PALAU SUSTAINABLE ECONOMIC DEVELOPMENT THROUGH RENEWABLE ENERGY APPLICATIONS (SEDREA) PROJECT

TERMINAL EVALUATION

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EXECUTIVE SUMMARY

The SEDREA project was intended to contribute to, at least in the reduction of the growth rate of GHG emissions from diesel-based power generation in Palau. The project purpose was the facilitation of the reduction of imported fossil fuel consumption through the widespread application of Renewable Energy Technologies (RETs) not only to meet the electricity needs of the country but also provide the other energy requirements for productive uses in the other major sectors of the national economy. The main outcome of the project was the effective utilization, and realization of benefits from the use, of the country's feasible Renewable Energy (RE) resources.

The SEDREA Project comprised of four components, each made up of between 7-10 activities that were expected to achieve the following: (i) bring about the establishment of a national policy and program for RE within the context of a national energy policy; (ii) create a conducive environment for investments in RETs on the power generation at the utility level; (iii) encourage application of household and village level RET applications especially in areas that cannot be served by the grid; and (iv) sustain an industry to support RE technology development and commercialization.

The main expected outcome of the project is the effective utilization, and realization of benefits from the use, of the country's feasible Renewable Energy (RE) resources. The expected outcomes per project component are as follows:

- Outcome 1: RE policy and institutional capacity building;
- Outcome 2: RE technology delivery and financing mechanism;
- Outcome 3: RE technology development and industry support;
- Outcome 4: RE information, training and advocacy; and
- Outcome 5: Programme Management Unit (PMU).

Overall, 15.6% of the budget that includes the preparatory phase and medium sized project remains unspent. This is equivalent to approximately $156,000 of the $1m GEF funding for the project. The MTR had recommended that the project be extended to end 2012 in order to complete pending activities, utilizing the remainder of the funds, which stood at that time at around 26% of GEF funding. Given that the project has run

for another additional year (end 2013), i.e., 2 years since the MTR, it is of concern that a significant fraction of the funds still remain unspent.

In terms of individual components, there is a huge variation in terms of achievements.

The major outputs under the first outcome were the National Energy Policy and a Strategic Energy Plan completed in October 2009, PPUC Tariff Study completed in 2010, the Penthouse Hotel Energy Audit completed in 2010, and a strengthened Palau Energy Office. Most of the funds were allocated for national and international consultancies to complete the above studies. SEDREA funded the appointment of a full-time Energy Adviser to the PEO and this assisted in the coordination of the national activities. One of the key outputs, the Palau Energy Act, is expected to be finalized by the legislature in the first quarter of 2014.

The key output of this component was the establishment of the RE Fund Window at the NDBP. Around 83% of GEF funds were expended for this activity. The majority of the GEF funds, around $400,000, were used for the purchase of 30 on-grid and 37 off-grid PV modules. The indicative co-funding of $2m from NDBP, to be sourced from European Investment Bank (EIB), and designed to assist in the provision of low interest loans to homeowner and business, did not materialise. The Bank used its general funds to support some of the work. All activities under this component have been largely accomplished, with the Renewable Energy Subsidy Loan Program (RESLP) firmly established as part of the NDBP's Loan Program. This sits alongside the Energy Efficient Loan Program (supported through IUCN) and the RETRO Energy Efficient Subsidy Program, supported by North REP.

About a quarter of the funds allocated for 'Information, Training and Advocacy' were spent, mainly on advocacy, community awareness and conduct of information campaigns through the media, school visits etc. The PEO also organised activities coinciding with Earth Day celebrations and was part of many talk shows on radio and TV. Other activities such as the establishment of RE Center, creation of a database and training for the production of energy curricula for schools remain unfinished.

Project Implementation, Formulations and Results

Formulation: The indicators and the potential deliverables seemed ambitious, but deemed appropriate during the design of the project at the time. There are questions

about the accuracy of the baseline and projections[1], which was compounded by the fact that the required flexibility and adaptive strategies seemed not to have been used to revise targets and deliverables owing to changed circumstances. The risk analysis was well articulated in the project document.

Implementation: The challenge for the PEO in executing the project was recognised in the risk analysis and flagged during the inception meetings. The coordination and communications between UNDP MCO and PEO should have been enhanced to ensure timely deliverables and management of risks. Timely and precise information exchange would have enabled more effective response measures.

Results: Notwithstanding the deficiencies in the anticipated outcomes of some of the components of the project, the innovative financing mechanism was a significant outcome of the project. This required the necessary enabling environment through regulations, policies, institutional frameworks, which were identified and progressed in collaboration with other partners, notably the EU funded projects. The coordination amongst the key stakeholders was strengthened and the private sector was meaningfully involved. The advocacy, capacity building, education and training activities played a huge role in the overall awareness and understanding about RE amongst the community.

Overall the project has delivered positive outcomes and good results. However, this could have been greatly enhanced with better implementation and execution arrangements. The terminal evaluation has given it a rating, which is satisfactory (S), notwithstanding the fact that some aspects were marginally unsatisfactory (MU). The financing window established under the project and the enabling environment created helped remove two of the most important barriers to renewable energy diffusion and uptake, i.e., financing and the enabling regulation in relation to selling energy to the grid. The REFW is a great model and has been shown to work in Palau under the project. It can also be emulated by other countries in the region and is a great example of how the commercial sector, including development banks, can be involved in the process and contribute tangibly to their social responsibilities in the context of small island countries. Yap, in the FSM, has been liaising with the NDBP for technical support and advice as it looks at a similar arrangement. RMI has sought the services of the former CEO of NDBP to assist with a similar scheme as part of the ADMIRE[2] activity.

[1] The PEO was unable to explain the numbers, and the relevant documents such as the GEF-approved SEDREA Project Brief were not available to the TE. Hence, the TE's opinion is that the figures were ambitious and maybe even wrong.
[2] Personal communication with Coordinator of ADMIRE, RMI

Some of the key recommendations are:

- Strengthening the National Energy Committee (NEC) and its TOR for more meaningful coordination and robust monitoring and reporting functions;
- Finalisation of the Palau Energy Framework and Energy Act;
- Explore scope for MOUs with North REP and other partners and short-term targeted consultancies to complete some of the pending activities;
- Explore partnership with the SIDS DOCK-PIGGAREP+ project on solar PV desalination systems on Kaynagel;
- Share and help roll out the positive accomplishments such as the RE funding window to other countries in the region;
- Manage carefully the concerns of the utility through robust analysis and education;
- UNDP should consider more tangible direct technical support for such projects during implementation, recognising the limitation within countries.

