, etc.

## 2. Rural Tourism Survey Findings

The next section sets out some of the study's findings from the tourism survey carried out under the study work programme. In total there are 4,000 fulltime equivalent employees in the tourism sector in Vanuatu, with an estimated 600<sup>20</sup> of these in the rural tourism area. According to data from the National Tourism Office and from Provincial tourism officers there are a total of 500+ individual tourism operators in Vanuatu. This can be broken down into 349 involved in accommodation, 126 touring operators, 121 in the restaurant industry, 38 in transport and 110 in 'other'.

*Overview Types of Tourism Operators*



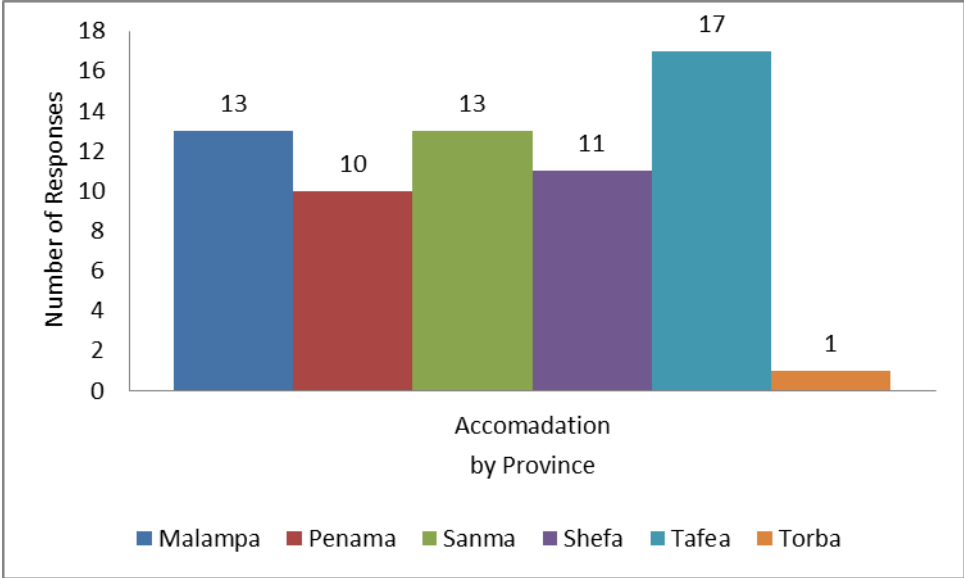
Rural Tourism operators have been very difficult to get in contact with. 166 calls were made to relevant operators to conduct a telephone survey. Only 65 surveys were completed. 60% of these were due to some problem with the telephone, for

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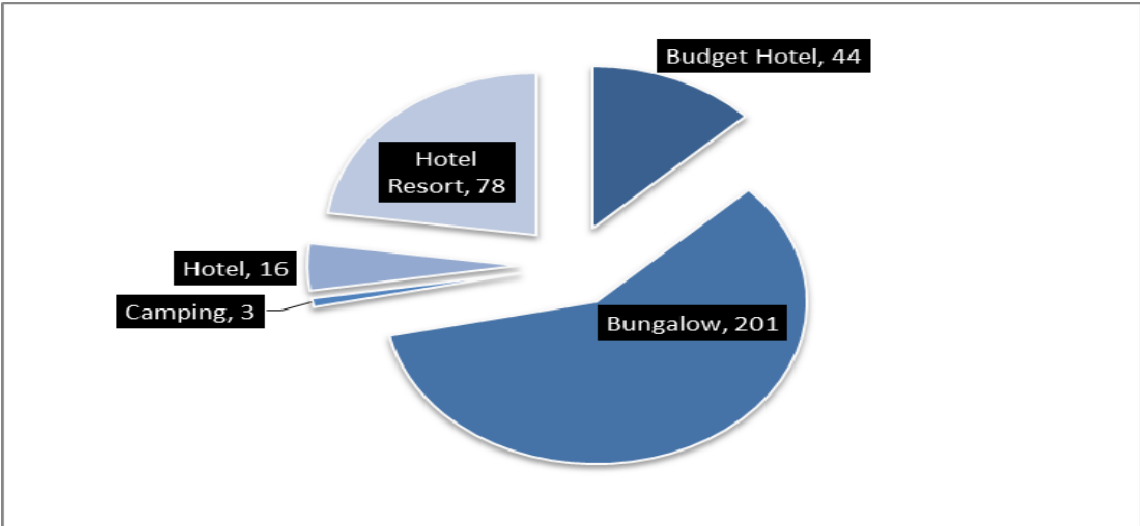
<sup>20</sup> Estimated from the fact that approximately 15% of tourists stay in rural areas (2010 MCA Tourism Survey).

example a wrong number or no answer. Furthermore some surveys were only partially completed as mobile phones would go flat during the call. Very limited feedback from the northern Torba Province was obtained, with only 1 survey completed. Apart from Torba, a sample of at least ten accommodation providers has been used for each province, as can be seen in the chart below.

*Overview Accommodation Provider Sample by Province*

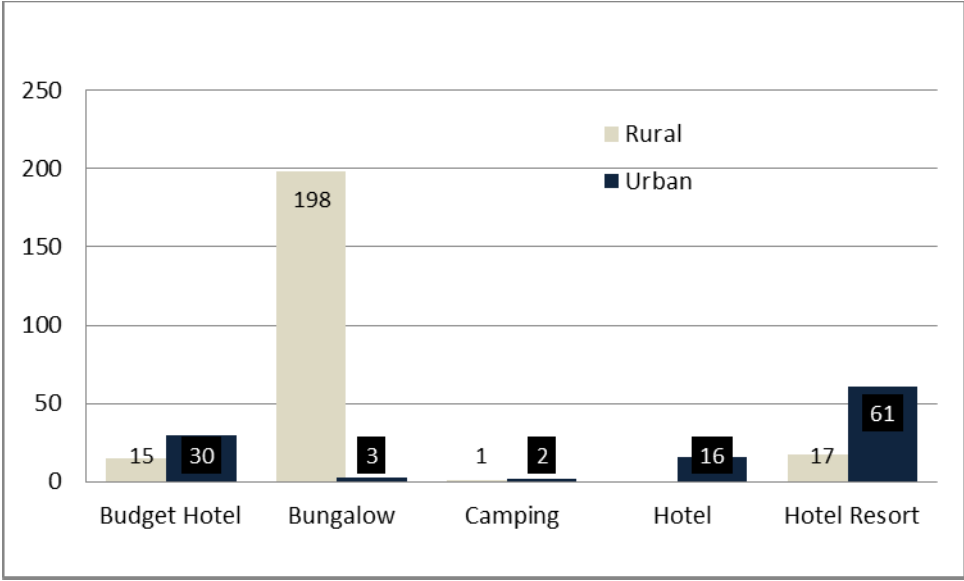


The breakdown of tourism models by accommodation providers is provided below, with bungalows clearly illustrated as the most common model in the country.



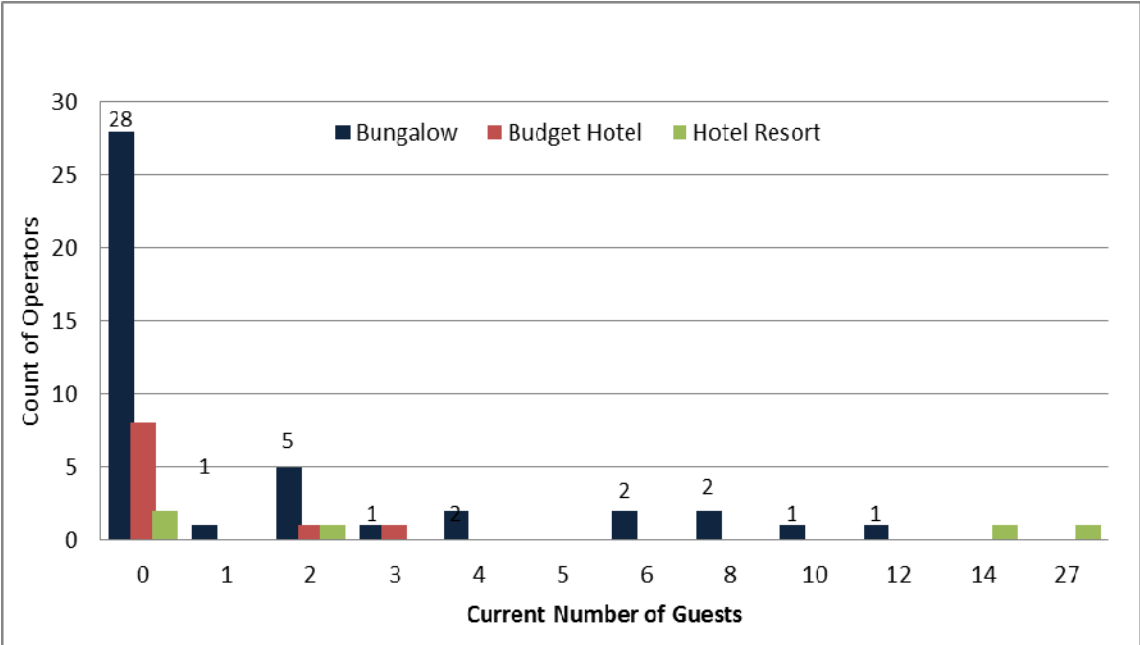
The **dividing line between rural and non-rural can be difficult to identify** in some cases, so the chart below should be treated with caution. It does

however provide an instructive insight into the abundance of rural bungalows, and comparative scarcity of rural hotels and resorts.



Regarding **occupancy levels**, the chart below indicating the number of guests staying in each of these establishments.

*Overview Occupancy Levels*



The dominant characteristic from the first chart is that as expected, hotel resorts are at the upper end of the price scale, while bungalows compose the majority of the lower-end. An interesting aspect of the second chart is the very high number of bungalows with no guests. Though questions about occupancy rates over the

last year were often poorly answered this indicator of very low occupancy rates was also supported by field visits, indicating that many of these bungalows were barely operating.

### 3. Rural Tourism Development Needs

The study desk research and extensive stakeholder interview and contact programme underlined the significant development needs of the Vanuatu rural tourism sector. Key areas of need include:

- **Infrastructure development:** There is a very high need for improvement of basic infrastructure in Vanuatu, especially in the outer islands. The main actions needed are to improve the physical infrastructure such as road access and maintenance, the development of wharfs and landings strips, and increasing the frequency of flights and shipping to the country. The direct effects of improving the basic infrastructure would include a reduction in transport costs, an improvement of food variety & quality, improved access to new eco-resources, contributing to a general increase in rural tourism potential (including improved health for local citizens). Improving the basic infrastructure would also lead to an improvement in tourism activities, increasing access to natural and culturally-oriented sites, and contributing to increased diversification of annual tourism income flows.



*Example of the local infrastructure challenges - the road to Tasariki, SW Santo*

- **Communications needs:** Increasing communications services in Vanuatu is a very high priority. The main actions needed for improving communication services in the area are creating a working mobile connection and 3G internet for mobiles, more WiFi and/or laptops for guests and visitors, and a space for mobile charging. The direct effects of these actions would include improved marketing, a fully operational booking system, increased responsiveness to

enquiries, increased willingness of customers to prolong holidays in isolated sites/villages; and enhancing the efficiency in tourism organisations. Tourism activities would also be improved by an increase in the organisation and reliability of expeditions, and better mobile connection to and from resorts.

- **Increased Technical Assistance:** There is a high level of priority for better technical assistance in Vanuatu, and the need for greater support for skills development of rural tourism operators was repeatedly mentioned during the field site visits. The main areas where technical assistance needs to be provided are hospitality and basic services, hotel accountancy, hygiene, food storage and refrigeration, plant & services maintenance, use of traditional materials; and decoration and gardening. The direct effects of these actions would lead to an improvement in service quality, efficiency and competence in tourism management, and increase of the seasonal clientele. Tourism activities would also be positively impacted on through these actions by enlarging & diversifying the overall tourism offer.

A 'mirror-view' example of how lack of human capacity in rural tourism needs and standards and the lack of structure support for rural tourism development can be seen in some unsuccessful unorganised bungalows. For example, Heaven Tours Bungalow is an example of the frequent unsuccessful case for an unorganised bungalow. The location of this particular model is in the Island of Tanna in a beautiful landscape, under the volcano. The resort consists of two bungalows and a kitchen which are well made with the use of traditional materials. Despite the attractive landscape and the well-built bungalows, this resort has proved to be unsuccessful for a number of reasons. One reason is that the area has no reliable mobile coverage, there is no marketing of the resort and no road signs to direct potential visitors to it. There is also no access to water on the site, with the nearest water source over 100 metres away. As a result of all of these factors, the resort has only received 6 guests since 2009. In contrast, the successful Evergreen Resort on Tanna Island, managed by a professional with a background in accountancy, prioritised staff development and brought in external consultants to train staff.

- **Niche Tourism:** On the contrary the niche tourism could represent a promising prospective for EU tourism / Tour Operators. These models dedicated to environment and culture and located in strategic areas such as water falls, marine conservation areas, or even small uncontaminated islands could justify long journeys for high-income clientele. In Europe, this type of high-quality tourism to many parts of the world such as East Africa, Tibet, Nepal, Central America, Madagascar etc., is on the increase. The core of this eco-tourism model is tourism lodges' management and a professional organisation for the tourism activities performed by expert guides in exclusive itineraries in the throughout local eco-cultural attractions. At moment, in Vanuatu the niche model are irrelevant, although a number of

interesting pilot projects could be organised in many parts of the Country with appropriate investments and organization.

- **Development of the tourism offer:** An improvement in the quality of the tourism offer in Vanuatu is also of some importance. The main actions that need to be taken to help achieve this are i) improved accommodation characteristics (such as decor, furniture, lighting); ii) improved attention to detail, service quality, cleanliness, training; iii) improved links to local attractions; and iv) improved restaurants, such as refrigeration at lower accommodation levels for cold drinks, and reliable supply of beef/fish/chicken for meals. The direct effect of this would be more diversification of the typology of customers, and more options in the tourism offer as a whole.
- **Examples of relevant on-going rural tourism support measures:** Section 1 of the report provided a summary overview of selected support for tourism development in Vanuatu. Within this spectrum of initiatives, a number of activities deserve special mention. One example is the work being implemented by the Department of Tourism in Malekula within the framework of the AusAid-supported TVET programme, which has been providing support to rural tourism operators, as mentioned earlier in the report. This support has included training and accreditation for bungalows, as well as creating a central booking office and providing reservation, phone and web support, and has been considered to have proved successful to-date. Other highly relevant initiatives being carried out by the Department of Tourism include the development of bungalow accreditation guidelines.

#### 4. Rural Tourism in Vanuatu – Key findings and Conclusions

From this chapter, key study findings have been

- As a general rule, most of tourism comes from Australia & NZ because of the geographical proximity to the Vanuatu Islands. For this clientele, the rural tourism sub-sector has been oriented mostly towards luxury hotels, mid-level resorts and bungalows in accordance with the tourists' level income. Only an insignificant flow of EC Tourism is included in this tourism pattern.
- The field work has confirmed the typology of rural tourism operators as a useful working categorisation and identified key characteristics and needs (including energy needs) for each category.
- The telephone survey findings have complemented the field visit programme by adding further information and insight to the nature of rural tourism, as well as confirming practical challenges such as the difficulty in contacting many rural tourism operators.
- Stakeholder interviews during the phone survey and site field visits have highlighted that although a lack of available renewable energy is important, other key barriers to the growth of rural tourism in Vanuatu are a lack of

specific promotion, poor communications in rural areas to book accommodation, poor local roads and other transport infrastructure, a lack of owner and staff training, limited restaurant menus and food availability, and competition from other better organised tourist destination to major and growing world tourist origination markets such as Europe, North America and East and South Asia.