There has been a request for further extension of the project from the PEO, considering that a number of the remaining activities could be completed using the balance of funds amounting to nearly $170,000. The need to complete the remaining activities is strongly supported but how best this is done should be addressed carefully. The PEO currently will not be able to complete the activities and would need UNDP's guidance in forging partnerships with parallel projects such as the EU funded North REP and SIDS DOCK-PIGGAREP + projects, as well as identifying short term consultancies.

ABBREVIATIONS AND ACRONYMS

ACP	Asia, Caribbean, Pacific
ADB	Asian Development Bank
ADFIP	Association of Development Financing Institutions in the Pacific
ADMIRE	Action for the Development of Marshall Islands Renewable Energies
AWP	Annual Work Plan
CDR	Combined Delivery Report
CEO	Chief Executive Officer
CER	CEO Endorsement Request (of GEF)
COFA	Compact of Free Association (between Palau and the USA)
CPAP	Country Programming Action Plan (of UNDP)
CY	Calendar Year
EC	European Commission
ECAPS	Energy Conservation and Awareness Programme for Schools
EE	Energy Efficiency
EIB	European Investment Bank
ELP	Energy Loans Program (of NDBP)
ETC	Evacuated Tube (Solar) Collectors
EU	European Union
FAO	Food and Agriculture Organisation
FSM	Federated States of Micronesia
FSP	Full Scale Project (of GEF)

GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Greenhouse Gases
GOP	Government of Palau
HQ	Head Quarters
IRENA	International Renewable Energy Agency
IUCN	International Union for the Conservation of Nature
IPPs	Independent Power Producers
HDI	Human Development Index
KWp	Kilo Watt (peak)
M&E	Monitoring and Evaluation
MCO	Multi-Country Office (of UNDP)
MOU	Memorandum of Understanding
MTR	Mid-Term Review
NDBP	National Development Bank of Palau
NEC	National Energy Committee
North–REP	North Renewable Energy Pacific (project)
O&M	Operation and Maintenance
PEO	Palau Energy Office
PIEPSAP	Pacific Islands Energy Policy and Strategic Action Planning (project)
PICs	Pacific Island Countries
PIGGAREP	Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project
PIF	Project Identification Form (of GEF)
PIREP	Pacific Islands Renewable Energy Project (GEF/UNDP/SPREP)

PMO	Project Management Office
PPUC	Palau Public Utilities Corporation
PREFACE	Pacific Rural/Renewable Energy France Australia Common Endeavour (project)
ProDoc	Project Document
PURE	Productive Uses of Renewable Energy (the objective of GEF SP4 projects)
PV	Photovoltaic
RED	Renewable Energy Division (of PPUC)
RESCO	Renewable Energy Service Company
RE	Renewable Energy REFW Renewable Energy Fund Window (of NDBP)
REP-5	Renewable Energy Programme (for 5 countries: FSM, Kiribati, Niue, Palau, RMI)
RET	Renewable Energy Technology
FQ	Request for Quotation
RMI	Republic of the Marshall Islands
RTA	Regional Technical Advisor (of UNDP)
SEDREA	Sustainable Economic Development through Renewable Energy Applications (for Palau)
SHS	Solar Home Systems
SO	Strategic Objective (of GEF)
SPC	Secretariat for the Pacific Community
SPREP	Secretariat for the Regional Environment Programme
SWH	Solar Water Heater
TE	Terminal Evaluation
TERM	Tonga Energy Road Map
T&D	Transmission and Distribution (for electricity grids)
UNDP	United Nations Development Programme

ACKNOWLEDGEMENTS

The support of the UNDP team, comprising of Josua Turaganivalu, Sharon Sakuma, Ronald Kumar, Manuel Soriano, Winifereti Nainoca and Emma Mario who assisted in many ways towards the planning, organisation and the conduct of the evaluation, for provision of the necessary information and comments and for the feedback on the report is gratefully acknowledged.

The Palau Energy Office through Mr. Greg Decherong and Mr. Nyk Kloulubak provided much needed assistance during the evaluation through arrangement of meetings with key stakeholders, provision of necessary information and responding to the myriad of issues that arose during the in country visit.

Particular thanks are also due to the many stakeholders in Palau (the list of people and institutions consulted is appended to the report) for availing themselves, often at short notice, to meet and respond to clarifications.

I am particularly indebted to Manuel Soriano who availed himself on skype and to Nyk Kloulubak who availed himself during the hectic climate change negotiations in Bonn, in March, to go through some of remaining issues in the draft report. This was important to enable the finalisation of the report which had been plagued by delays due to unavailability of relevant people for further clarifications and the lack of information/data.

Thank you everyone for your patience, professionalism and understanding shown both during the in-country consultations as well as requests for subsequent clarifications by email and follow-up conversation.

Chapter 1 INTRODUCTION

1.1 Palau's Energy Scene

Access to affordable and reliable sources of energy is crucial to enhancing sustainable livelihoods, contributing to economic growth and development. In Palau with extreme dependency on imported petroleum products, volatility in petroleum prices results in serious implications for national economies, constraining growth and development prospects, and in some cases marginalising socio-economic gains and threatening stability. While many Pacific ACP (Africa, Caribbean and Pacific region) countries (PACP) have set ambitious renewable energy targets and implemented various energy efficiency and conservation measures, the progress made towards these targets has been slow. National expertise in renewable energy and energy efficiency strategies is limited and the capacity to plan and implement these is low.

The Government of Palau (GOP) has long recognised the need for energy conservation and other measures, as exemplified by the Presidential Executive Orders 132[3], 234[4] and 350[5] to ensure reduction in the cost of energy given its heavy reliance on imported fossil fuel for energy production. The Palau Energy Conservation Strategy (PECS)[6] provides strategies and practical action plans to support the Government in its effort to reduce its energy consumption as specified in the Executive Order.

Renewable energy development was recognized as a priority for Palau's sustainable economic development. This has the twin benefits of reducing the dependency on expensive fossil fuel imports and mitigating green house gas (GHG) emissions in support of actions against climate change, which poses serious threats to Palau's sustainable development.

1.2 The Case for SEDREA

The impetus for SEDREA was the Pacific Islands Regional Energy Project (PIREP)[7], which also led to Pacific Islands Greenhouse Gas Abatement through Renewable Energy

[3] Presidential Directive No. 04-005, 7 December 2004.

[4] Presidential Directive No 234, September 2005.

[5] Presidential Executive Order 350, 17 October 2013.

[6] Palau Energy Conservation Strategy (PECS): Strategies and Action Plans to Reduce Energy Consumption by Government, September 2007.

[7] US$760,000 UNDP/SPREP-GEF regional medium scale project that was implemented from May 2003 to mid-2006 Covering Cook Islands, Fiji, Federated States of Micronesia, Kiribati, Marshal Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu.

(PIGGAREP), a regional project covering 11 Pacific Island Countries (PICs)[8]. It is significant that the Republic of Marshall Islands (RMI) and Palau opted not to be part of PIGGAREP leading to the development of national projects: ADMIRE[9] for RMI and Sustainable Economic Development through Renewable Energy Applications (SEDREA) for Palau.

The Pacific Regional Energy Assessment for Palau, under PIREP, confirmed the good potential for renewable energy resources, as well as its ability to provide the necessary support in the successful exploitation of these alternative energy sources. This provided the impetus for the SEDREA project, and was expected to fill some of the important gaps from the EU-funded, REP-5[10], and other ongoing energy development projects. The overarching mandate of REP-5 was poverty reduction through improved access to electricity.

The SEDREA Project was conceptualized based on consultations with, and involvement of, institutions at the national and local levels that have a mandate, or were working in the areas of rural development, environment, climate change, energy, and sustainable development particularly in the outer islands. These include: the Ministry of Finance, which is responsible for the EU-REP 5 project in Palau; GEF Small Grant Programme (SGP), which is part of a regional SGP along with Federated States of Micronesia and Republic of the Marshall Islands and intended to support small-scale RE projects in the country; and the Second National Communication (SNC) to the UNFCC, which is being implemented by the United Nations Environment Programme (UNEP). The project was intended to enhance general awareness and knowledge on climate change related issues and the national capacities in Palau through the preparation of the SNC. Regional institutions (Secretariat of the Pacific Regional Environment Programme, SPREP) were also involved in the conceptualization as well as the UNDP-GEF RCU for Asia-Pacific in Bangkok and UNDP-GEF, New York. UNDP Fiji MCO was designated to be involved throughout project implementation on monitoring and evaluation.

SEDREA project was funded under the GEF-4 (Global Environmental Facility 4th replenishment) OPERATIONAL PROGRAM: OP #6: Promotion of the Adoption of Renewable Energy by Removing Barriers and Reducing Implementation Costs. The project was approved under the umbrella of then applicable GEF Strategic Program SO-5: Promotion of Renewable Energy for the Provision of Rural Energy Services. The project was designed in 2006 – 2007, the document (ProDoc) was finalised in December 2007, and national on-the-ground Palau SEDREA activities started with the project's inception workshop, which was held in June 2009.

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[8] Comprising Cook Islands, Fiji, Kiribati, Nauru, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu

[9] Action for the Development of Marshall Islands Renewable Energies project

[10] Support to the Energy Sector in 5 Pacific Island States, REP-5: Palau, Niue, Nauru, the Federated States of Micronesia and the Republic of Marshall Islands

1.3 Project Background

The SEDREA project was intended to contribute to, at least in the reduction of the growth rate of GHG emissions from the diesel-based power generation in Palau. The project purpose was the facilitation of the reduction of imported fossil fuel consumption through the widespread application of Renewable Energy Technologies (RETs) not only to meet the electricity needs of the country but also provide the other energy requirements for productive uses in the other major sectors of the national economy. The main outcome of the project was the effective utilization, and realization of benefits from the use, of the country's feasible Renewable Energy (RE) resources.

The SEDREA Project comprised of four components, each made up of between 7-10 activities that were expected to achieve the following: (i) bring about the establishment of a national policy and program for RE within the context of a national energy policy; (ii) create a conducive environment for investments in RETs on the power generation at the utility level; (iii) encourage application of household and village level RET applications especially in areas that cannot be served by the grid; and (iv) sustain an industry to support RE technology development and commercialization.

The main expected outcome of the project is the effective utilization, and realization of benefits from the use, of the country's feasible Renewable Energy (RE) resources. The expected outcomes per project component are as follows:

Outcome 1: Renewable Energy (RE) policy and institutional capacity building

Outcome 2: RE technology delivery and financing mechanism

Outcome 3: RE technology development and industry support

Outcome 4: RE information, training and advocacy

Outcome 5: Programme Management Unit (PMU)

Chapter 2 OBJECTIVES AND SCOPE OF TERMINAL EVALUATION

2.1 General Principles

The following are the overall objectives for monitoring and evaluation of GEF projects:

a. To promote accountability for the achievement of GEF objectives through the assessment of results, effectiveness, processes and performance of the partners involved in GEF activities. GEF results will be monitored and evaluated for their contribution to global environmental benefits; and,
b. To promote learning, feedback and knowledge sharing on results and lessons learned among the GEF and its partners, as basis for decision-making on policies, strategies, program management, and projects and to improve knowledge and performance.

As defined in the GEF Monitoring and Evaluation (M&E) Policy, an evaluation is a systematic and impartial assessment of an activity, project, program, strategy, policy, sector, focal area or other topics. It aims at determining the relevance, impact, effectiveness, efficiency and sustainability of the interventions and contributions of the involved partners. An evaluation should provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons into the decision-making processes.

The Monitoring and Evaluation (M&E) policy at the project level in UNDP/GEF has four objectives:

i. Monitoring and evaluation of results and impacts;
ii. Provision of a basis for decision making on necessary amendments and improvements;
iii. Promotion of accountability for resource used; and,
iv. Documentation, feedback provision on, and dissemination of lessons learned.

In accordance with UNDP/GEF M&E policies and procedures, all full sized and medium-sized projects supported by the GEF should undergo a terminal evaluation upon completion of implementation. A final evaluation of a GEF- funded project (or previous phase) is required before a concept proposal for additional funding (or subsequent phases of the same project) can be considered for inclusion in a GEF work program. However, a final evaluation is **not** an appraisal of the follow-up phase.