- The field visit work has also shown that there is little in the way of niche models of rural tourism that correspond to international tourism standards in Vanuatu, although there is significant potential to develop this area. However, this should not be the focus of a PPP model recommended, as there are larger and more pressing needs among the majority of rural tourism operators where efforts to address them can make an important contribution to the sustainable development of rural communities in Vanuatu. However, some recommendations on development of niche rural tourism are provided for the medium term, outside of the core PPP model developed.
- Many tourism operators have confirmed their interest in, and need for, more support in many of the above areas to develop their understanding and skill set and capacity to understand required quality standards expected by visiting guests, and to work towards improving their offer to meeting these guidelines.
- As seen earlier in the report, there are a number of tourism development initiatives underway that can be of relevance for this study, although for the most part there has not been a significant and concentrated programme to target rural tourism operators. However, the AusAID supported TVET programme has provided some valuable support to the tourism sector, and the Department of Tourism's work on developing bungalow accreditation is of fundamental importance and this study should see to further support and amplify such work.



### III. RURAL TOURISM ENERGY SITUATION

This section sets out the current energy situation and energy needs of rural tourism operators, based on the desk research and the field visit programme findings.

#### 1. Introduction

Vanuatu has eighty-six islands of which four have privately owned and operated urban area based electricity grid systems. The four electricity grids are: (1) in Port Villa; (2) in and around Luganville on Espiritu Santo Island; (3) in Norsup on Malakula Island; and (4) in and around Lenakel on Tanna Island. The rest of the islands of Vanuatu do not have any grid electricity supply. The four Vanuatu grids are all diesel generator based. Luganville has about 40% of its generation coming from the donor funded Sarakata hydro project. The Port Villa grid has a successfully operating 2.75MW privately funded and operated wind farm.

Grid electricity is available for around 82% of the urban Vanuatu population. However, only around 80% of potential urban customers in grid-supplied areas are actually connected, due to a lack of affordability for connections and from limited incomes to pay for any electricity used<sup>21</sup>. Grid electrification is being slowly extended. Only around 6% of the Vanuatu population outside electricity grid coverage areas has an electricity supply, primarily from solar PV systems and petrol generators<sup>22</sup>. Vanuatu grid electricity tariffs are among the highest in the Pacific<sup>23</sup>. The electricity tariffs of Vanuatu's private operated grids generally reflect the need for a realistic return on capital investment, full diesel fuel cost recovery, and appropriate O&M cost provision<sup>24</sup>. Vanuatu's electricity grids are very unusual in the Pacific in having private sector operation, not relying on donors for new and replacement generators, not relying on government subsidies, and being explicitly regulated to operate in a long term financially

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<sup>21</sup> A World Bank funded study is currently underway by consultants (Castalia) to assess practical ways to extend urban electrification, with possible subsidies to UNELCO as the owner and operator of three of the four Vanuatu electricity grids.

<sup>22</sup> Ref VERD Program Design Document, December 2012

<sup>23</sup> Most Pacific electricity tariffs are too low for fully sustainable on-going electricity supply as most utilities operate at a loss and/or are subsidised, often with hidden subsidies, and including intermittent and/or unreliable electricity supply. Reference ADB / PPA benchmarking study of 21 Pacific utilities studied in 2011

<sup>24</sup> There is an underlying and on-going tension between the largest private electricity supplier UNELCO and URA (the Utility Regulatory Authority) over what are fair and reasonable charges. However, at least this tension is transparent and openly debated on Vanuatu, which is a rare and valuable feature compared to the situation in most other PICs.

sustainable manner. Various EU and other subsidies and grants have been made for some grid-connected biofuel and PV systems.

In rural areas outside the four grids in Vanuatu, solar lanterns now primarily provide lighting<sup>25</sup>, and have replaced most of the former rural kerosene lighting in Vanuatu. A range of PV solar systems for lighting are also available and sold by private sector RE suppliers in Port Villa and some other main urban centres in Vanuatu. LPG is available and widely used in urban areas in Vanuatu. LPG is used in most tourist facilities in both urban and rural areas. LPG is used for cooking and for the provision of hot water in most Vanuatu tourist facilities. In most unorganised bungalows, cooking is primarily provided by local wood fuel and no hot water for personal bathing or for laundry use is available or provided.

Vanuatu has a suitable general existing policy environment for the deployment of RE under PPP arrangements to support rural tourism. Development of a formal VERM (Vanuatu Energy Roadmap) is underway funded by AusAID and implemented by a WB (World Bank) team with technical inputs from other donors (e.g. ADB). VERM, due to be completed by Sept 2012, is modelled on TERM (Tonga Energy Roadmap). VERM is expected to address any remaining key policy issues relating to energy development in Vanuatu and is expected to be followed by a flexible implementation plan. It is not envisaged that this EU BizClim project will need to address any significant outstanding renewable energy policy issues as part of supporting rural tourism focussed RE in Vanuatu.

Vanuatu is the recipient of an increasing number of donor-driven RE and EE (energy efficiency) projects, including consultancy provision and technical assistance and/or equipment provision projects. These projects include those from the EC, IUCN Oceania through Italian/Austrian support, SIDS-DOCK, UNDP/SPREP-GEF PIGGAREP, ADB-GEF PEEP-2, Japan PEC, WB GPOBA, and others. This EU BizClim project consultancy struggled with evidence of clear consultant and donor fatigue in Vanuatu, which places additional strain on limited government capacity levels. Specifically, this EC BizClim consultancy project faced major difficulties in obtaining meeting appointments with government and private sector tourism and renewable energy stakeholders, due primarily to too many consultants working on different and overlapping projects in a very small sector with only a very limited number of people that everyone wanted to see.

All donor projects talk about fostering local ownership, but real local ownership is minimal. Such small national government offices struggle with finding sufficient capacity to interact with the various multiple consultants working in Vanuatu at any one time. So there is a strong argument to work very carefully with the private renewable energy sector in Vanuatu to help it grow organically and not to become dependent on stop-start donor activities that would undermine sound business development needs and ensure a proper customer (and not donor) customer orientation. Vanuatu is arguably already beyond its absorptive capacity

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<sup>25</sup> Private sector RE suppliers generally provide the solar lanterns at commercial and unsubsidised prices, but with some occasional donor supported awareness raising, marketing and sales funding support.

for new donor led RE projects. In addition, the Vanuatu renewable energy private sector comprises very small operators with limited financial resources, and the private renewable energy sector is already steadily growing from its small base from existing private sector renewable energy demand and donor projects such as the AusAID funded and driven VERD project.

Many donor funded renewable energy hardware projects struggle to keep operating for more than a few years due to lack of local funds for O&M, and the sheer cost and logistics of getting relevant RE technical expertise and spare parts to the extremely isolated parts of Vanuatu that comprise most of its islands and where most of its people live. Even getting recipients to buy and fit a US\$5 new battery for a \$20 solar lantern is problematic, the risk is that most current solar lanterns are likely to be abandoned after 2 years when the battery dies, and people will either do without solar lighting or just get a new solar lantern.

## 2. **Baseline Rural Tourism Energy Supply Situation**

Electricity is generally currently provided by diesel generators in luxury resort-hotels and also in mid-level resort-hotel rural tourist facilities in Vanuatu. Luxury resort hotels generally run their diesel generators for 24 hours per day 7 days per week. Mid-level resort-hotel rural tourist facilities in Vanuatu generally run their diesel generators for 4 – 16 hours per day, seven days per week.

Unorganised rural bungalow tourist facilities do not provide much, if any, electricity supply outside of at best solar lanterns for lighting and for mobile phone recharging, with some using small petrol generators when their (infrequent) guests turn up.

Organised bungalows generally have either petrol generators that are run for a few hours per day for lighting and for refrigeration when there are guests, or have basic solar PV systems that just provide lighting, and in some cases the PV systems have a small (usually 150 to 350W) inverter which feeds a modified sine wave AC (alternating current) central power point or very occasionally room power points for mobile phone, camera and laptop charging.

Diesel generators are the baseline electrification technology for luxury resort-hotels and also in mid-level resort-hotel rural tourist facilities in Vanuatu. For organised bungalows, petrol and occasionally diesel generators are the most common baseline electrification choice given their low first cost compared to equivalent solar PV systems.

For solar PV or hydro rural tourism RE supply options, a diesel or petrol generator backup is generally required to provide a reliable electricity supply by covering long cloudy periods or low stream/river flow seasons. The other option followed in some cases is to use oversized batteries and only provide lighting and in some cases also energy efficient refrigeration.

Diesel and petrol generators are low capital cost, provide high quality and reliable electrical supply with simple O&M, and their necessary O&M is well

known and widely available in Vanuatu. A wide variety of diesel generators are used, although for petrol generators a number of Yamaha units and some common low cost Chinese brand generator were seen in use.

With nearly all the luxury resort-hotels and also nearly all the mid-level resort-hotel rural tourist facilities in Vanuatu being visited, it was noteworthy that not one of them used a kWh meter. In most cases the diesel use was also poorly quantifiable, and in the one case where precise figures of diesel use and generator costs were given by the luxury hotel-resort accountant and relieving manager, the figures given were clearly not believable. For petrol generators the fuel use figures were at best approximate, and loads were also completely unknown. Most diesel and generators were clearly run very under loaded, and in many cases very old, unreliable and fuel inefficient diesel generators were still being used.

In the cases where diesel generator fuel use and loads could be believed or reasonably estimated, fuel use would seem to be in the range of 1 to 2 kWh/litre. As a point of reference, modern diesel generators run in a well-loaded fashion can achieve 4.0 or higher kWh/litre of diesel used. Most of the diesel generators used in Vanuatu tourist facilities were very lightly loaded. In some cases incandescent lights in restaurants or access paths were left on in the daytime, although whether this was to provide a larger minimum load or whether it was because no one was interested in managing energy costs is unclear.

For petrol generators, figures of as low as 0.1 kWh/litre were indicated when the petrol generator was lightly loaded as it was only running a few lights.

The tourism facility people interviewed were aware that diesel and petrol costs were high, and that solar PV systems had higher initial capital costs but lower running costs. However, it is not possible to do any realistic calculations of actual investment paybacks without knowing the actual kWh needed or the current kWh/litre of the diesel or petrol generators used.

Even with significantly higher world oil prices, diesel generators will clearly remain the baseline electrification option for luxury resort-hotels and the mid-level resort-hotel rural tourist facilities in Vanuatu - as the diesel generator operating cost remains low compared to other rural tourism provision costs, in particular the transport of guests, the provision of the necessary staff, and the supply and transport of necessary materials and food. Although all the Vanuatu rural tourist facilities interviewed were keen to move to grid connections just as soon as they became available, there was a general understanding that grid electricity would not in fact be much less expensive than running their own diesel generators. Rather, the attraction of grid electricity is that it would be one less thing to worry about, and that running diesel generators is not a core area of expertise for tourism operators.

Solar water heaters (SWH) are already installed in some mid-high priced housing, hotels and resorts in Vanuatu. The SWH used are generally expensive FPC (flat plate collector) systems with integral tanks imported from Australia. Sales of new FPC systems are minimal; from surveys of suppliers undertaken the

FPC SWH sales are probably less than 10 FPC systems per year, which is low for a potential market for SWH systems in Vanuatu of around 1000 systems.

Lower priced ETC (Evacuated Tube Collector) SWH units sourced from China are now just starting to be successfully sold in Vanuatu, although numbers are small and expertise in sourcing the most appropriate units is still limited. So all rural and even urban tourist facilities can now profitably switch to the use of SWH with LPG backup. The ADB-GEF PEEP-2 (Promoting Energy Efficiency in the Pacific, Phase 2) project that is now being implemented in Vanuatu (as well as in Cook Islands, PNG, Samoa, and Tonga) includes SWH in its list of technologies to be supported in principle, but the promotion of SWH under PEEP-2 depends on priorities set by the respective governments – and it is not expected that the promotion of SWH for tourist facilities will be a high priority for the limited PEEP-2 hardware funds available. For luxury level hotel-resorts that may want to use less obtrusive SWH systems, it is not clear if pumped ETC systems are widely known about or available in Vanuatu, although the necessary expertise and equipment would be readily available from nearby Australia, New Caledonia or New Zealand sources.

Around 100 'solar assisted' AC units have been imported into Vanuatu or are on order from China with Japanese compressors and use either flat-plate or evacuated tube collectors. However, how they really work and their actual efficiency (COP – Coefficient Of Performance) is unknown. The ADB-GEF PEEP-2 project is already looking into this issue of 'solar-assisted AC' in Vanuatu and is arranging for independent testing of some models. As tourism develops in Vanuatu, including in rural areas, AC is likely to become more common in luxury hotel-resort tourist facilities, so 'solar assisted' LPG-fired AC is in principle a highly relevant and available RE technology for rural tourism in Vanuatu.

Biofuels, in particular coconut oil, are in-principle a viable technical option in rural Vanuatu that can be used in suitable diesel engines for power generation, marine transport and road personal and goods transport. However, in practice copra is only available for processing into coconut oil as a fuel when the value of copra is low. While neat coconut oil can be used in certain diesel engines with appropriate operational regimes, it cannot be used as a drop-in replacement for all diesel engines, further transformation of the neat coconut oil into biodiesel is really required for widespread use. The use of coconut oil has significant pricing, supply chain, and technology issues, as has been found in the Port-Olry biodiesel grid in Santo, where the cost of running the generator engines on biodiesel is higher than running them on diesel.

Research carried out by the energy and natural resources department of the Secretariat of the Pacific Community looked into the economic feasibility of coconut-oil bio-fuels in the Pacific<sup>26</sup>. The study concluded that burning coconut oil

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<sup>26</sup> See for example summary of the research findings as reported in the *Pacific Economic Bulletin* Volume 25 Number 3 © 2010 The Australian National University; [http://peb.anu.edu.au/pdf/PEB25\\_3\\_Martyn.pdf](http://peb.anu.edu.au/pdf/PEB25_3_Martyn.pdf).

as a fuel is a relatively low-valued end use for the coconut, with the labour intensiveness of copra production presenting an insurmountable cost frontier that renders coconut bio-fuel projects uneconomic in most parts of the Pacific, with the exception of copra farmers in low-wage locations in remote Melanesia and Micronesia who could benefit from local consumption of coconut bio-fuel. A trial coconut-oil bio-fuel power-generation project at Port Olry in the northeast of Espiritu Santos Island, showed that village residents *face one of the highest energy tariffs in the Pacific: VT150 per kilo-watt hour (approximately US\$1.50)* (Jensen 2010). The study concluded that the rural income-generating opportunities and local energy savings of coconut-oil bio-fuel power-generation projects are illusory".

Gasification of biomass, while a simple idea, rarely proves to be as straightforward to implement in real world rural field conditions. A key challenge is that a lot of regular maintenance is needed due mainly to the presence of tar and particulates in the gas. In order to upscale gasifier-based rural electrification, more reliable, low tar gasifier systems are being developed". Gasifiers deployed for the last 30 years in the Pacific (along with a reliance on unsustainable community ownership models) have more often than not failed due to ongoing and significant gas clean-up technical requirements and failures. Suitable technical solutions for gas clean up exist, and biomass gasifier fed internal combustion engines can reliably run for years, but the gas clean up side is technically and maintenance intensive. While a suitably motivated or technically skilled rural tourism operator in Vanuatu could in principle supply electricity to his/her own resort using a coconut husk-fuelled gasifier and a suitable internal combustion engine, past experience in the Pacific suggests that it is likely that only some of the best-managed higher-end resorts could meet the above success factor preconditions, and past experience in the Pacific islands suggests that for most rural tourism operators it would not represent a viable option.

Wind power is in principle an option in some sites in Vanuatu, but it is even more dependent on batteries than solar PV is unless it is fed into a sizable electricity grid as is done by UNELCO for their wind farm near Port Vila. In addition, suitable windy sites are generally distant from where the electricity could be used. The wind resource is not known in much of Vanuatu. Winds monitoring towers and anemometers with the necessary data loggers are only now being installed in all provinces as this report is being prepared. Ideally 18 months of measured wind data is required for assessing the costs/benefits of wind systems and results are highly site and anemometer /wind turbine height specific. There may be an excellent resource on a particular island but not necessarily near the resort. So wind and coconut oil or biodiesel are not being recommended for further consideration in this EU BizClim study.

Hydro is in principle the 'ideal' rural tourist electricity supply option. Hydro is a very mature technology, it can provide reliable base load and load-following electricity supply, it has low maintenance requirements, it is fully scalable from a few hundred watts to thousands of megawatts, and it can technically run reliably for decades. However, hydro for rural tourism in Vanuatu comes with significant technical challenges, including finding an existing or prospective rural tourist

facility site within about 1km (approx. maximum electricity feeder length) from a suitable stream with sufficient head (height difference between intake and discharge) and sufficient flow rate for a significant part of the year, and landowners who agree to hydro weirs, penstocks, power houses, and distribution lines being deployed on or crossing 'their' land.

In practice the main barrier to the successful deployment of hydro in Vanuatu is not technical but is the generally unclear, and/or overlapping, and/or multiple, and/or debateable customary ownership of land and the inability to enforce any agreements on on-going hydro resource access outside a local informal context. This has led to the failure of nearly all the numerous community managed local hydro schemes in Vanuatu.

Hydro has run for many years at the Sarakata hydro site in Santo, although with periodic land disputes that have sometimes meant it could not operate. Hydro has been successfully applied at the Epi Guest House on Epi Island due to the dedication of the guesthouse owner. However, this is the only known successful micro hydro application in Vanuatu for rural tourism. So hydro is a highly site and application specific option in Vanuatu for rural tourism. Hydro is clearly not a widely applicable technology for rural tourism in Vanuatu.

Solar PV systems for households and rural tourism are available from a number of private suppliers in Port Villa. Solar PV is a well-proven technology with over 30 years' successful (in the right conditions) deployment in the Pacific. Solar PV is a widely and publicly known technology in Vanuatu, it is readily commercially available now in Port Villa, it is not especially site specific, it can be scaled up to any desired capacity, it can be modular, and prices are steadily decreasing with increased global PV manufacturing scale and current world PV supply overcapacity. However, solar PV relies on expensive and heavy batteries, which often require maintenance and need costly replacement at 4 – 7 year intervals. In practice, solar PV is the only RE option for electrification of rural tourist facilities that is nearly universally applicable throughout Vanuatu.

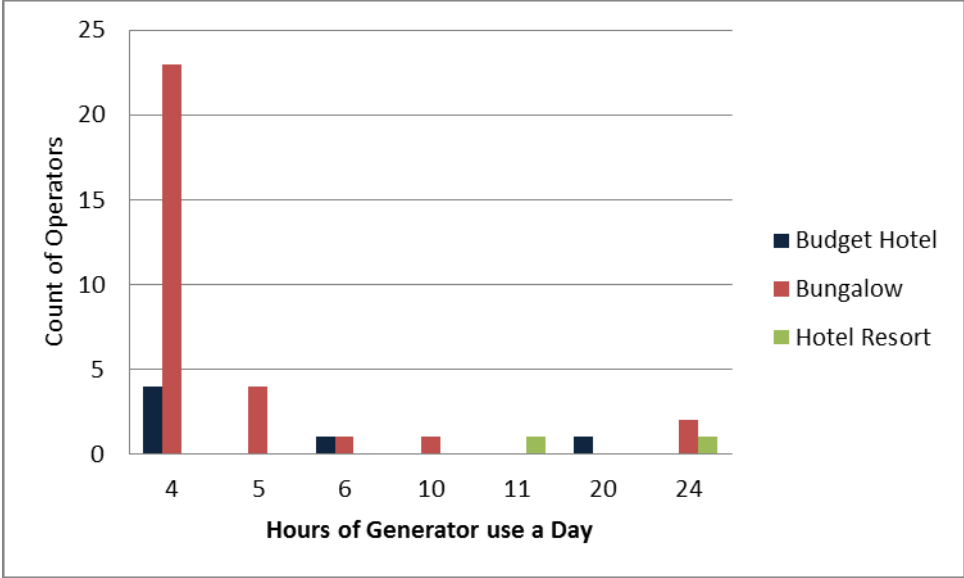
### **3. Rural Tourism Energy Needs and Renewable Energy Options**

This section summarises the findings from the desk research and field visit programme. As mentioned, the field visit programme comprised site visits to rural tourism operators in Efate, Santo, and Tanna over a three-week period, as well as site visits in the Port Vila area.

#### **3.1 Electricity**

Despite grid connections being underway on Efate, Santo and Tanna, with further extension planned, the geographic and socio-economic nature of Vanuatu means that about 5 luxury resort-hotels and 15 mid-level resort-hotels are unlikely to ever be connected to the grid. For these hotels, the simplest and most attractive option is to use diesel generators as a source of energy. Similarly for bungalows,

diesel or petrol generators have been the straightforward solution to meeting their energy needs. Diesel cost per litre of those surveyed ranged from Vt160-Vt400 per litre. As shown below, bungalows run generators for 4 hours a day but only when they have guests. Most resort-hotels have 24 hour generators operating.



The reason that diesel generators are likely to continue to be used by these 20 resort-hotels is that diesel generators are the simplest and most well understood means to provide electricity for their tourism businesses. Electricity costs are accepted as a high but unavoidable cost of doing business in the rural Pacific including in rural Vanuatu. Reducing electricity costs is not one of the core management areas of focus for these 20 resort-hotels. Diesel generators represent a well-known technology, they provide high quality pure sine wave electricity, they are tolerant of motor loads like pumps and large infrequently used devices like arc welders etc. starting directly on line, it is easy to arrange for larger and smaller units to be run to meet wide daily variations in electrical loads, and if diesel generators sets are loaded to at least 50% load then they can reliably operate for around 24,000 hours between major overhauls (3 years of continuous operation), and they are the lowest capital cost electricity generation technology option. If properly loaded and regularly maintained (big ifs in practice) diesel generators can produce between 3 and 5 kWh (net of generator sets' own loads) of electricity supply per litre of diesel. Diesel is provided by fuel tanker on Efate and Santo and by 44 (US) gallon drums on other islands, but the drums are robust and can readily be floated ashore if seas are too high for the boat to land.

The widely applicable 100% renewable energy alternative realistically comprises huge solar PV arrays if the diesel generators were to be fully replaced for most of the year. A 150kW PV array would provide only around 15kW of 24 hour a day electricity supply, and this would be the applicable level of electricity demand for a mid-level resort-hotel. Such a PV system would need multiple inverters operating in parallel or large special inverters where spares provision would be a problem, and it would require a massive battery bank, with very careful safety



protocols as the battery bank would represent a serious explosion risk if the batteries were ever short-circuited (e.g. by a dropped wrench across the battery terminal) or if any hydrogen produced built up and exploded. An indicative cost for a PV system with fully battery storage would be well over \$1 million for a mid-level resort-hotel in Vanuatu<sup>27</sup>.

The simplest renewable energy option would be to run a parallel diesel-PV system without energy storage, where renewable energy (in practice in 95% of cases this would be solar PV) runs in parallel with the diesel generator set during the daytime. This would remove the need for a battery bank, but limit the PV energy contribution to around 10% of the daily electricity supply, as only around 20% of the supply at any one point could be PV for systems stability reasons, in particular that a cloud blocking the sun could reduce the PV output from 100% to nearly zero in seconds, and hence the diesel generator set would need to be able at all times to increase output in seconds to compensate for any lost PV generation.

An intermediate hybrid system would run the diesels during the day, and rely on battery power and inverters to provide the electricity supply at night. This would provide quiet electricity generation at night, and replace smaller more lightly loaded diesels, and hence be more effective at reducing generation costs that reducing daytime electricity supply.

However, none of the hotels in Vanuatu currently have kWh meters, so they have no idea whether their diesels are energy efficient in their basic specification or operation or not. None of the resorts use special high efficiency refrigerators or freezers or display fridges or room bar fridges, this would probably save around 20% of resort electricity use at paybacks of a few years. None of the resort hotels use cooling towers instead of radiators on their diesel generator sets, although this alone could reduce diesel use by around 10%. The replacement of diesel generator sets with full renewable energy options would not provide any significant extra benefits such as increased electricity supply hours per day or significant green marketing credentials. So there are many simpler and much more cost-effective energy efficiency options that Vanuatu resort-hotels could use compared to installing solar PV even in its simplest fuel saving parallel mode operation.

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<sup>27</sup> Solar PV systems with full battery storage and designed for minimal (coconut) diesel generator back up are being commissioned covering the three atolls of Tokelau and funded by New Zealand, the systems cost NZD7 million or around USD5.66 million. The systems comprise 4032 solar panels, 392 inverters, and 1344 batteries weighing 250kg each. The combined systems' output would be roughly large enough for three mid-level resort hotels or one luxury resort-hotel in Vanuatu. See <http://www.aid.govt.nz/media-and-publications/development-stories/march-2012/tokelau-leading-light-renewable-energy#> and <http://www.aid.govt.nz/media-and-publications/development-stories/march-2012/tokelau-leading-light-renewable-energy#> Note there is no mention of who will pay for and the transport of all 336 tons replacement batteries in 4 to 7 years, or what will then happen to the old batteries.

The reality is that currently no renewable energy option can provide sufficient cost savings to be justifiable for electricity supply for these hotel-resort establishments. Hydro, wind and biofuel (coconut oil) technologies are in theory very applicable technologies but in practice they have very limited applicability off-grid electricity generation in Vanuatu.

The 30 to 40 organised rural bungalows in Vanuatu generally use small diesel or petrol generators and they operate them for only 1-6 hours a day and only when guest are present, due to fuel cost constraints. Such smaller generators, especially the petrol ones, have higher fuel use per kWh produced, and this is made worse by the frequently low load levels they are run at – one bungalow was found to be running the smallest possible petrol generator to just run a few lights for a fuel use of under 1 kWh/litre. These small under-loaded diesel and petrol generators get much lower hours between major overhauls than is the case for the larger diesel generators used in resort-hotels. Diesel and petrol costs per delivered litre of those surveyed ranged from Vt160-Vt400 per litre, depending on transport distances and the state of the relevant roads between the nearest port and the tourist establishment. Diesel or petrol generators are the straightforward solution to meeting the bungalows' electricity supply needs, but for these tourist operators electricity supply is a significant part of their business costs structures and they are generally interested in renewable energy (especially solar PV), including because it also offers an improved 24/7 electricity supply – a supply that they just cannot afford to supply with small diesel or petrol generators.

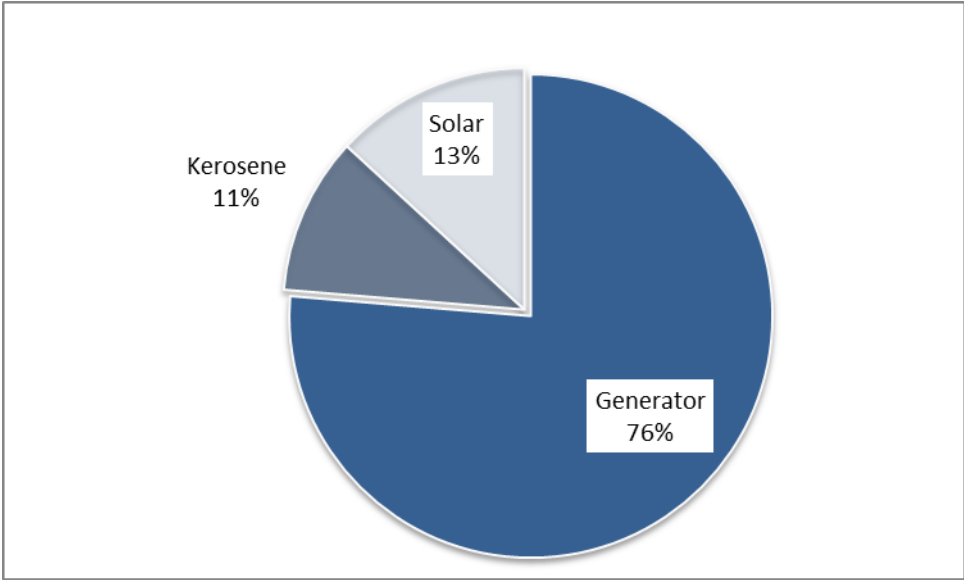
Solar PV technology remains the best option to emerge as a viable alternative electricity source for the rural tourism sector in Vanuatu. In some parts of Vanuatu it has already began to replace smaller diesel and petrol generators. It is a proven technology, and is particularly suitable for off-grid electricity generation as a result of its modular nature.

### 3.2 Lighting

In Vanuatu, the conventional rural lighting technology used has been kerosene wick lamps. The costs associated with this form of lighting are \$3-10\$ for the lamp itself, with a running cost of \$12-\$18 a months for the kerosene. The current situation is that solar lighting is significantly replacing kerosene in both rural and urban Vanuatu. Since 2012 a total of 20,000 basic \$15 solar lanterns have already been sold, along with a further 10,000 more advanced solar lanterns selling for \$55-\$90 have larger PV cells and batteries and can also be used to charge mobile phones – and mobile phones use is very high in rural Vanuatu and having a working mobile phone is probably more important to rural people in Vanuatu than having sophisticated lighting. The majority of these sales have come in 2012. Another 10,000 solar lanterns are in the process of being imported, and these additional 10,000 units will mean that solar PV lanterns will then meet nearly all of the rural lighting demand in Vanuatu. The success of existing efforts to replace kerosene wick lights with solar lanterns is already being shown by the fact that some rural general stores have now stopped

stocking kerosene at all. The current breakdown of sources of lighting for bungalows can be seen in the chart below.

*Overview Sources of Lighting for Bungalows*



The primary challenge in the area of lighting is now replacement batteries. The NiMH (Nickel Metal Hydride) batteries for the existing generation of solar lanterns will only last 12-24 months, so batteries for the first solar lanterns sold will now need to start to be replaced. If the batteries are not replaced the old solar lanterns will just be thrown away (recycling the old lanterns is highly unlikely in rural Vanuatu) and new lanterns purchased, which is of course not an ideal waste management situation. Importing replacement solar lantern batteries and establishing suitable distribution networks for replacement is now being thought about, but are not yet in place.