Terminal evaluations are intended to assess the relevance, performance and success of the project. It looks at early signs of potential impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. It will also identify/document lessons learned and make

recommendations that might improve design and implementation of other UNDP/GEF projects.

The overall objective of this TE is to review progress towards the project's objectives and outcomes, assess the efficiency and cost-effectiveness of how the project has moved towards its objectives and outcomes, identify strengths and weaknesses in project design and implementation, and provide recommendations on design modifications that could have increased the likelihood of success, and on specific actions that might be taken into consideration in designing future projects of a related nature.

2.2 Scope of SEDREA Evaluation

The specific objective is to undertake an independent and objective terminal evaluation (TE) of the SEDREA as per UNDP/GEF requirements and procedures. The scope of the terminal evaluation (TE) covers the entire UNDP/GEF-funded project and its components as well as the co-financed components of the project.

The TE will assess the Project Implementation taking into account the status of the project activities and outputs and the resource disbursements made up to date.

According to the Terms of Reference[11] the evaluation will involve analysis at two levels: **component** level and **project** level. On the component level, the following shall be assessed:

i. Whether there is effective relationship and communication between/among components so that data, information, lessons learned, best practices and outputs are shared efficiently, including cross-cutting issues.
ii. Whether the performance measurement indicators and targets used in the project monitoring system are specific, measurable, achievable, reasonable and time-bounded to achieve desired project outcomes.
iii. Whether the use of consultants has been successful in achieving component outputs.

The evaluation will include such aspects as appropriateness and relevance of work plan, compliance with the work and financial plan with budget allocation, timeliness of disbursements, procurement, coordination among project team members and committees, and the UNDP country office support. Any issue or factor that has impeded or accelerated the implementation of the project or any of its components, including actions taken and resolutions made should be highlighted.

On the project level, it will assess the project performance in terms of:

a. Progress towards achievement of results,
b. Factors affecting successful implementation and achievement of results,

[11] See Annex F

c. Project Management framework, and
d. Strategic partnerships.

2.3 Evaluation Methodology

As per the guidance provided, the TE Contractor was expected to become 'well versed as to the project objectives, historical developments, institutional and management mechanisms, activities and status of accomplishments. Information will be gathered through documents review, group and individual interviews and site visits.

The SEDREA project context was the earlier work arising out of PREFACE, PIESAP and PIREP projects that were the basis for the SEDREA design. The regional PIGGAREP project (the Contractor had recently completed M&E for the PIGGAREP[12] in 4 countries: Cooks, Kiribati, Samoa and Tuvalu) and the ADMIRE[13] project in RMI were the direct result of the earlier studies at the regional and national levels. These and other studies such as from ADB, IRENA, IUCN, REP 5, North REP and UNDP provided useful and relevant RE situation analyses and baseline information in the Pacific generally and in Palau specifically.

The SEDREA TE findings and conclusions are based on:

I. Reviews of SEDREA's design documentation (ProDoc, CER and UNDP Country Program Action Plan (CPAP) 2008-2012 for Palau);
II. SEDREA's activities for the years 2009, 2010, 2011, 2012 and 2013. These were derived from the APR/PIR and REFW reports; Annual Financial Reports; Quarterly Progress Reports; Annual Work Plans;
III. Reviews of the proposed SEDREA activities to its scheduled project, in particular the Mid-Term Review (MTR)[14] and its recommendations;
IV. Interviews and interactions with SEDREA stakeholders during the 2-13 December evaluation mission to Palau (and in subsequent email exchanges);
V. Review of the extensive SEDREA documentation made available to the review, including reports and relevant information generated as a result of the project's interventions; and
VI. Related information on other parallel and preceding initiatives and projects.

Chapter 3 FINDINGS AND ASSESSMENT

[12] Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) – Regional UNDP-GEF project implemented by SPREP

[13]

[14] Final Report: Mid-Term Review of SEDREA, 31 December 2012, Frank Pool Consultants

3.1 Component Level

3.1.1 Appropriateness and Relevance of Work Plan

The inception workshop held from 24-25 June 2009, reconfirmed "the overall relevance of the planned outputs and activities as described in the UNDP Project Document (including GEF Medium Size Project Brief)". However, the proposed project outputs and activities as well as inputs were to be reviewed in detail as part of the inception phase, over a period of two (2) months - specifically from 24 June to 24 August 2009 - and reflected in an Inception Report. It was agreed that the draft Inception Report, which is to be prepared by the Palau Energy Office (PEO), would be distributed to stakeholders for comments no later than 14 August 2009.

In the absence of this latter report, the TE assumes that the work plan and budget, as per the Project Document[15], detailing the Total and Annual Work plan Budget sheet, Management Arrangements, Monitoring Framework and Evaluation provided the overall guidance for the project implementation and execution. No documentary evidence was provided to suggest any changes to the work plan as the project was implemented.

The outline of the Activities, Results and Actions required in support were appropriate and relevant, given the overarching goal of the project. The budget was designed to be indicative as it would not have been possible to be more precise on the actual figures, given the changing prices and circumstances, which would impact on procurement.

The work plan and activities for the REFW[16] led by NDBP and the energy policy development coordinated by the PEO[17] were well articulated. However, those relating to the other activities and deliverables could have been further clarified during the project implementation. The Project Advisory Committee and its successor NEC were the logical forums to discuss any issues relating to the implementation of specific activities and for providing guidance on alternative arrangements. This would have led

[15] Project Document Palau Sustainable Economic Development through Renewable Energy Applications (SEDREA), UNDP/GEF, December 2007.

[16] Final Inception Report for Preparatory Phase Consultancy for the Establishment of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP). Prepared by ReEx Capital Asia & Dr Herbert Wade, December 2009.

[17]Development of the Palau National Energy Policy, NEPF/PAL5/NPE2, Inception Report, Gerhard Zieroth (International Consultant) in co-operation with Kathy Kesolei & Associates, Palau, April 2009.

possibly to completion of specific tasks such as creation of database, developing curriculum for schools and capacity building for resource assessment and surveys led by external consultants working alongside local counterparts as under study, enhancing local capacities in RE services as well as project development.