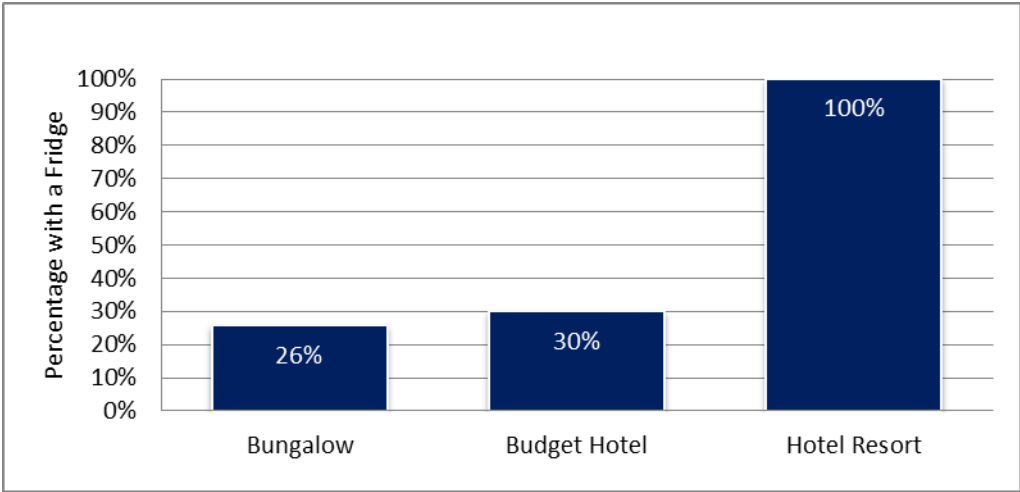
Further technology developments in this area will help through the transition to ubiquitous use of solar PV lighting in Vanuatu, as a new \$35 mobile recharging solar lantern technology using Lithium-Iron-Phosphate batteries should give five or more years of battery life. Basic 3-4 light and DC mobile/camera/laptop charging PV-Battery systems have also been developed and are being sold for around \$200. Such systems are a promising option for organised rural bungalows. For the unorganised bungalow sector, the most promising option is the provision of a solar lantern for each bungalow, with one mobile phone charging solar lantern for the restaurant area. This keeps the light system cost in synch with the generally low and unpredictable occupancy of this important but diffuse rural Vanuatu tourism sector.

### 3.3 Refrigeration

Only 26% of the roughly 200 tourist bungalows in Vanuatu have refrigeration. The majority of these fridges and freezers in island bungalows use 220-240V AC

(alternating current) electricity, and they are generally old and inefficient. To operate these fridges and freezers the bungalows need to use generators, generally using petrol. Yet without fridges or freezers the tourist bungalows cannot keep fish and meat frozen for guests, nor can they keep beer cold. So the lack of a fridge or freezer lowers the attraction of a tourist bungalow (fewer guests) and lowers the income they can derive from what guests they do get, as they cannot reliably sell restaurant meals with fish or meat, nor can they sell their guests cold beer. Freezers can also be used to sell and store ice, which is in general demand for fishing to keep caught fish fresh longer, as well as for adding to drinks in the generally hot weather. The lack of refrigeration facilities outside of resort-hotels is clearly illustrated in the chart below.

*Overview Refrigeration Facilities by Type of Tourism Operator*



Using old inefficient fridges and freezers means that the petrol generators need to be larger output and to run for more hours per day, as a poorly insulated fridge or freezer will not keep food (or beer) as cold for as long as a well-insulated model. If the tourist bungalow tries to use solar PV to replace some or all of the petrol generator use, then it will need a larger PV system than it would need if efficient fridges and freezers were used. In particular larger AC loads like refrigeration need larger DC to AC inverters, which are expensive if reliable pure sine waver inverters are used, and if cheaper inverters are used then they will have a shorter life and produce modified sine wave waveforms that are not good for modern electrical appliances.

*Typical old Freezer (right) and Highly Inefficient Display Refrigerator (Left), (Port Olry, Santo)*



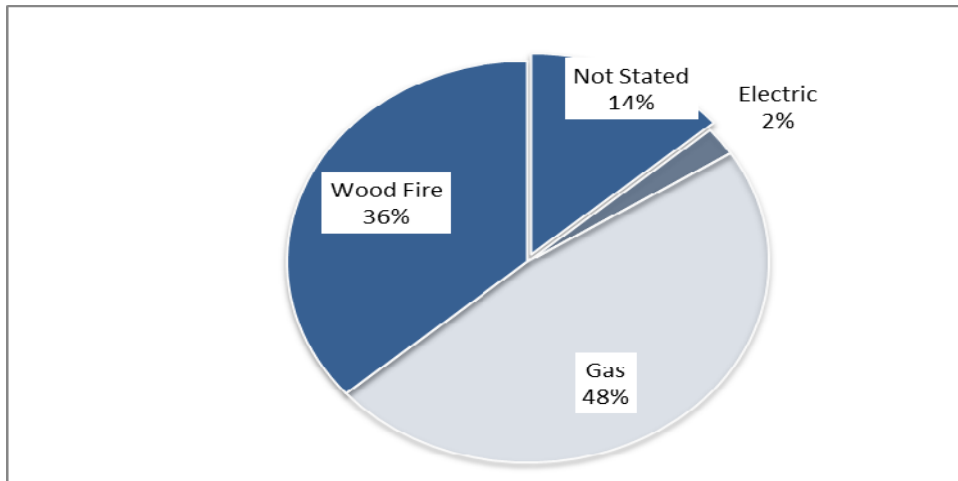
A better option for these tourist bungalows would be to use solar PV directly as DC (Direct Current) refrigeration. Not only is there a higher efficiency with solar DC refrigeration, but there is also the added advantage of not having to purchase either expensive reliable sine wave inverters, or use less expensive but less unreliable DC/AC inverters. Another benefit of using DC refrigeration, is that they generally have higher insulation levels and more energy efficient compressors, so they stay colder longer and they require less energy to run when they are operating, all of which lowers the costs of the necessary PV solar system required to power them.

There are some examples of LPG fridges in use, but their absorption cycle refrigeration is very inefficient unless complex and expensive advanced refrigeration cycles are used. So affordable absorption refrigeration is expensive to run, and LPG becomes more expensive to buy the further away one gets from Port Vila and the further one gets away from the wharf on the applicable island. Significant numbers of good quality 225-liter DC freezers are already being sold in Vanuatu for around \$2500. Many of these DC freezers are used in PV systems. DC freezers could be supplied for under \$2000 if they were to be tax and duty exempt. Five-year warranties for DC refrigeration appliances should be possible as they now have a well proven low failure rate when used in Vanuatu.

### 3.4 Solar Water Heaters (SWH)

Only luxury and mid-level resort-hotels in Vanuatu provide hot water using costly LPG. A more sustainable and economically friendly option is solar water heaters. SWH systems are available in Port Vila and Luganville, but not in rural areas. For the bungalows analysed in the survey, the following breakdown of sources of hot water further illustrates the gulf in amenities between the hotels and the bungalows, with wood fire and gas the primary sources identified.

#### *Overview Sources of Hot Water in Rural Tourism Bungalows*



The different options include:

- Traditional *thermosyphon flat plate collector (FPC) systems* with integral tanks. This technology has been used in Vanuatu for around 20 years. Such conventional FPC SWH typically cost of \$1900 or more as they generally use copper collectors and pipes and the ones sold in Vanuatu are made in relatively small numbers in relatively high cost countries such as Australia or Malaysia. These conventional FPC systems are well proven technology that has a proven 20-year or so lifetime. However, these FPC systems do not work very well in cloudy weather or the wet season, so they will only work to full capacity for around half the year in Vanuatu.
- *Evacuated tube collector (ETC) systems*, with food grade stainless steel tanks and rust resistant mounting frames. These ETC systems still work well quite well in cloudy or wet conditions. Because such mass-produced packaged ETC systems are made in huge numbers in low cost countries (usually China) and because they use little copper and use mostly glass and steel and stainless steel, they have a much lower manufacturing cost than FPC systems. These ETC systems are now very popular globally, accounting for 70% of world SWH systems. There are two main sub-divisions of ETC SWH technology: -
  - *Flooded ETC systems*. This technology is only directly applicable as a low-pressure system, and complete SWH systems are now available for \$500-\$700 in Vanuatu. These systems are applicable for organised bungalows and some mid-level resort-hotels, and they should have a 10-20 year life where there is reasonably 'soft' water – as where there is 'hard' water with dissolved minerals these minerals will be deposited on the inside of the tubes and hence performance will steadily drop over time.



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*A Name Brand Flooded Evacuated Tube Solar Water Heater (Tonga)*

- o *Heat pipe ETC systems* are becoming increasingly available. This technology is suitable for high-pressure hot water systems, and has tubes that are easily removable in case of cyclones. These heat pipe ETC systems are suitable for high mineral content water, and are available from \$900 in Vanuatu. Such heat pipe ETC systems would be the preferred SWH systems for most mid-level and high-level resort hotels in Vanuatu. In addition, heat pipe ETC systems are quite capable of reaching higher temperatures than FPC or flooded ETC systems, so heat pipe ETC systems are better for mid-level and high-level resort hotels with their own extensive laundry energy demands for clean sheets and towels every day and so forth. Heat pipe ETC SWH systems are the preferred technical SWH solution in the Pacific.

### 3.5 Solar PV systems

As previously mentioned in this section, solar PV technology is the most feasible renewable energy option to replace diesel generators as the primary source of off-grid electricity generation. Basic PV technology has been available in Port Vila and Santo for 20 years, is a proven technology in Vanuatu, and is well known to the public. There already exists a strong functioning supply and demand PV market in the country. Packaged PV systems solutions are now available with a selection of PV panels, batteries, inverters, and charge regulators to choose from across a variety of qualities, capacities and costs. Any proposed interference with this area of the market needs to be extremely careful not to undermine or bankrupt existing market participants. Other dangers would be that user incentives to balance costs could be weakened, and that relationships with suppliers could be damaged.

## 4. Indicative Costs of Rural Tourism RE Systems

Indicative costs for rural tourism RE systems are:

- \$500 - 1000 for ETC SWH modular units for each one to two tourist rooms.
- \$20,000 for six large PV panels, a 1.4kW output full sine wave inverter for AC power, four large gel/sealed batteries, a DC freezer, all with five-year warranties.
- \$6,500 for three large PV panels, four LED lights, two or three large gel/sealed batteries, a reasonable quality 300W inverter for intermittent AC power for DVD/ TV monitor, regulator(s), a 225 litre DC freezer, control board, all necessary wiring and conduit etc., all with one to five year warranties.
- \$850 for a 85W PV panel, four CFL/LED lights, one 100A-h 12V gel/sealed battery, a regulator, wiring for bungalow lighting, a basic 150 - 300W inverter for AC for mobile/phone/laptop charging and for a Wi-Fi router.
- \$250 for a small PV panel, three DC LED lights, a 6V gel/sealed battery, an integrated regulator and DC mobile/camera/laptop charger, plus a solar lantern each for 3 bungalow rooms.
- \$80 per bungalow facility for \$15 basic solar lanterns for three rooms, plus one \$35 mobile charging solar lantern unit for the restaurant.

Based on the study findings recommendations for renewable energy solutions for rural tourism operators are developed in the study recommendations section (Section V).



## IV. DESIGN CONSIDERATIONS FOR A PPP MODEL

The previous sections of the report have summarised the study findings with regarding to:

- Situation of rural tourism operators and rural tourism development needs (Section 2)
- Energy situation of rural tourism operators and their renewable energy needs (Section 3)
- Current Vanuatu energy and rural tourism and energy policy and regulatory frameworks (Section 1)

### 1. **Regulatory Requirements Regarding PPPs and Vanuatu Experience in PPPs**

Vanuatu has no experience with implementing a PPP model in terms that it is typically understood from PPP literature. The findings from the desk research and fieldwork, in particular the tourism survey, where the size of the rural tourism sector market (of rural tourism operators)<sup>28</sup> is counted in the hundreds of operators (and with generally limited financial capacity) the costs of the institutional, legal, and administrative overheads of a typical formal contractual PPP model would likely be out of all proportion with the benefits that could be provided.

This understanding has highlighted the need for this project to coordinate any outcomes of this project with existing rural energy programmes such as VERD in order to take advantage of the required government capacity building, and also to not burden the small Vanuatu economy and its low capacity government sector with further administration overheads and tasks. In other words, the inception phase stakeholder feedback suggests that developing a PPP model (or models) that are appropriate to, and feasible in, the Vanuatu context will be a key success factor.

In the widest sense of public-private participation, the VERD Programme is significant in Vanuatu as it represents a publicly-supported initiative (Government of Vanuatu and AusAid) with a clear focus on stimulating the

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<sup>28</sup> A key consideration for this program design is that the Vanuatu market is extremely small, 28,000 households, 3,000 institutions locations (eh schools, clinics), and that the rural tourism market is extremely small <300 operators.

private sector market (renewable energy suppliers market) to address the energy access challenge in the country. Prior to the VERD program, what was missing from the Vanuatu electrification landscape was a private sector participation project model – i.e. a model that focuses on incentivising/facilitating private markets to participate in the delivery of electrification services. Many emerging best practice rural electrification programs are targeted at stimulating/establishing private sector investment and involvement and address commercial risk/affordability issues through the use of subsidy payments and the development and provision of financing mechanisms. Such a project approach is an essential part of the required mix of electrification options in enabling effective wide scale electrification of rural tourism operators in Vanuatu.

## 2. Vanuatu Energy Policy and Regulatory Environment Review - Conclusions

The conclusions from the policy and regulatory review of Vanuatu's energy policy and regulatory environment can be summarised as follows:

- **Regulatory conclusions:** The regulatory conclusions are:
  - Vanuatu has a well-functioning independent, regulatory authority. The Electricity Supply Act has been deemed has having little or no implications for the study recommendations, given the scale and supply solutions envisioned for rural tourism.
  - Only a few pieces of legislation have a direct impact on rural electrification especially the Demand Driven Subsidized Vendor Sales (DDSVS) model described earlier.
  - Although Utilities Regulatory Authority Act (URA) has the power to set price and standards for rural electrification to date it has not done so to-date, and team contact with URA intends to have a light handed approach to regulating this sector given its limited resources.
  - The policy review work has confirmed the relevance of this study's focus and recommendations to key Vanuatu government policy declarations. From the policy initiatives and programmes reviewed, **the VERD programmes stands out as the key programme which must be taken fully into account by this study's work, in particular in terms of the study recommendations and design of a PPP Model, for a number of reasons:**
    - Reason 1: VERD programme aims are highly complementary with the focus of this study, and represents a comprehensive programme that encompasses many areas of action relevant to this study, including Electrification Funding Mechanisms. Accreditation of electrical system vendors, Consumer Protection

Standards, and an emphasis on skills enhancement through strategic local and national partnerships.

- Coherence with current institutional development plans, in particular the Rural Energy Unit vision within the newly Upgraded Department of Energy, institutional roles, and requisite staffing and resourcing.
- It key that this study avoids recommending stand-alone initiatives that do not integrate with existing initiatives, in particular give the often insufficient co-ordination between donors in the past and in particular due to limited capacity levels with the country.
- **PPPs experience in Vanuatu:** There has been no experience in Vanuatu in implementing PPPs in the classical sense of PPPs, and this, allied to the significant capacity levels demanded by conventional PPPs and the limited capacity levels in Vanuatu – raise serious doubts as to the appropriateness of any conventional PPP approach. However, the VERD programme does have an important private sector participation dimension that is also highly relevant to the outcomes ought this by the follow up to this study.

### 3. Energy Access Models and PPP

#### 3.1 Rural Electrification (Off-Grid) Models

There are three main service delivery mechanisms for delivering off-grid rural electrification: i) Government/Donor Implemented 'Give Away' Model; ii) Community Management Model, and iii) Private Sector Participation Model.

Rural electrification activities implemented to-date in Vanuatu have fallen under either the government/donor implementation model or the community management model. Past and current electrification activities in Vanuatu have primarily consisted of: i) Donor funded coconut oil generator systems; ii) Donor/Government funded solar home systems – one project incorporating monthly payment arrangements to fund required maintenance by Energy Unit staff ; iii) Donor funded wind turbine systems with community management model (new model funded by European Union); and iv) Donor funded scoping study for mini-hydro projects.

Background work done by the VERD program in Vanuatu and experience in international projects has demonstrated that government/donor 'give away' projects do not achieve sustainable outcomes due to a combination of factors including lack of on-going service and maintenance arrangements, lack of ownership and engagement from the communities and interference from politicians in project implementation. This has been the dominant model employed in Vanuatu and the failure rate for such projects has been high.