3.1.2 Compliance: Financial and Work plan

Table 1: Final Budget Figures (as of December 2013)

Components	Total planned (as per ProDoc)	GEF Contribution	Co-Financing	Actual Spent (a.o. 31 Dec 2013)			% GEF contribution
				GEF	Co-Financing	Total	
1. RE Policy and Institutional Capacity Building (focused on 10 activities).	300,400	115,000	185,400	107,630.50	187,937.15	295,567.65	93.6
2. RE technology delivery and financing mechanisms (focused on 7 activities).	3,089,700	480,000	2,609,700[18]	457,848.40	Not available	457,848.40	95.4
3. Renewable Energy Technology Development and Industry Support (focused on 7 activities).	319,700	125,000	194,700	125,000.00	Not available	125,000.00	100
4. Renewable Energy Information, Training and Advocacy (focused on 7 activities).	259,950	167,250	92,700	43,086.67	Not available	43,086.67	25.8
5. Project Management	430,250	87,750	342,500	85,223.10	Not available	85,223.10	97.1
Total	**4,400,000**	**975,000**	**3,425,000**	**818,788.67**	187,937.15	**1,006,725.82**	**83.9**

[18] The US$ 2 million from the NDBP was not realized.

Table 1, above, summarises the final budget figures, as provided by UNDP. These are based on the annual and quarterly progress project reports for the years 2009-2013. The figures are the cumulative figures obtained in December 2013. The following conclusions can be drawn from the numbers:

- Overall, 15.6% of the budget remains unspent. This is equivalent to $156,000 of the total $1m GEF funding for the preparatory phase and medium sized project. The MTR had recommended that the project be extended to end 2012 in order to complete pending activities, utilizing the remainder of the funds, which stood at that time at around 26% of GEF funding. Given that the project has run for another additional year (end 2013), i.e., 2 years since the MTR, it is of concern that a significant fraction of the funds still remain unspent.

- In terms of individual components, there is a variation in terms of expenditure: Component 3 has fully expended (100%) its budget allocation; Components 1 and 2 and 4 have expended more than 90%; while Component 4 has only spent approximately one quarter of its allocation. The project management budget has spent more than 90% of its budget. It was not possible to get the cost figures for individual activities within each component. However, since the procurement was through UNDP MCO, it is assumed that the usual diligence was observed in terms of authorizing expenditure and these were justified according to the approved budget lines. In any case, there are close inter-linkages between the individual activities and the outputs are probably more appropriately considered at the component level.

Component 1: RE Policy and Institutional Capacity Building

Appropriate regulations, policies and frameworks were recognized as vital for the uptake of renewable energy systems in the overall mix of energy sources for Palau. The limited capacity in the Palau Energy Office was also a major issue in terms of not only implementing SEDREA but for the overall achievement of the renewable energy target as part of the Government's vision for reducing dependency on fossil fuels. It is vital for key institutions such as PPUC, Government agencies and the private sector to work together in this common endeavour.

The entire GEF funding for this component, including a significant amount of co-financing, was used for the various activities in achieving the two key outputs under this component. In total, 93.6% of GEF funding were expended for this component. The

major outputs were the National Energy Policy and a Strategic Energy Plan completed in October 2009, PPUC Tariff Study completed in 2010, the Penthouse Hotel Energy Audit completed in 2010, and a strengthened Palau Energy Office. Most of the funds were allocated for national and international consultancies to complete the above studies. SEDREA funded the appointment of a full-time Energy Adviser to the PEO and this assisted in the coordination of the national activities.

One of the key outputs, the Palau Energy Act, is expected to be debated and finalized by the legislature in the first quarter of 2014. The activity to produce that is now also being supported by the SPC implemented North REP project. This Regulatory Framework, consisting of the Palau Energy Act and the Palau Energy Act Regulations, will facilitate the diversification of how energy is supplied to the People of Palau through both the development of progressive policy, and through the implementation of this policy by a more robust, cost effective, and efficient Energy Administration.

Component 2: RE Technology delivery and Financing mechanisms

This component had the largest amount of GEF funds committed and also attracted the largest co-financing. The key output of this component was the establishment of the RE Fund Window at the NDBP. 95.4% of GEF funds were expended for this component. The majority of the GEF funds, around $400,000, were used for the purchase of 30 on-grid and 37 off-grid PV modules. There was indicated co-funding of $2m from NDBP. This was to be sourced from the EIB and used to subsidise loans for homes and the commercial sector. However, NDBP was not successful in getting this loan. Instead it used its own funds to support capacity building, trainings and other administrative functions of the Energy Loans Program.

All activities under this component have been largely accomplished, with the Renewable Energy Subsidy Loan Program (RESLP) firmly established as part of the NDBP's Loan Program. This sits alongside the Energy Efficient Loan Program (supported through IUCN) and the RETRO Energy Efficient Subsidy Program, supported by North REP. Whilst there is no formal documented M&E system for implementing the REFW and the various RET supported projects, there are internal mechanisms within the Bank that ensures the repayment, operation and maintenance and regular feedback/responses from customers.

One of the key outcomes of this component was the putting into law, in 2012, the 'Net Metering Act', which was vital in the sustainability of the RET and supporting the Renewable Energy Subsidy Program (RESP) under the REFW at the NDBP. The further amendment of the Net Metering Act via the NDBP-PPUC Memorandum of

Understanding, provided much needed catalyst for further interest in on-grid PV systems.

By the time of the terminal evaluation, 18 systems, out of the 30 on-grid systems procured, had been installed and 12 allocated, pending installations. This was major progress since the time of the MTR in 2011 when only 2 on-grid and 1 off-grid applications were processed. Of the 35 off-grid systems, one has been installed as demonstration unit at the NDBP premises, 20 have been earmarked for installation in the south-west islands, and the remaining 14 will be used as part of the rehabilitation of homes in the cyclone ravaged island of Kayangel[19]. This latter strategy will also assist in enhancing the more direct social benefits of renewable energy for development, especially in responding to natural disasters.

Component 3: Renewable Energy Technology Development and Industry Support

This component had an allocation of $125,000 GEF funding and to-date 100% expenditure was recorded against this. Two activities (such as: i) the assessment of feasibility of other upcoming RETs and their applicability; and ii) assessment of power generation potential, productive uses and value-added applications of RE resources for RE project pipelining) were undertaken and completed during the establishment of REFW and PPUC tariff review. Two other activities (such as: i) assessment of local capabilities for rendering RE consultancy services and project development support; and ii) assessment of feasibility of the local manufacture and/or importation of selected RE equipment and components) were also undertaken and completed during the establishment of REFW. Some of the activities, such as wind resource monitoring and mapping, and associated capacity building/training on resource assessment and surveys are being undertaken under the North REP, presumably as part of the co-financing support for SEDREA. The feasibility of identification and importation of RE equipment and components is being undertaken as part of Component 2, implemented by the NDBP.

Component 4: Renewable Energy Information, Training and Advocacy

About a quarter of the funds allocated for this component was spent, mainly on advocacy, community awareness and conduct of information campaigns through the media, school visits etc. The PEO also organised activities coinciding with Earth Day celebrations and was part of many talk shows on radio and TV. The 2012 campaign was on the theme '2012 International Year for Sustainable Energy'. In addition to providing a platform for greater publicity on the NDBP's Energy Loan Program, the event featured

[19] This plan was proposed by the PEO during the visit to Palau of the Resident Representative who, according to Nyk Kloubulak, had given her support for this.

booths highlighting the "Energy Partnerships' amongst PPUC, PEO and NDBP and provided promotional material as giveaways on SE4ALL. There were also public hearings organized on the findings of the PPUC Tariff Study Review.

During the time of the terminal evaluation, there was mention of the PEO and UNDP working together to establish a webpage on Renewable Energy, which would contain links to finished reports and other relevant documentation.

The other activities such as the establishment of RE Center, creation of a database[20] and training for the production of energy curricula for schools remain unfinished. As elaborated in the recommendations, this is unfortunate as available funds could have been used for specific consultancies to complete the tasks. North REP is supporting an initiative with the Palau Community College (PCC) to develop and offer regular course on 'Grid-connected Solar PV Design and installation' as part of the regular program on Electrical Technology.

Project Management

The bulk of the GEF funds for this was used for the support of a fulltime Energy Adviser within the PEO, over three years. This was necessary for the successful implementation of SEDREA given the acknowledged capacity constraint of the PEO with only one full-time person tasked to coordinate the energy work for Palau. The co-financing was for in-kind support of the SEDREA project in terms of the provision of necessary office space, equipment and other logistical assistance.

3.1.3 Management and coordination

An effective project management structure was vital for the project's success. At the design stage, it was envisaged that the Project Organisation Structure would comprise a Project Board consisting of the Executive (PEO), Senior Supplier (UNDP) and Senior Beneficiary (Director, Department R&D), Project Assurance (Palau Energy Working Group) and Execution Teams (Trainer, NDBP and Community) supporting the Project Management through the PEO.

During the inception workshop, concern was raised about the administrative and financial capacity of the Palau Energy Office (PEO) to effectively manage the SEDREA. It was agreed that the capacity of the Project Management Office (PMO) be reassessed by end of 2009 with the appropriate recommendation to be made to the first multipartite

[20] PEO has contracted the Palau Community College (PCC) to work on establishing an energy database. This will be done after the PEO website has been created and launched. The plan is to launch the database by end of February or early March 2014.

review meeting. Options should include cost-sharing of required staff with other on-going and planned national and regional including EU's EDF-10 project.

It was also noted during the Inception Workshop that the commencement of SEDREA was very timely considering that the development of a National Energy Policy Framework including National Energy Policy and Strategic Action Plan was underway. In this context it was recommended that SEDREA activities be reflected in the Strategic Action Plan. In addition, it was decided that the Palau Energy Office is to relocate from the Ministry of Public Infrastructure, Industries and Commerce to the Office of the President, to ensure the orderly and proper development of the energy sector in Palau as one of the priorities of the administration.

However, this proposal has not been carried through. The PEO is rightfully concerned about the need for continuity that is possible with its current situation as a sort of semi-autonomous unit within the Ministry of Public Infrastructure, Industries and Commerce. Discussions on the draft Energy Act may rekindle the debate on the most appropriate setting for the PEO. There was a suggestion that the PEO become part of the President's Office given the GOP's legitimate concerns on climate change and conservation. Whilst this would help elevate the important dimension of climate change mitigation through renewable energy, there is the other fear that political changes would inevitably bring about changes in the personnel, thereby losing continuity and momentum. According to observers, the climate change unit is seriously considering moving back to the Ministry of Environment.

The inclusion of PPUC as an active partner to the SEDREA project, was noted with great appreciation since their involvement was critical for the successful achievement of the SEDREA project's goal and objective. The NDBP's involvement in the component establishing a Renewable Energy Fund Window (REFW) - a crucial element of the SEDREA project - was very relevant and important in ensuring expansion of NDB's loan program to cover renewable energy. Furthermore, PPUC confirmed the relevance of the proposed activities in the power sector and requested that the study on renewable energy electricity pricing and financial incentives study could be undertaken as a matter of urgency. Therefore it was agreed that for the remainder of 2009 two key activities will be support to a review of the tariff of PPUC as well as undertaking the preparatory phase to expand NDB's loan program to cover renewable energy.

3.1.4 M&E framework

The Monitoring Framework and Evaluation was based on Quarterly Progress Reports (QPR) within the annual cycle and on Annual Review and Project Reports. The QPRs

provided by the PEO to UNDP, were generally comprehensive with clear description of the expenditure. According to the ProDoc, 'An issue Log shall be activated in Atlas and updated by the Project Manager to facilitate tracking and resolution of potential problems and requests for change'. It is not clear if this was done on a regular basis, although the narrative did allude to issues in the progress of the project. Furthermore, the ProDoc also mentioned that " A Project Lesson-learned log shall be activated and regularly updated to ensure ongoing learning and adaptation within the organization, and to facilitate the preparation of the Lessons-learned Report at the end of the project'. Again it is unclear if this was done as such a report was not made available to the TE.

The TE was provided Annual Work Programs and Combined Delivery Reports Minutes or notes from the National Energy Committee, which took over the role of the Project Assurance, as specified in the ProDoc. The AWPs from the PEO were comprehensive and well intentioned, and would have benefitted from regular monitoring of the achievements and strategies to ensure completion of pending activities.

There were issues in terms of the timing of these reports that also delayed approval of the budgets for the following phase, undoubtedly contributing to the delay in implementation of activities. The delays were attributed to the work commitments of the PEO, in particular absence on approved duty travels. It is not clear if UNDP was informed about such absences and whether any remedial measures were put in place to ensure that these did not impact on the progress of the projects. Looking through some of the email trails between PEO and UNDP, it seems there were months when no communications were received. The importance of efficient and timely communications cannot be over emphasised in the context of implementing development projects in often remote parts of the region, or at least that are difficult to get to given the time and resource constraints.