The community management model is one with merit and is likely to be the appropriate model for some rural electrification projects. This community management model is being trialled and implemented by the EU-funded projects, both with respect to its mini-grid copra generator projects and wind-turbine projects but with limited success to date. It is however important to also recognise the limitations of this model in Vanuatu. Such a model will not be appropriate in many communities – e.g. where social capital in the communities is low and/or where communities are divided. The successful development of such a model also often involves a high cost in training, organising and setting up an appropriate community management structure. Non-payment of electricity tariffs is also a difficult issue to overcome given the close kinship ties in many communities<sup>29</sup>.

### 3.2 Use of the Demand Driven Subsidised Vendor Sales Approach in Vanuatu

Following detailed analysis over the last two years by the VERD program of various approaches to off-grid electrification, the chosen option was a demand driven subsidised vendor sales approach. In essence this means the programme will provide subsidies for the purchase, by end users, of renewable energy equipment. The subsidy will also cover the vendor's costs of meeting after-sales service commitments. A key advantage of this approach is that it can meet demand in a flexible way, providing differentiated products based on user's own assessment of their requirements and ability to pay. This is essential given the broad range of tourism operators that the tourism typology uncovered.

A demand driven vendor sales approach provides consumers with the flexibility to purchase the size and type of equipment they require, rather than being prescribed by a utility supply company, or donated by a donor or Government. When investment choices are not made by the end user, often equipment provided does not meet or is excessive to their needs, which can reduce user commitment to the sustainable operation and maintenance of the system. Past Government projects have often used equipment directly imported from abroad due to the high costs of equipment in Vanuatu. However, a consequence is that users are often not able to source spare parts or access technical support for their system.

In view of the above, a demand vendor subsidised sales PPP approach is thought to be most appropriate, whereby the end user approaches a retailer and purchases a system of their choosing based on their own assessment of their requirement for electricity and ability to pay.

Sales of solar home systems are already taking place in Vanuatu through a number of established companies but the customer base is limited given the high

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<sup>29</sup> i.e. It is a problem for those responsible for tariff collection to pursue their family members for failing to make their payment.

cost of these products and poor customer awareness. Often installation, maintenance and after sales service are not included in the sale, with the end user taking responsibility for maintenance. Additionally, it is difficult for consumers to differentiate between high quality and low quality products, and to ensure they are purchasing the right system to meet their needs.

A program that aims takes advantage of the knowledge, skills and dynamics of the existing market but also helps over coming these above deficiency is the most likely to succeed in rural Vanuatu and is closely aligned to the market promotion objects of the BizClim programme.

Whilst the model offers some challenges, it arguably offers the only reasonable, scalable model for delivery of off-grid systems within the Vanuatu context including rural tourism operators. The model is flexible enough to respond to needs of users across Vanuatu, and not just a particular geographical area. The VERD program is specifically designed to overcome the disadvantages listed above of this approach. For example, sales of equipment can be coupled with significant training and education of companies, technicians and end users. Companies need to be trained to deliver high quality installations and to run effective businesses. Locally available technicians will be essential to ensure that cost of maintenance is affordable. Users need to be educated to take responsibility for daily operation and maintenance of their systems. Standards for equipment, technicians and after sales service could be put in place to guide customers to companies providing the best value for money.

#### 4. **Lessons Learnt from Past Rural Electrification Projects**

The study has also sought to briefly distil experience form previous and on-going rural energy access initiatives and projects in Vanuatu, with a view to ensuring that the study's recommendations take account of past mistakes and learning.

- **Financial design and financial sustainability challenges:** Projects have often failed due to dependence on donor funds and lack of provision for a transition to a more sustainable market oriented approach. Off grid community scale electricity generation projects need to be preceded by sufficient analysis to establish accurate load demand, willingness and ability to pay, and potential for growth in the future. If the generator capacity exceeds demand (which has been common), it results in inefficient operations and high cost to consumer and often non-payment by consumers.

Broadly speaking, fee for service arrangements in Vanuatu have not been very successful and many have achieved less than 50% of the expected payment collection. Fee for service customers tend to feel uncomfortable paying for something that they do not get to own, preferring to make a one off payment on individual electricity generating equipment. Another learning has been that providing solar home systems on a free or highly subsidized basis often reduces the user commitment to the sustainable use of the system. Users who lack a sense of ownership tend to mistreat batteries and

not to conduct the regular necessary maintenance. However, low affordability does needs be addressed if wide electrification is to be achieved.

- **Insufficiently robust implementation practices:** Many previous donor-driven electrification projects have relied on equipment directly imported from abroad as equipment purchased in Vanuatu tends to be costly. However, this has left users unable to source spare parts and unable to contact technicians with knowledge of particular systems. A number of systems installed by projects in the past have failed after a few months of operation due to poor installation. To ensure long term effectiveness of an energy system, installation should be reviewed by an external evaluator before any subsidy payment is made to the supplier. Although an external evaluation brings increased costs, it will save money in the long term.
- **Staff turnover:** In Vanuatu and other Pacific island states, turnover of technical personnel is high since technical services are in strong demand and technical training improves the trainee's chances for moving to a higher level job. This means that training for replacement personnel must be continuously available locally.
- **Equipment design problems:** Many problems have occurred with renewable energy systems following poor system design and equipment selection. Regulators, controllers, electrical wiring and appliances have all been incorrectly chosen for their use and components are regularly undersized or inappropriate for their purpose. Furthermore, the Pacific environment places additional demands on sustainable energy equipment, due to its high humidity, salty air, high ambient temperature and frequent heavy rains. The corrosive impact of UV and salt water has often been underestimated, rendering parts dysfunctional within a few years.

Batteries have also been an important source of system failure, due to poor maintenance and incorrect day to day use. Open cell batteries require regular attention by trained technicians to maintain water levels which has often been neglected and the water required to maintain electrolyte level in batteries needs to be distilled which has added an additional level of complexity. High quality, modern batteries with low maintenance requirement and long warranties will be essential for any project's long-term success.

- **Insufficient focus on operations and maintenance (including after-sales support):** A lack of provision for essential on-going maintenance has led to many dysfunctional systems, allowing small problems to write off whole systems. Poor maintenance has been exacerbated by low support from contracted service companies and in most cases the absence of a local technician. Projects have struggled to make routine maintenance replacements due to a lack of access to spare parts, often because the equipment was originally imported directly from abroad.

Anecdotal evidence suggests that a large number of solar home systems installed through donor funding in Vanuatu have failed due to the lack of on-going maintenance arrangements, lack of commitment and difficulties in

obtaining regular payments. Users of Solar Home Systems need to maintain strong links with local companies for on-going technical support and access to spare parts. Strong after-installation service is essential for system and project sustainability as poor system performance leads quickly to loss of confidence and collapse of market. Incentive arrangements should be put in place with suppliers to elicit sustained solar system service. Users have lacked the financial structures necessary to allow them to pay for maintenance assistance or spare parts when needed, and projects using a fee for service supply model have found considerable difficulties in obtaining regular payments. The importance of adequate maintenance and repair arrangements has been emphasised by a number of stakeholders, including the Department of Energy and the Vanuatu Permanent Representation to the EU.

- **Insufficient focus on consumer education and training:** Closely linked to the importance of adequate maintenance and operations service levels is **consumer education in proper operation and maintenance of installed equipment and related components**. In numerous cases for example, a lack of user training and information regarding correct operation of solar systems has significantly shortened battery life, which in many cases translates to system life as users do not know where to buy or cannot afford a new battery. This has been partially driven by a lack of commitment to the equipment by the user, when users have not purchased a system they may have low demand for its service and have low incentive to operate it and maintain it.
- **Political interference:** Political interference in the management and implementation of a renewable energy access project can also mitigate against success. For example, in sometimes. Additionally, in respect of solar home systems project (e.g. the JICA solar home system project), political intervention in the JICA solar home system project has in the past impeded efforts by the Department of Energy to repossess solar home systems from those who had defaulted on payments.
- **Land management difficulties:** Customary tradition can mean that many difficulties can arise regarding land use, land access (or crossing), and land management in sustainable energy access projects, depending on the type of project. This was one of the challenges that arose in the EU-funded Port Olry project, where the Electricity Committee set up to operate and manage the plant had to deal with some land dispute and capacity issues which eventually resulted in the involvement of the community's Catholic Church in resolving the dispute and managing the system.
- **Lack of sustainable financing path:** Projects most often fail because of dependence on donor funds and the lack of provision for transition to a more sustainable market oriented approach or sustainable support structure. With this in mind, it is important to strive for tariff collection that is sufficient to cover at least operations and maintenance, and to provide sufficient funds for sustainable equipment replacement.

- **Over/Sole focus on technical issues:** Projects implemented primarily in a technical manner do not work and equal attention must be given to financial, institutional and social aspects in designing and implementing a project.
- **Need to focus on wider tourism needs:** Rural electrification alone is insufficient to spur tourism development. Electrification must take place in the context of a larger development strategy. Providing an electricity supply will only make a significant contribution to sustainable rural tourism development when other necessary conditions are present – access to health, education, reliable water supplies, security of land tenure, adequate dwellings and access to markets, transport and communication infrastructure and targeted marketing and promotion.
- **Local participation and co-ownership:** Participation of local communities is key to project success and project should require some financial contribution for service received to ensure ownership and buy-in – donated system projects often fail. Projects should, at minimum, engage communities in assessing the level of demand, educating consumers in advance, encouraging them to sign up for supply and promoting efficient use of electricity.
- Monitoring and associated support is critical to ensure that problems related to a project's sustainability are identified and acted upon. The project should not leave communities stranded at activity completion.
- **Promoted increased energy efficiency:** Demand side management and energy efficiency activities should be explicitly integrated with efforts to expand access to power. Given Vanuatu's high electricity prices, there is strong potential for energy efficiency to reduce electricity costs, as well as reduce Vanuatu's reliance on diesel imports.
- Other key lessons from rural electrification and rural energy access experience, both in Vanuatu and beyond, include the need for strong government commitment, local ownership, strong management arrangements,
- **Learning regarding Solar home or small business systems:** Specifically in respect of solar home or small business systems, some of the key lessons learnt are: i) strong after-installation service, including consumer education in proper maintenance and operating procedures is essential for system and project sustainability<sup>30</sup>; ii) sufficient scale is necessary to establish commercial sustainability of solar system sales and services; iii) importance of providing consumer choice and to ensure pricing reflects costs; iv) solar systems installed in public facilities in rural areas without strong linkages with local

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<sup>30</sup> This is important as poor system performance leads quickly to loss of confidence and collapse of market. Incentive arrangements should be geared to eliciting sustained solar system services in the communities.



market based capacities and cost levels for follow-up maintenance, technical and commercial services have poor sustainability track records; and v) household solar home systems made available on a free or highly subsidized basis has a poor track record for sustainability.

Rural tourism in Vanuatu is a relatively small and geographically concentrated sector. The remoteness and expense of operating in rural Vanuatu in combination with issues of low literacy, multiple languages, low education levels, poor transport, limited communications, lack of clarity regarding land ownership, and frequent natural disasters all mean any business operation inevitably encounters significant and hard-to-control risks.

## 5. Good Practice Examples

Despite multiple donor programmes over many years, rural electrification remains very limited. With the issues as described above, many systems have had very short functioning lives, generally due to poor maintenance and training. More positively, current donor programmes such as Lighting Vanuatu, VERD, and the ADB-GEF PEEP program have incorporated these lessons in their designs, and have made developing government capacity a key component.

For example, strengths of the VERD approach are how it seeks to combine building the technical and business capacity of rural based people, and partnering them with private sector companies. The cost of travel in Vanuatu is high and population density is low which makes the cost of servicing equipment using centrally based technicians prohibitive. For maintenance and repairs to be cost effective and sustainable, a strategy to decentralise these services is required. The VERD training component focuses on providing training, equipment and curriculum for the Rural Training Centres (RTCs) to enable them to train students to have basic repair and maintenance skills. It is also anticipated that the RTC teachers and their graduate students will be contracted by the private sector to provide maintenance services.

With 30 RTCs across Vanuatu, these institutions will be able, with the right support, to reach the majority of communities in Vanuatu. The VERD program will play a key role in supporting rural technicians to get accredited, and link them with private sector companies to carry out maintenance and repair services. The program may also need to provide funding support to the RTC's or technicians to equip them with necessary tools and stock of small parts (e.g. energy efficient lights, wires, fuse).

Another successful project which has avoided past mistakes is the **Lighting Vanuatu** initiative, an AusAID-funded Department of Energy Project with the objective of the removal of the barriers for a rapid transition from kerosene based lighting to solar charged LED lighting in Vanuatu. The wide dissemination

of pico-solar products under this project has the potential to provide the vast majority of rural households in Vanuatu with access to off-grid basic electric lighting which is affordable, safe, and reliable<sup>31</sup>.

The project provided funding to assist local NGO's, ACTIV and VANREPA to achieve wide scale distribution of pico-solar products, particularly in the rural areas of Vanuatu. The funding for this project allowed facilitating bulk procurement of project approved pico-solar products, together with project development and management expenses including project personnel, marketing costs, battery disposal facilities, monitoring and evaluation costs. By providing funding support to ACTIV and VANREPA, the project overcame the identified barrier relating to the 'commercial risks of scale-up'. Given the relatively low cost of these products, many consumers are already able to purchase the products on a commercial basis. The project improved the affordability of these products through lower unit purchase costs via bulk procurement of products by ACTIV and VANREPA and by obtaining duty and VAT exemptions. The project has to-date succeeded in building a sustainable and commercially viable pico-solar industry and has supplied over 30,000 pico-solar lights throughout the country.

## 6. Taking into Account the Barriers to Rural Tourism Operators Take-up of RE Solutions

It is important to understand the reasons behind the relatively low penetration of renewable energy solutions among rural tourism operators, in particular in tourism bungalows (both organised and semi-organised) – i.e. outside of the luxury resort hotels and to a lesser extent the mid-level hotels.

For example, regarding solar home lighting systems, the barriers to accessing such systems for small tourism operators in Vanuatu are unique and do not fit the common model where sustainable access is constrained by limited beneficiary incomes. Analysis carried out by the Vanuatu Energy for Rural Development (VERD) programme for example showed that barriers to access appear to exist for three primary reasons:

- **Willingness and ability to pay:** Many small tourism businesses in Vanuatu (especially those in rural communities) have very low occupancy rates, limited and intermittent cash incomes despite having total incomes

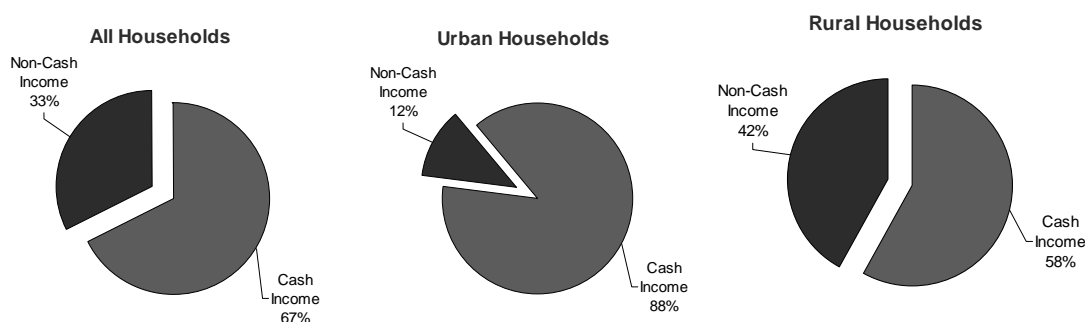
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<sup>31</sup> The project's objectives were to a) distribute a minimum of 24,000 pico-solar products to households in Vanuatu. Particular attention is to be made to distribute these products to rural households; b) raise awareness of pico-solar products by households in Vanuatu; c) establish and expand a network of distribution/sale channels to enable the sustainable distribution and sale of products across Vanuatu's rural communities; and d) build a domestic "pico-solar" industry which is commercially viable and sustainable.

which are above poverty thresholds. This is a key issue to consider in the design of an effective PPP model, and also underlines the point made in other parts of this report that addressing sustainable energy needs of rural tourism is only one part of an effective response.

Many Ni-Vanuatu households derive significant proportions of their income from non-cash sources that is significant income comes from subsistence agricultural production. This is especially true in Vanuatu's rural communities. Whilst these households may not classify as poor, they do have very limited access to cash. Vanuatu's 2006 Household Income and Expenditure survey estimated that the average household monthly income in rural communities was approximately VT 53,500. Current prices of solar home systems available in the market would constitute somewhere between 25% and 84% of average total rural household monthly incomes and 44% to 148% of average cash rural household monthly incomes. Give the small size of many rural tourism operators their incomes are likely to be similar to the typical household.

*Proportion of Aggregate Household Income from Cash and Non-Cash Sources<sup>32</sup>*



Vanuatu's Diagnostic Trade Integration Study (DTIS) notes that rural household cash incomes vary considerably over time due to irregular (i.e. 'lumpy') sales of agricultural commodities at volatile prices. In addition, the DTIS suggests that rural agricultural producers tend to focus less on cash crop production (in favour of subsistence) once they have met a specified income target. Often, this target corresponds to school fees or other basic expenditures.<sup>33</sup>

- **Logistical barriers:** Supply chains and distribution networks for renewable energy systems are underdeveloped and currently inefficient. This creates logistical barriers to importing and distributing systems to

<sup>32</sup> Vanuatu National Statistics Office – Household Income and Expenditure Survey 2006

<sup>33</sup> Gay, Daniel (editor) "Vanuatu Diagnostic Trade Integration Study," Department of Trade, Industry and Investment, 2008.

potential customers, while the distribution challenge increases with regard to all areas outside of Port Vila, and in particular on the outer islands.

- **Vendor cash and working capital constraints:** Local renewable energy system vendors are small and medium-sized enterprises. Costs of doing business in Vanuatu are high and continuously place strains on vendor liquidity. The cash requirements to fund working capital investments have previously inhibited vendors from fully serving the market for solar lighting products.

## 7. Fostering a clear Private Sector Dimension

This BizClim study's Terms of Reference provides of course a clear private sector development dimension through the study objective of identifying a PPP model for the provision of increased energy access for rural tourism in Vanuatu.

As part of the study research and work programme remit therefore, the study team has looked at how the private sector can be involved in a PPP model.

One of the reasons why the VERD initiative has received significant attention from this study's focus is its encouraging focus on fostering the development of the local renewable energy equipment supplier sector. All projects under the VERD will be supplied by local companies using local technicians, which will help build efficient supply chains and a critical mass of similar equipment to assist the development of local operation and maintenance skills and improve access to spare parts.

The VERD programme not only helps foster the development of the local private RE equipment supply sector, but aims at addressing the potential shortfalls of this approach, particularly through provision of: a) Cost Effective Maintenance (supporting RE vendors to establish a network of technicians, improve user training, provide after sales service guarantees, honour equipment warranties, and maintenance contracts for institutions); and b) Quality Assurance in RE supply (implementing vendor accreditation and system standards),

This approach plays a facilitating role, while letting the free market operate meeting the BizClim aims of fostering a business-enabling environment with emphasis on promoting environments within which the private sector can grow. In this instance the growth of rural tourism and the Vanuatu renewable energy supply sector. While the VERD program sets technical specifications and warranty and service requirements, the companies are free to set price and adopt their own marketing strategies in a competitive market. Project support such a public-private partnership includes training and capacity building of vendors, system installation technicians and system operators. With linkages built with micro-finance institutions which provide loans to systems supplied by pre-qualified and quality controlled companies.

## V. RECOMMENDATIONS FOR A PPP MODEL

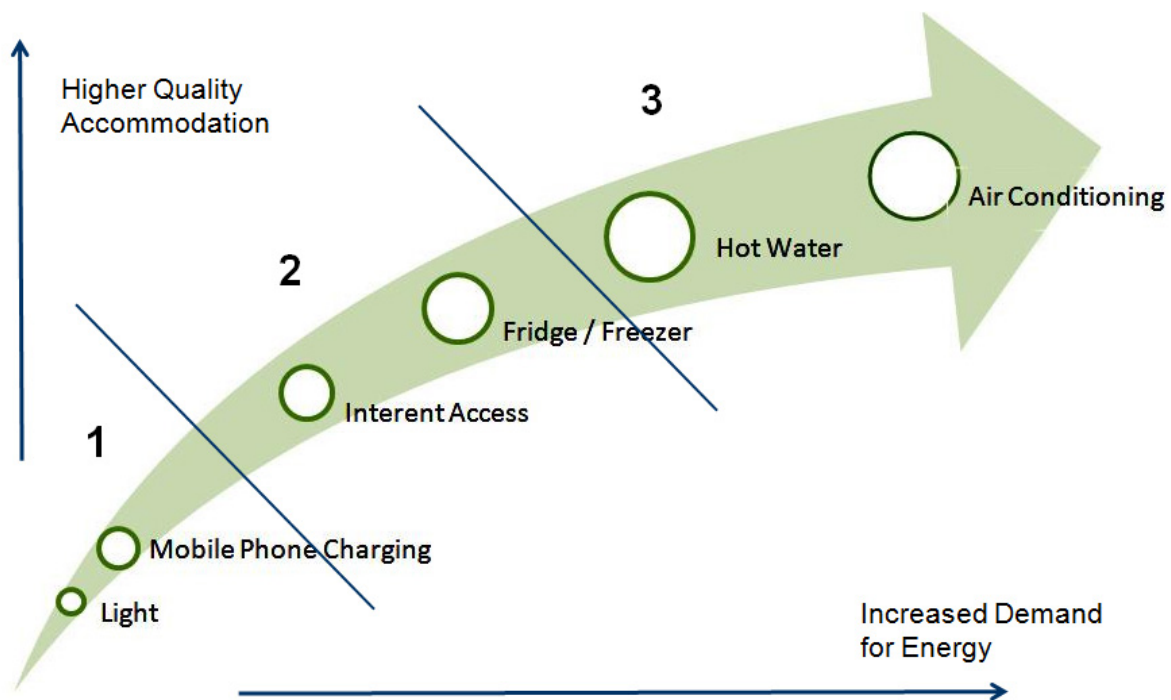
### 1. Principles and Assumptions underlying the Recommendations

The recommendations below are made given these key factors:

- Capacity is limited in government and tourism sectors thus any recommendations has attempted to integrate with existing institutions, policy and programs with no new delivery mechanism proposed. The recommendations have been kept simple with the focus on expanding projects that are already working.
- Rural cash incomes and especially island bungalow incomes are low and volatile thus subsidies are required.
- Renewable Energy is not the biggest barrier to Rural Tourism. The rural tourism sector is small but has potential thus factors beyond renewable energy are critical and need to be supported in any program.
- Rural Tourism is a very broad category in terms of sophistication, revenue, level of development and geographic location. Thus a demand driven model based on individual operator needs is critical.

Given the broach range and geography of tourism operators the recommendations below break the spectrum of tourism operator type and energy use into three categories, as well as a fourth component dedicated to rural tourism development and support:

1. PPP Component 1 - Lighting and phone charging renewable energy access services for Low-End (Unorganised) Bungalows
2. PPP Component 2 – Renewable Energy Access for Organised Bungalows and Higher End Resorts (Full Range of Energy Uses)
3. PPP Component 3 –SWH Hot Water (All Rural Tourism Operators)
4. PPP Component 4 - Rural Tourism Development Support Programme



As shown in the diagram above, as accommodation quality increases energy demand also increases. However, providing access to modern energy is not on its own sufficient to move an operator up the quality curve. However, provision of energy access also needs to be supplemented with training, marketing and other services such as adequate infrastructure to advance along the curve.

## 2. Recommended Rural Tourism PPP Models for Vanuatu

Based on the wider analysis above and the significant field visit programme of rural tourism operators, and in light of the renewable energy situation and options analyses, and informed by the results of the government, renewable energy and tourism industries' capacities, the following three PPP renewable energy for rural tourism in Vanuatu assistance packages are proposed, along with a fourth rural tourism support component:

### 2.1 PPP Component 1 - Lighting and Phone Charging Renewable Energy Access for Low-End Bungalows

This package is aimed at the large number of low-end (un-organised and semi-organised) bungalows with low and volatile incomes. The aim is to provide cheap lighting and mobile phone charging solutions using the recent successful approach of the *Lighting Vanuatu Project*. The recommended PPP model would provide funding to allow local suppliers to import equipment in bulk and then assist in marketing. This represents a simple low overhead approach with proven

local success, and has another important advantage in that does not impose unnecessary demands on local organisations.

- **Target Rural Tourism Market:** Based on data from data from the Tourism Office and the telephone survey approximately 200 bungalows exist in Vanuatu. Based on the results of the study telephone survey these operators have low and volatile incomes, have communication problems, offer a low standard accommodation, and rely on relatively expensive forms of lighting such as kerosene or small generators.
- **RE Product Offer:** The most important needs in terms of energy usage is lighting and phone charging which can be supplied by simple integrated units requiring no specialist installation and very minimal training to use. Based on the study field visit findings, we would recommend:
  - \$80 per bungalow facility for \$15 basic solar lanterns for each of 3 rooms, plus one \$35 mobile phone charging solar lantern unit pre bungalow facility.
  - \$250 for PV panel, three DC LED (Light emitting Diode) lights, a 6V gel/sealed battery, an integrated regulator and DC mobile/camera/laptop charger, and 3 solar lanterns per bungalow facility.
- **RE Suppliers:** As with the recent successful Lighting Vanuatu program local renewable energy suppliers and local NGO's would be assisted to import these products.
- **Public Subsidy and financing aspects:** Under this component rural tourism bungalow owners would pay for at least part of the solar lantern/basic system costs, in order to filter out the very low occupancy bungalow operations and to help facilitate the development of a proper commercial renewable energy supply and purchase/ownership by the bungalows and to maximize the chances for sustainability.
- **Implementation Modalities:** The Lighting Vanuatu model can be expanded to include lighting and phone charging products suitable for low end bungalows. Assistance is given to import and market the products and they are sold at close to commercial rates to the end users. Additional marketing assistance will be required that with the aid of the Tourism Department would target these operators. This project is simple with low overheads and minimal demands on limited government capacity.
- **Management:** As per the Lighting Vanuatu programme, we recommend that this PPP component would be managed by the Department of Energy of the Government of Vanuatu, with input from the Department of Tourism.
- **Estimated budget:** Based on the above component scope, we would estimate the indicative budget to be approximately \$100,000.

## 2.2 PPP Component 2 – Renewable Energy Access for Organised Bungalows and Higher End Resorts (Full Range of Energy Uses)

### Introduction

This component would cover the broad range of tourism operators given its demand driven approach. This approach would incorporate a tourism component into the existing VERD program with assistance of the department of Tourism accreditation program, as the VERD programme also has the support mechanism required for more complex renewable installations.

This project plans to leverage off the extensive work done by the VERD program and provide an arm of that program to supply rural tourism. It is a demand driven subsidized vendor sales approach that can cover a broad range of operators and technologies. The VERD program is also the essential support structures for these more complex systems.

- **Target Rural Tourism Market:** Based on data from data from the Tourism Office and the telephone survey approximately 60 rural tourism operators fall into this category organised bungalows, including bungalows already informally accredited or those likely to be shortly. This is a very broad category of operators from simple one or two room bungalows to five star resorts. They have a broadly different and a complex range of energy needs. The demand driven nature of the programme allows this broad range of operators to be grouped together.
- **Public Subsidy and financing aspects:** Under this component rural tourism operators would pay for at least part of systems installed costs. This would help ensure proper commercial renewable energy system relationships and prioritisation of key features with system suppliers and installers. This part payment would also help ensure strong renewable energy system ownership and a strong focus on the system's on-going sustainability. Secondly, we recommend a 20% additional funding for project management, awareness, training, accreditation, technical standards, establishing & policing extended warranties, etc.
- **RE Product Offer:** Again, there is a broad range of potential technology solutions that are suitable. Based on the study research and field findings, applicable indicative electrification systems would be the following:
  - \$20,000 for six large PV panels, a 1.4kW sine-wave inverter, four large sealed long life gel batteries, a 225 litre top quality freezer, all with full 5 year warranties.
  - \$6,500 for three large PV panels, a 225 litre good quality DC freezer, four LED lights, three large long life gel/sealed batteries, good 150-300W inverter for intermittent AC power, regulator(s), control board, wiring and conduit, etc.



- \$850 for one medium sized PV panel, three or four CFL/LEDs lights, one large long life gel/sealed battery, a regulator, wiring for bungalows' lighting, and a basic 150 - 300W inverter for AC for mobile/phone/laptop charging and to power a Wi-Fi router for wireless Wi-Fi for guests.
- **Suppliers:** Existing Vanuatu based renewable energy suppliers that will be accredited by the VERD programme.
- **Implementation Modalities:** As mentioned above, it is recommended that this PPP Component would leverage the extensive work done by the VERD programme and provide an arm of that program to supply rural tourism. It is a demand driven subsidized vendor sales approach that can cover a broad range of operators and technologies. The VERD program is also the essential support structures for these more complex systems. It is proposed that a new arm of the VERD would be focussed on supplying rural tourism with the assistance of the Department of Tourism to target accredited tourism operators. Accredited bungalows would qualify for higher renewable energy subsidies.
- **Management:** As in the case of component 1, this component would be managed by the Department of Energy with input from the Department of Tourism.
- **Estimated budget:** Based on the above component scope, we would estimate the indicative budget to be approximately \$300,000.

### 2.3 PPP Component 3 –SWH Hot Water (All Rural Tourism Operators)

#### Introduction

This component would be focussed on providing rural tourism operators with a Solar Hot Water subsidy, using the existing Asian Development Bank GEF PEEP programme (Global Environment Facility 'Promotion of Energy Efficiency in the Pacific' project) as an implementation vehicle. The GEF PEEP project is currently being implemented in Vanuatu and includes solar hot water as a component but currently only provides technical assistance. Under this Component, we recommend expansion of this component to include provision of solar hot water subsidies along the lines of the VERD program. This component would also cover the broad range of tourism operators given its demand driven approach.

- **Target Rural Tourism Market:** Based on the study work we would assume 1,000 tourist rooms as the indicative target market size. SWH are equally as applicable to both rural and urban tourism as in both cases they replace LPG.
- **Public Subsidy and financing aspects:** Under this component rural tourism operators would pay for at least part (our recommendation is 50% end-user

financing) of systems installed costs, in order to ensure proper commercial SWH supply arrangements and a suitable SWH system sense of ownership for on-going SWH system sustainability. (Given that the heat pipe ETC market has not yet developed in Vanuatu, any PPP scheme can offer a reasonable (say 50%) capital cost subsidy without significantly distorting the SWH market in Vanuatu). Secondly, as with Component 2 above, we recommend a 20% additional funding for project management, awareness, training, accreditation, technical standards, extended warranties etc.