3.1.5 UNDP support

The project details a comprehensive matrix of risk analysis and very appropriate responses to counter threats to the project implementation and delivery. At the time of the project inception and initiation, the project was ably supported by UNDP's experts who were familiar with the technical issues of energy as well as project management and its challenges at the national level. It seems, however, that different people were tasked to deal with the oversight of the project for various periods during its implementation. This obviously did not provide sufficient continuity or understanding of the project to enable more direct UNDP advice in assisting the PEO in

reorienting/refocusing activities with the changing circumstances within the country. The RTA undertook several visits to the country during the initial stage of the project and that was found to be very useful. However, subsequently the lack of technical support seemed to have had some effect on the progress and reporting of the activities. In the absence of records/minutes of meetings of the Project Steering Committee or its successor, the National Energy Committee (NEC), it is unclear whether the need for additional technical support was mooted. This is the platform where all key stakeholders, including UNDP, were expected to meet and discuss, on a regular basis, the progress with activities. This would have been the forum to hear of request for any greater technical assistance. In the absence of a direct request, UNDP and other members should have been able to assess the rate of progress and flag areas that would have required more attention.

UNDP also needs to enhance its communications with countries and individuals tasked to engage in various activities. The TE's own experiences with the lack of timely communications and responses from the UNDP, let alone from the other stakeholders within the country, has been frustrating. Needless to say, the delay in provision of information in a timely and systematic way has a major impact in meeting deadlines and enhancing efficiency in the processes.

3.2 Project Level

3.2.1 Achievement of results

The Project Results Framework, in Table 2 below, summarises the key achievements based on the identified indicators.

Table 2: Project Results Framework

	Description	Indicator	Baseline	Target	Status December 2013
Objective	Reduction of fossil fuel consumption through RE utilization	• Installed capacity of RE based systems • % RE Share in national energy mix • RE contribution in tons of oil equivalent	2.7 MW in 2010. 2.4% in 2010. 3.4% in 2015. 25,916 toe.	8.76 MW in 2010. 7.8% in 2010. 12.8% in 2015. 20% in 2020 National Energy Policy Target. 91,466 toe.	0.664 MW. 1 MW likely by 2015, i.e., <10% of average demand. Target of 20% by 2020, possible following 5MW by IPP (under negotiations)[21].
Outcome 1	Clearly defined national legal, policy and institutional framework	RE regulation established thru EO	Not yet organized	RE policies and IRR are established and enforced by Year 3.	Draft Energy Act being finalized, due to be completed in 1st Quarter, 2014 after endorsement by NEC and legislature. RE unit established within PPUC. All RE projects will go through PPUC for approval.

[21] This is indirectly attributable to SEDREA, in terms of being the catalyst for relevant legislations, regulations etc.

		No. of permits licenses for RE projects	None	A permitting process and clearing house established and operational by Year 3.	Clearing house to be established under the Energy Framework and Energy Act.
Outcome 2	Affordable capital and financing cost of acquiring RET	RE Fund Window is established in participating private and public banks	None	REFW established and operational by Year 3.	REFW fully operational with RESP alongside EESP for new homes and REESP for existing homes.
		No. of key personnel of host banks and financial institutions trained on RE financing	None	At least 10 by Year 2; 20 by Year 3; 25 by Year 3	All loan officers of NDBP
		No. of projects financed by public and private finance institutions and effectiveness of financing schemes	None	75% of all who availed of loans	18 on-grid systems installed, 10 assigned and 2 being processed. All 30 systems will be in place by 1st Qtr. 2014. Of 35 off-grid systems, 1 demo installed, 20 assigned to SW islands, remainder for Kayangel Island being rehabilitated. To be supported by North-REP[22].
		No. of RE projects meeting financial viability objectives	None		18
Outcome 3	Established dependable and diversified local RE industry	No. of service providers and service suppliers	None	5 by Year 2	4
		Annual business volume	None	At least 20% annual growth	

[22] There was a strong recommendation by the MTR to utilize these devices rather than let these deteriorate in storage. The only demand that was established by the PEO was for the installations in these outer islands. Indirectly they would assist in reducing use of other sources of energy for heating water. Hot water for bathing/washing is not a priority in these places but its use would also assist in sanitation and hygiene.

Outcome 4	Improved confidence and public interest on RE projects.	No. of RE related conferences/workshop, training held within and outside Palau	None	Four (4) per year	3 training workshops conducted during the 1st Qtr. 2013 for NDBP staff and private sector. One completed in 4th Qtr. 2012
		Increase in productive application of RE	None	At least 10 productive applications of RE evaluated and project identified by Year 1.	3 PV and 3 SWH systems on commercial buildings[23].
		No. of RE project generating revenue	None	At least 5 RE projects are generating revenue by year 3.	18, due to increase to 30, on-grid systems by 2014. One off-grid system to increase to 35 by 2014.
		Sales volume increased	None	Electricity sales from RE growth at least 15% per year	
		Renewable energy and energy conservation as part of school curriculum	None	RE and energy conservation are incorporated in the primary, secondary and tertiary levels by Year 3.	The Palau Community College is finalizing course on Grid-connected solar PV Design and Installation (supported by North REP)

[23] Savings accrued from these as a result of reduced power bills would generally help reinvestment which is good for the economy.

The overall goal of the project was to reduce annual GHG emissions as indicated by the reduced amount of fuel used for power generation and the reduction in the amount of carbon dioxide emitted as a consequence. Obviously the goal was aligned to the GEF Operational Program under which SEDREA was funded. The baselines indicated for the actual RE use in 2010 seems inflated making the projected figures for 2015 overly ambitious. From all records and discussions with the PEO, the RE contribution to the total energy demand in 2010 was around 0.2MW. The current figures are around 0.8MW, approximately 4-fold increase, and given the pending installations to residential and commercial sites under the RESP, this figure could be around 1 MW by 2015. This will be close to 10% of the average national electricity demand. It must be stressed however, that the figures include contributions from other projects, notably the EU funded REP5 and North REP, as well as from bilateral sources. However, SEDREA had a major impact in catalyzing support through the necessary regulations, framework and institutional arrangements. The PPUC is currently considering a proposal from an IPP for a 5MW system, and if this is realized, the national target of achieving 20% renewables by 2020 will become a reality.