- **RE Product Offer:** SWH costs is assumed at \$500 (for basic flooded ETC systems) and \$1000 for the recommended heat pipe ETC SWH modular units for each one to two tourist rooms, comprising a mix of flooded ETC and heat pipe TEC systems depending on user needs and willingness to pay their (say 50%) share of the cost. Currently, SWH sales are very limited as traditional flat plate collectors are expensive, some flooded ETC systems are available, no heat pipe ETC systems have been sold yet but these are the best SWH technical option.
- **Suppliers:** The supplier base would need to be built as the heat pipe ETC market is not yet established. However, the scheme could easily arrange to use the same vendor roster and accreditation as the VERD scheme.
- **Implementation Modalities:** As mentioned above, it is recommended that this PPP Component would leverage the ADB-GEF PEEP-2<sup>34</sup> project as a delivery vehicle, as it already includes a suitable SWH TA (Technical Assistance) component but it lacks significant SWH hardware funding support to achieve its full potential impact. Thus, there would be a benefits on both sides, for the Bizclim-sponsored model by securing an existing implementation vehicle and not having to develop a greenfield implementation capacity, and for the ADB-GEF PEPP2 project by benefitting from an a wider service offering that would make for increased impact. Should this implementation option not prove possible, a second option would be to house this component under the VERD arm proposed under Component 1 above.
- **Management:** As in the case of component 1, this component would be managed by the Department of Energy with input from the Department of Tourism.
- **Estimated budget:** Based on the above component scope, we would estimate the indicative budget to be approximately \$300,000.

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<sup>34</sup> The Asian Development Bank (ADB) run Global Environmental Facility (GEF) co-funded Promoting Energy Efficiency in the Pacific Phase 2 (PEEP-2) project that is now underway in Vanuatu for four years

The diagram below provides a summary of the recommended 3 Rural Tourism Renewable Energy Access Components recommended under the proposed PPP model.

*Overview 3 Component Rural Tourism Renewable Energy Access Models*

	Low End Bungalows	Accredited bungalows to 5 Star Resorts	Accredited bungalows to 5 Star Resorts
Beneficiaries	200	70	40
Product	Solar Lighting and Phone Charging	Solar Home System with Fridge	Solar Hot Water
Suppliers	VANREPA, Youth Challenge	Local RE Suppliers	Local RE Suppliers / Hardware Stores
Program	Lighting Vanuatu	VERD	ADB-GEF PEEP
Management	Dept of Energy / Dept of Tourism	Dept of Energy / Dept of Tourism	Dept of Energy / Dept of Tourism
Est. Cost *	Vt 10 million	Vt 30 million	Vt 30 million
Suggested Donors	AusAID, EU, Others	AusAID, EU, Others	EU, others

2.4 PPP Component 4 - Complementary Tourism Development Programme

**Introduction**

This component would be focussed on addressing some of the rural tourism development challenges identified by the study, which is necessary in order to ensure the sustainability and optimal impact of Components 1-3 above.

- **Target Rural Tourism Market:** The primary focus of the rural tourism support programme would be rural tourism operators in unorganised and semi-organised bungalows, as well as rural citizens (in particular women) interested in developing a rural tourism activity. Depending on the scale of the programme launched, there could also be a phased implementation covering progressively different geographical regions and/or different types of rural tourism operators.
- **Public Subsidy and financing aspects:** The tourism support programme proposed would be a donor-funded technical assistance and services support

programme. However, as part of the detailed programme design and formulation, a small-scale capital subsidy component could be considered – for example providing a matching public subsidy to match an own contribution (in cash and/or in kind) from rural tourism operators to upgrade their bungalow's attractiveness and tourism offer.

- **Tourism Support Programme Services:** Services and support that could be considered under this component could include:
  - a. **Common (central) group support/services to rural tourism operators,** such as enhanced online presence to increase exposure to would be visitors and reservation support and online reservation/booking support<sup>35</sup>. A key objective of such services would be to increase the visibility of tourism bungalows with a view to increasing occupancy rates.
  - b. **Individual support to rural tourism operators:** This could include a wide variety of support measures including i) onsite audit of bungalow with recommendations for improving the tourist/visitor offer and experience; ii) support for bungalows to upgrade their rural tourism offer (e.g. developing an action list of steps and improvements); iii) accreditation of bungalows that meet required standards; iv) possibly offering small subsidies to incentivise rural tourism operators; v) bungalow visits to well-run facilities to provide hands-on demonstration of required standards etc. etc.
- **Implementation Modalities:** The rural tourism support programme would be implemented by the Department of Tourism. It should be emphasised that all of the above examples of potential actions are recommended in part with the view of increasing occupancy rates and improving cash income regularity of RT operators – which will increase their capacity to take-up support from the renewable energy access solutions under Components 1-3 above. Secondly, it is important to note that some of the above actions are already being implemented by the Department of Tourism in some locations – for example in Malekula, the AusAid-supported TVET programme has been providing support to rural tourism operators, as mentioned earlier in the report. This support has included training and accreditation for bungalows, as well as creating a central booking office and providing reservation, phone and web support, and has been considered to have proved successful to-date. Other highly relevant initiatives being carried out by the Department of Tourism include the development of bungalow accreditation guidelines.
- **Management:** This component would be managed by the Department of Tourism, with co-ordination structures with the Department of Energy put in place.

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<sup>35</sup> Other possible support services could include support in developing websites using standard templates to reduce costs.

- **Estimated budget:** The budget requirement would depend on a number of variables, including the final range of services agreed, whether the programme would provide small investment grants, the amount of technical assistance support, delivery mechanism, and the scale of geographical coverage. In order to provide some working guideline for Bizclim and donors we would tentatively put the budget requirement at between EUR 0.5 million and EUR 1 million.
- **Benefits and Synergies:** Benefits of this Component its addressing some of the rural tourism development challenges identified by the study, as well as providing greater implementation resources for the Department of Tourism to pursue its policy objectives, as set out in respective strategy documents for the respective provinces, where lack of funding for each provincial tourism effort is a key constraint. There would be **strong synergies with Components 1-3**, in particular in that this additional rural tourism support axe would increase the attractiveness of the renewable energy solutions under Components 1-3, as well as increases in performance and quality at rural tourism bungalows would lead to increased revenue inflow and hence increased capacity to co-finance renewable energy solutions available under Components 1-3. Not only would this lead increased private sector development in the form of a more vibrant rural tourism sector, but it would in turn would have a positive impact on developing also the renewable energy equipment supplier industry in Vanuatu by increasing both demand per rural tourism operator and by increasing the market in general.

### 3. Other Rural Tourism Development Recommendations

Two other recommendations are made outside of the core PPP model proposed above:

- a. It is also recommended that the Department of Tourism dialogues as a matter of priority with the relevant line Ministries to address other key constraints to rural tourism development. These constraints, as mentioned earlier, include in particular infrastructure and communications development needs, in particular improving the main roads in the outer islands. Regarding communications, the Department should seek to work to secured an upgrading in connectivity to wireless services in Vanuatu (phone and Wi-Fi), and in particular extension of coverage to coastal areas on the islands. With a large number of Ni-Vanuatu rural tourism operating close to beaches on the coast, this would increase the attractiveness to tourists of staying in more remote locations for longer.
- b. A medium-to-long term recommendation would be to consider development and implementation of a complete eco lodge facility in a pilot area (e.g. in a marine conservation area, targeting high-end EU tourism. This recommendation is made outside of the main recommendations and not covered by Component 4 above. This business plan should be directed toward the key EU tour operators already involved in New Caledonia, so that their

expertise and most importantly clientele can be added to Vanuatu tourism. Such a marine conservation area would provide a good example of a public/private partnership, with public donors being provided in the form of EC donors and EIB (European Investment Bank) loans, and strong private sector involvement from foreign entrepreneurs, EU tour operators, local owners and the local community.

The main project components would be: i) increasing energy access; ii) developing a wharf; iii) developing a seaplane airstrip; iv) establishing good mobile coverage; and v) providing technical assistance. The main business related objective of this project would be the establishment of a higher level of tourism from within the European Union, Australia and New Zealand. The **public component** of this action would include increasing access to energy, developing a wharf, local NGOs (Non-Governmental Organisations) providing technical assistance, and authorisations and permissions. The **private component** would include developing the airstrip and helipad, establishing bungalows and resort services, providing 25-40 horses and more vehicles, providing on-site job training, and general organisation of the project. The tourism activities created by this project would include scuba diving and snorkelling, horse excursions, bush walking, and nature immersions guided by biologists. The marketing and management of the project would be a joint venture between local and EU tour operators, while a public participation approach will be used to negotiate with the local community and families.

#### 4. Advantages and Benefits of the Proposed PPP Model

We believe the above recommended PPP model and its constituent components offer significant advantages for Vanuatu and meet some of the key criteria identified during the study research and field work programmes:

- a. The recommended approach emphasises **appropriate energy technology** (cost effective both in terms of implementation and on-going operations, aligned with Government priorities and use of indigenous resources in order to reduce country's reliance on imported diesel).
- b. The approach avoids mistakes made in some previous energy access initiatives and focusses on **providing the right incentives for private companies to participate in the delivery of energy access for rural electrification** – to ensure the commercial sustainability of a project approach.
- c. **Strong focus on adequate maintenance and repair and general post-installation support:** The PPP model design and implementation recommendations focus not just on implementing the project but in ensuring service and maintenance arrangements and appropriate monitoring mechanisms are in place and work effectively post installation of energy systems.
- d. **Scalability:** To deliver a project design that is scalable and replicable.

- e. Provide a PPP approach that is not overly complex, and takes account of the capacity levels in the public sector and private sector.
- f. **Addresses wider development needs of tourism:** Addresses not just the provision of a rural energy solutions for rural tourism stakeholders, but also takes into account the wider challenges and needs of rural tourism in Vanuatu. This is an important factor in enhancing long-term sustainability prospects – for example the provision of practical support and TA to provide rural tourism operators with support to develop and improve their tourism offer will also lead to increased local tourism revenue inflows (and hence their capacity to pay) - and increase the potential market for RE solutions proposed under the above PPP Model Components.
- g. **Support of key stakeholders:** Support from key government and private stakeholders is crucial in any PPP initiative. The study validation workshop allowed the study team to present the study findings and above recommendations, which received strong backing from key stakeholders.
- h. **Subsidised demand-driven vendor sales PPP model:** As seen from the previous sections, a public subsidy will be required in order to address key barriers such as the low capacity to pay and of many rural tourism operators<sup>36</sup>. From the previous analysis, we recommend a subsidised demand-driven vendor sales model as used by the VERD initiative. This model has a number of key advantages, including allowing for a **flexible model that is demand driven** (as opposed to pushing renewable energy equipment regardless of beneficiary/end-user interest and commitment) and one that ii) **provides increased market opportunities** for local Vanuatu private sector RE equipment vendors, thereby ensuring a sustainable private sector participation in the model. As per the VERD model, the recommended PPP model will provide (public) subsidies for the purchase of renewable energy equipment target by end users (rural tourism operators). The subsidy will also cover the vendor's costs of meeting after-sales service commitments. Under the program, support will only be provided to accredited supply renewable energy companies and accredited tourism operators.
- i. **Strong and added-value public dimension to the PPP model:** In the recommended approach above, the public participation occurs on several levels, setting standards, accreditation of vendors, monitoring warranties, training, public awareness, and importantly a direct financial contribution through the subsidy. All previous off-grid Government projects in Vanuatu have utilised subsidies in implementing their projects (often 100% capital subsidy). Similarly, many vendor sales programs implemented in developing countries have also utilised direct subsidies to help facilitate wide-spread

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<sup>36</sup> This local capacity includes both limited access to cash and often irregular and unpredictable cash income. Over the longer term, improvement in infrastructure services, improved competition and market penetration could drive prices down. More affordable systems and effective credit mechanisms could reduce the need for subsidies in the long term.

dissemination of PV systems. Given the high costs of systems in Vanuatu and low income earnings of the rural population and many rural tourism operators, it is clear that direct subsidies will need to be used to address the critical barrier of affordability in facilitating the accelerated uptake of renewable energy. Subsidies are justified on social equity grounds; that is, the need for rural households to achieve a level of parity with households in areas that benefit from subsidised grid extension infrastructure costs and lifeline tariffs.

- j. PPP model promotes the involvement of two private sector groups:** The recommended PPP model would support and benefit two private sector groups - rural tourism operators *and* renewable energy suppliers.
- k. RE Supplier Assessment and Quality Control:** Under the model, RE equipment suppliers will be assessed under a number of quality and performance parameters, as in the VERD programme:
  - Use of quality products that meet required technical standards (this is a particularly important issue that was raised during the validation workshop).
  - Use of accredited technicians to install systems
  - Demonstrated capacity to provide user training and after-sales service, honour warranties and to provide access to skilled advice and spare parts,
  - Presentation of a viable business plan for expanding sales and service,
  - Agreement to abide by a code of norms.
- l. Technology Choice:** The study analysis has recognised that the electricity needs of tourism users in Vanuatu are diverse, and that the program must facilitate the provision of a range of system sizes able to meet the particular needs of individual users. This is particularly true of rural tourism operations that can range from single room bungalows with only a kerosene lamp to large resorts with sophisticated diesel generation and large hot water requirements. All options for the provision of electricity (and for hot water and cooking) will therefore be considered against the overriding principle of using the safest, most reliable, most affordable technology for a given context. The support mechanism is flexible enough to allow vendors to gain approval for other technology systems and packages should the demand arise. Small hydro or wind systems for example may be considered but must compete on the basis of the overriding principle. An inherent advantage of this approach is that the technology solutions are not prescribed by the government or donors.
- m. Flexibility:** The proposed model is also flexible enough to respond to needs of users across Vanuatu, and not just a particular geographical area. Furthermore, RE equipment sales can be coupled with significant training and education of companies, technicians and end users, leading to enhanced local skills levels and increasing sustainability prospects. A demand driven subsidised vendor sales appears to be the only viable PPP option, given the current political context, limited institutional capacity, high costs of systems



and maintenance, and users' limited ability and willingness to pay and modest power demand of many bungalows. The model proposed help strengthen an existing functional renewable energy private sector and takes advantage of exiting implementation systems. It has the flexibility of not being geographically constrained and being able to meet the specific energy needs of each user.

- n. The existing VERD program and Department of Tourism work also aims at addressing the potential shortfalls of this approach, particularly:
- Cost Effective Maintenance – Support Vendors to establish network of technicians, improve user training, provide after sales service guarantees, honour equipment warranties, and maintenance contracts for institutions; and
  - Quality Assurance in Renewable Energy Supply– Implement vendor accreditation and system standards,
  - Quality Assurance in Tourism Supply – TVEET based training and implementation of an accommodation accreditation system.

This approach plays a facilitating role, while letting the free market operate meeting the BizClim aims of fostering a business-enabling environment with emphasis on promoting environments within which the private sector can grow. In this instance the growth of rural tourism and the Vanuatu renewable energy supply sector. While the VERD program sets technical specifications and warranty and service requirements, the companies are free to set price and adopt their own marketing strategies in a competitive market. Project support such a public-private partnership includes training and capacity building of vendors, system installation technicians and system operators. With linkages built with micro-finance institutions which provide loans to systems supplied by pre-qualified and quality controlled companies.

The key success factors to these recommendations are that they:

- Recognises that access to renewable energy is not the most important barrier to rural tourism
- Recognises the limited government capacity thus leverages off existing programs and implementations
- Is flexible enough to deliver solutions to small island bungalows, community tourism projects up to 5 star resorts
- It builds on existing and currently working market driven system i.e. local Renewable Energy Suppliers)
- It meets the BizClim aims of fostering a business-enabling environment both in tourism and renewable energy supply

It is supported by Vanuatu Government with Directors of the Department of Energy and the Director of the Department of Tourism working together to put specific request to donors based on these models and using this research to back their proposals. (see Annex 1 to this report).

## VI. STUDY VALIDATION WORKSHOP

As per the study Terms of Reference, a Validation Workshop was held in the Chantilly Hotel in Port Vila on Friday 21 June. The purpose of the validation workshop was to present the study's preliminary findings and recommendations to a selection of key stakeholders in Vanuatu, and to obtain feedback and recommendations from these stakeholders. The workshop was attended by key Government stakeholders and with representatives of the private sector, including representatives of the Department of Tourism, Department of Energy, EU Delegation, AusAID, NZAid, Chamber of Commerce, Vanuatu Investment Promotion Authority, and Local renewable energy suppliers.

Overall, the feedback to the workshop presentations from the study team was very positive. The Validation Workshop Report in Annex 2 summarises the workshop discussion and feedback.

**There is strong support for the study findings among Government Stakeholders that will be central to any post-study implementation of the PPP model recommended in the previous section, in particular the Department of Energy and the Department of Tourism.**

Some of the discussion points and feedback are summarised below:

- The Department of Energy expressed support for the core assumptions underlining the design of the PPP model and making it appropriate to the local Vanuatu context, including avoiding new greenfield initiatives and in particular building upon current Island policy as set out in the VERM, and in particular support targeted simple initiatives that have started on a small scale and proven their worth (e.g. support provided for the Lighting Vanuatu initiative) for basic rural tourism operators' needs) as set out in the proposed PPP Model's Component 1; and with more complex needs (and more complex RE solutions) building upon the VERD initiative. The Department of Energy has expressed its support and availability to contribute to developing the study recommendations into proposals to donors in a post-study follow-up phase (see Annex 1 Letter of Support).
- The Department of Tourism has also welcomed the study findings and the PPP approach and the focus on private sector development. It underlined the importance of integration of any new PPP project with the training aspects currently being undertaken by the TVET programme and the importance of accreditation of tourism operators in improving the sector – in this regard linking subsidies proposed under the study's PPP model to this process would

give an important incentive and was welcomed by the Department. The renewable energy needs of rural tourism operators identified in the study were endorsed, with examples being provided of provinces where lack of energy access made it impossible to find a bungalow with refrigeration facilities to provide guests with cold drinks.

- One local renewable energy equipment supplier endorsed the PPP approach of the study, but emphasised also that a clear focus need to be included by donors on quality standards local businesses being undercut by cheap imitation products or by companies offering long warranties but not honouring them. In this regard, while endorsing the overall approach of the VERD programme, emphasised that it needed to move ahead more rapidly and to ensure that donors have a clear focus on quality specifications.
- Feedback from donor representatives present at the validation workshop was positive, with all donors present expressing their willingness to consider funding support for the finalised PPP model and study recommendations. For example, the EU Delegation stated that it would consider direct requests from the Vanuatu government following on from the study's recommendations, (even if no funds had of course been earmarked for this study's follow-up), while the representative from the NZ Aid programme stated that they were very interested in the study's results and supportive of the PPP approach, while NZ Aid was looking to expand its work in tourism and renewable energy.

## **VII. ANNEXES**

### **1. Annex 1 – Letters of Support from Target Key PPP Stakeholders**

- 1 Letter of Support for BizClim Study Findings from Department of Energy, Mines and Minerals**
- 2 Letter of Support for BizClim Study Findings from Department of Tourism**
- 3 Letter of Support for BizClim Study Findings from Renewable Energy Equipment Supplier**

## 2. Annex 2 - Validation workshop Report

### 1. Validation Workshop Overview

The purpose of the validation workshop work shop was to present the study's preliminary findings and recommendations to a selection of key stakeholders in Vanuatu, and to obtain feedback and recommendations from these stakeholders. The workshop was held in the Chantilly Hotel in Port Vila on Friday 21 June.

The workshop Programme is summarised below. Initially the workshop programme was foreseen for 4 hours plus a social and networking session at the end. However, the study team was advised to keep the formal workshop programme (specifically the presentations) shorter<sup>37</sup>.

The workshop was attended by key Government stakeholders and with representatives of the private sector, including representatives of the Department of Tourism, Department of Energy, EU Delegation, AusAID, NZAid, Chamber of Commerce, Vanuatu Investment Promotion Authority, and Local renewable energy suppliers.

#### *Summary Workshop Programme*

Time	Workshop Session Overview
15:00	Welcome and Introductions
15:15	Workshop Programme Overview
15.30	<b>Study Findings - Rural Tourism in Vanuatu</b> <ul style="list-style-type: none"><li>a. A typology of Rural Tourism</li><li>b. Rural Tourism operators in Vanuatu – Selected characteristics &amp; needs</li><li>c. Rural Tourism Operators – Findings from Field Visits</li></ul>
15:50	<b>Study Findings – Energy Needs in Rural Tourism in Vanuatu</b> <ul style="list-style-type: none"><li>a. Energy Needs among Rural Tourism Operators in the wider context</li><li>b. Energy load and energy need</li></ul>

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<sup>37</sup> This was due to the number of conferences that has taken place in Port Vila during the preceding month, which had created a certain level of conference fatigue as well as local stakeholders working to try to catch up on normal office work.

Time	Workshop Session Overview
	<ul style="list-style-type: none"> <li>c. Feasible technology solutions</li> <li>d. Current availability in Vanuatu</li> <li>e. Overall recommendations</li> </ul>
16.10	<p><b>Towards a Feasible PPP Model for Access to Renewable Energy for Rural Tourism Operators in Vanuatu - Recommendations</b></p> <ul style="list-style-type: none"> <li>a. Past experience in Vanuatu</li> <li>b. PPP requirements and options and fit with Vanuatu context</li> <li>c. Proposed model /model variants</li> <li>d. Discussion points</li> </ul>
16:30	<b>Discussion and question and answers</b>
17.00	<p><b>Summing Up – Key Feedback from Workshop Participants</b></p> <p><i>Mr. Tim Hewatt, Member of the Study Team</i></p>
17.30	<b>Closing Remarks</b>
17:35	<b>Drinks and networking</b>

## 2. Validation Workshop - Reaction and feedback on Study Findings

Overall, the feedback to the workshop presentations from the study team was very positive. Some of the discussion points and feedback are summarised below:

- Initial comments from the Department of Energy were how can we move from this research to some real implementation.
- **Government Tourism Stakeholders:** Ms Isaachar from the Department of Tourism spoke about the importance of integration of any project with the training aspects currently being undertaken by the TVET programme. She said that accreditation of tourism operators was important for improving the sector and linking subsidies to this process would give an important incentive. In regards to improving standards and the need for renewable energy she gave the example of Torba province where there was nowhere to get a cold beer. George Borugu, Director of the Department of Tourism, stated that the PPP approach was important and that local industry needed to be supported to grow not replaced. He requested that a presentation be given specifically to the Department of Tourism the following week.

- One local renewable energy equipment supplier endorsed the PPP approach of the study, but emphasised also that a clear focus need to be included by donors on quality standards local businesses being undercut by cheap imitation products or by companies offering long warranties but not honouring them. In this regard, while endorsing the overall approach of the VERD programme, emphasised that it needed to move ahead more rapidly and to ensure that donors have a clear focus on quality specifications.

### 3. Validation Workshop – Feedback from Participating Donor Representatives

Feedback from donor representatives present at the validation workshop was positive, with all donors present expressing their willingness to consider funding support for the finalised PPP model and study recommendations:

- **EU Delegation:** Mr. Adrien Mourgues, Programme Officer for the EU Delegation, clarified that no money had been specifically allocated to some of the projects mentioned in the study team presentations. The presentation slides were updated to make this clear. Though no specific funds were allocated Adrien stated that several funds exist for these types of projects and that the EU would respond to direct requests from government.
- **New Zealand Aid:** The representative from the NZ Aid programme stated that they were very interested in the results as NZ Aid was looking to expand its work in tourism and renewable energy. Mr Nipo was also supportive of the PPP approach.
- **AusAid:** The VERD representative from the AusAid-supported VERD programme welcomed the recommended approach of building upon/coalescing key relevant components of the VERD Programme, and avoiding duplication and the additional risk and complexity entailed in launching a separate stand-alone initiative.

### 4. Follow-Up Meetings

A meeting was held at the Leo Moli, Acting Director of the Department of Energy. was unable to attend the workshop so a presentation was given in his office Monday the 25<sup>th</sup> June<sup>38</sup>.

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<sup>38</sup> Mr Moli was unable to attend the workshop, due to other commitments.



Mr Moli was very supportive of the study models put forward and stressed the importance of the integration with the VERD programme. Mr Moli followed up the meeting with a letter of support to the BizClim team.

On Tuesday the 26th of June a presentation was given to the Department of tourism. Present were the Director George Borugu, Department of Industry Officials, Department of Trade Officials, Tourism Sector Analyst from the Prime Minister's Office, Tourism Expenditure Analyst from the Department of Finance and the Principle Product Development Officer for the Department of Tourism.

Leo Moli from the Department of Energy also attended to aid in the coordination between the two departments and to help plan the next steps in approaching donors to finance the recommended projects.

Reuben Tafau from the Department of Industry asked why the focus was on solar over other renewables like wind and hydro. This was answered partly by Leo Moli from the Department of Energy – highlighting the difficulties of past implementation. It was also mentioned that the demand driven model does not excluded these technologies for the situations where they would be suited.

Marokon Alilels, Director General of the Ministry of Trade and Business Development, was supportive of the models put forward and encouraged the departments of Trade and Tourism to work together to take this research and recommendation to the proposal level. George Borugu, Director of the Department of Tourism, repeated his support in the meeting and followed up with a letter to the BizClim study team the following day.

### 3. Annex 3 – Validation Workshop Participant List

#### a. Validation Workshop Participants:

	Name	Title	Organisation
1	Adrien Mourges	Programme Officer	EU Delegation
2	Jimmy Nipo	Senior Development Programme Co-ordinator	New Zealand High Commission
3	Adela Issachar	Principal Product Dev. Officer	Department of Tourism
4	George Borogu	Director	Department of Tourism
5	Moses Bani	Principal Tourism Investment Officer	Department of Tourism
	Janet Samuel	Principal Provincial Tourism Development Officer	Department of Tourism
6	Allan Kalfabun	General Manager	Vanuatu Tourism Office (VTO)
7	Leith Veremaito	Senior Programme Manager	Governance for Growth (AusAID)
8	Raymond Vuti	CEO	Vanuatu Investment Promotion Authority (VIPA)
9	Nick Ritsinias	Managing Director	Energy 4 All
10	David Stein	Team Leader	VANREPA
11	Marokon Alilee	Director General	Ministry of Trade
12	Esly Kalo	Groups and Cruise Manager	Evergreen Travel
13	Gideon George	Owner	Havannah Eco Lodge
14	Batick Manusia	Owner	Vanglobe Solar

	<b>Name</b>	<b>Title</b>	<b>Organisation</b>
15	Eric Kerres	Managing Director	Greentech
16	Mr Toni di Vietri	BizClim Study Team	New Frontier Services
17	Mr Frank Pool	BizClim Study Team	New Frontier Services
18	Mr Tim Hewatt	BizClim Study Team	New Frontier Services

**b. Post Workshop Consultation and Meetings:**

19	Leo Moli	Acting Director	Department of Energy
20	George Borugu	Director	Department of Tourism
21	Reuben Tafau	Representative	Department of Industry
22	Marokon Alilels	Director General	Ministry of Trade and Business Development

#### 4. Annex 4 – Stakeholder Interviews

The table below sets out the list of stakeholder interviews carried out, during Phase 1 and Phase II of the study.

	Name	Title	Organisation
1	Adrien Mourges	Programme Officer	EU Delegation
2	Adela Issachar	Principal Product Development Officer	Department of Tourism
3	Linda Kalpoi	General Manager	Vanuatu Tourism Office (VTO)
4	Allan Kalfabun	Marketing Manager	Vanuatu Tourism Office (VTO)
5	Simon Cramp	Director	Governance for Growth (AusAID)
6	Leith Veremaito	Senior Programme Manager	Governance for Growth (AusAID)
7	Nima Heschmat	Principal Economist	Utilities Regulatory Authority
8	Oliver Fernandez	Project Manager	Utilities Regulatory Authority
9	Romney Marum	Analyst	Utilities Regulatory Authority
10	Leo Moli	Acting Director	Department of Energy
11	Jesse Benjamin	Analyst	Department of Energy
12	Tony Pittar	Chairperson and Owner/Manager	VHRA and Eratap Beach Resort
13	Smith Tebu	CEO	VIPA

	Name	Title	Organisation
14	Nick Ritsinias	Managing Director	Energy 4 All
15	David Stein	Team Leader	VANREPA
16	G. Soldateschi	Legal & Environment Expert	Vanuatu Government
17	HE Mickey Joy	Ambassador	Embassy of the Republic of Vanuatu to the European Union, the Kingdom of Belgium, the Republic of France, the High Commission to the United Kingdom
18	Noah Patrick Kouback	Principal Officer	Embassy of the Republic of Vanuatu to the European Union, the Kingdom of Belgium, the Republic of France, the High Commission to the United Kingdom
19	Velit Bay Plantation	Santo, Vanuatu	Luxury Resort
20	Eratap-beach Resort.	Efate, Vanuatu	Luxury Resort
21	Aore Island Resort	Santo, Vanuatu	Middle-level Resort
22	The Havannah	Efate, Vanuatu	Luxury Resort
23	Moyyan Resort-	Santo, Vanuatu	Middle-level Resort
24	J7 Tourism Consulting	Tanna, Vanuatu	Tourism operators
25	Tamanu Resort	Efate, Vanuatu	Luxury Resort
26	Wahoo-havannah	Efate, Vanuatu	Fish catching & boat
27	Beachcomber lodge		Organised Bungalow
28	Erakor Island	Efate, Vanuatu	Middle-level Resort
29	Hideaway Island	Efate, Vanuatu	Middle-level Resort
30	Southern Island Adventure Tour	Tanna, Vanuatu	Tour organisation

	Name	Title	Organisation
31	Whitegrass resort	Tanna, Vanuatu	Luxury Hotel
32	Resort Tanna Lodge	Tanna, Vanuatu	Middle-level Resort
33	Evergreen Operator	Efate, Vanuatu	Travel organization
34	Lonnoc Beach-	Santo, Vanuatu	Organised Bungalow
35	Velit bay Plantation	Tanna, Vanuatu	Organised Bungalow
36	evergreen resort	Tanna, Vanuatu	Organised Bungalow & Tours
37	Havannah-ecolodge	Efate, Vanuatu	Semi –Organised Bungalows
38	Sanma mysteries	Vanuatu	Tour organization
39	Paradise Cove Resort	Efate, Vanuatu	Semi –Organised Bungalows
40	Sunset bungalow	Efate, Vanuatu	Semi –Organised Bungalows
41	Vata-vaka Bungalow	Efate, Vanuatu	Unorganised Bungalow
42	Towoc & bungalow	Santo-Vanuatu	Semi –Organised Bungalows
43	Turtle Bay	Santo, Vanuatu	Semi –Organised Bungalows
44	Amazing Tour	Tanna, Vanuatu	Tour organisation
45	Friendly Bungalow	Tanna, Vanuatu	Organised Bungalow
46	Lenakel Cove –Horses	Tanna, Vanuatu	Semi –Organised Bungalows Horses hiking
47	Port Resolution Yacht Club	Tanna, Vanuatu	Organised Bungalows
48	Rocky Ridge Bungalows	Tanna, Vanuatu	Semi –Organised Bungalows
49	Sunrise Bungalows	Tanna, Vanuatu	Semi –Organised Bungalows
50	Santo safari tours	Santo, Vanuatu	Tour organisation
51	Ekasup	Efate, Vanuatu	Cultural Village
52	Kustom	Efate, Vanuatu	Tour organisation

	<b>Name</b>	<b>Title</b>	<b>Organisation</b>
53	Lelepa Island Tours	Efate, Vanuatu	Tour organisation
54	George Borugu	Director	Department of Tourism
55	Reuben Tafau	Representative	Department of Industry
56	Marokon Alilels	Director General	Ministry of Trade and Business Development
57	Delphine Greindl	Brussels	Anthropologist, former resident of Vanuatu, working on social development projects