Outcome 1

SEDREA alongside other projects, notably the EU funded REP5 and North REP, was instrumental in catalyzing work on rules and regulations, policies and framework and institutional arrangements which were vital in facilitating concrete action on renewable energy. These created the necessary enabling environment and helped reduce barriers to the uptake of renewable energy in Palau. The National Energy Committee provided the coordination amongst the key stakeholders and served as the important high-level link to the political decision making machinery of the Government.

Some of the key regulations and policies that have been realized are (bracketed names are of the entities providing primary support):

- Tariff Review (SEDREA);
- Net-metering Act (SEDREA);
- Energy Act (in draft) (North REP & SEDREA);
- RE Framework (North REP): Standards and Guidelines for IPPs; Tariff Review; Grid Stability studies (one by IRENA); Training Needs Assessment for PPUC; and Investment analysis;

- Energy Loans Program: RE (SEDREA); EE New Homes (IUCN); and EE Retrofitting (North REP); and
- National Energy Committee (SEDREA).

PPUC has created an RE Unit and strengthened regulations. A consultancy through the PEO led to the development of a "RE framework for PPUC" that includes: (1) Grid-connection Guidelines, Regulations and Standards; (2) Capacity assessment report and revised tariff schedule; (3) Grid stability report; (4) Investment analysis comparison; (5) Power Utility Policy Paper; and, (6) Tender documents for Independent Power Producer renewable energy proposals with PPA template.

The Palau Energy Act and Framework are being finalized. This will lead to a review of the PEO status, i.e., whether it should be upgraded as a department or bureau. The Consultancy, jointly with the North REP, is ongoing and the expected time of completion is first quarter of 2014. The submitted draft is undergoing review by the NEC and government.

Outcome 2

The Renewable Energy Subsidy Program under the ELP, implemented by NDBP, is the most successful and noteworthy achievement of SEDREA. Financing for renewable energy is one of the biggest impediments to the diffusion of RE in the Pacific. The NDBP, through the REFW, and based on its previous experience with the Energy Efficiency support program supported by IUCN, has been able to demonstrate a pragmatic approach to the enhancement of RETs through a comprehensive financing approach covering specific components such as

- Market assessment;
- Guidelines and operating procedures for loans for RE systems;
- Capacity assessment;
- Training, including NDBP staff on the new portfolio;
- Awareness and training for industry;
- Marketing and promotion or REFW;
- Coordination with suppliers and service providers;
- Coordination with utility, PEO and other stakeholders;
- Quality assurance;

- Incentives to encourage potential customers; and
- Education and advocacy.

The TE was provided with an impressive array of materials, documentation, publicity material in the form of brochures and CDs, posters and samples of training materials used for education and capacity building. It is a tremendous boost and a huge measure of the success of this component that the ELP model is now being sourced by other countries in the region.

A regional planning and training workshop aimed at sharing the experiences on the ELP was organized by PIGGAREP and IUCN, and held in Palau in 2011. The concept is now in the process of being replicated to ADFIP (Association of Development Financing Institutions in the Pacific) members. The REFW is being seriously considered as part of subsequent phase of PIGGAREP for RMI and Tuvalu, while IUCN is responding with support for subsidies sought by the National Development Banks of Cook Islands, Kiribati, Samoa and Tuvalu. NDBP was invited to show case their product and talk about their experiences in Yap.

There were also 3 technical training courses conducted on RE installation and maintenance for the private sector. The Bank's commercial acumen in ensuring deliverables such as consultancies and training done in a timely and effective manner ensued a high level of professionalism and business approach to quality control, monitoring and evaluation of the program.

It was always the intention to phase down the subsidy provided to consumers as incentives to invest in solar PV. However, there is understandable anxiety about the sustainability of the scheme in the absence of subsidies in the near term. There is a possibility of the GOP diverting some of the funds from the UAE[24] to the subsidy scheme. If this were to happen, it will be a real boost for the RESP and much needed Government endorsement of the value of the program. In the meantime the NDBP is continuing its efforts in marketing and educating the public on the value of investments in RET, given the realistic scenario of rising fuel and electricity prices.

Outcome 3

[24] As part of UAE's support to the Pacific, Palau is expected to receive $5m, modalities for which will be finalized in 2014.

The sustainability of the RE program is largely dependent on the meaningful participation of the private sector. Through the REFW, the NDBP had undertaken training and capacity building in the private sector, and maintained a close partnership with industries. The industries have been very much part of the training programs organized by the NDBP and currently there are at least two active contractors[25] that are working closely on the program. The Bank is in negotiations with the contractors to carry inventories for RE, as part of a line of credit.

Several private sector entities such as the Palau Pacific Resort, Carp Island Resort and WCTC shopping center have taken independent ventures into installing RET's in the form of Solar PV grid connected systems on their establishments. Palau Hotel, Palau Resort and Penthouse have installed solar hot water systems. PPUC and PEO coordinated the energy audit of the Penthouse leading to this action.

Currently 7 companies are certified in RE installations of which 2 are actively involved in supplying RET in country. Two local companies (Galaxy Builders and Wind & Solar Power Tools) have been trained during the second and third quarters of 2012 to distribute and install RE systems (such as solar PVs for household electricity and household solar water heaters. One of these companies is engaged in SEIAPI (Sustainable Energy Industry Association certification authority.

The Energy office and the NDBP have participated in numerous conferences and workshops both in country and abroad such as the Pacific Islands Energy Summit, Climate change and financing workshop, Micronesian President Summit. Palau presented on the success stories of Palau's Energy Loan Programs through the national Development Bank. Palau was recognized at the recently concluded "Ashden Awards" held in London, and awarded 1st runner up in the Asia Pacific region small island developing states for most innovative RE initiative.

Overall, the observed and documented impacts are commendable and include:

- Increasing uptake of solar photovoltaic (PV) and solar water heaters (SWHs) as the two most technologically mature and commercially appropriate renewable energy technologies (RETs) in Palau and were initially targeted by the REFW; and

- Increasing demand for follow-up/refresher training by all three groups of stakeholders (NDBP staff, local vendors and contractors, PPUC RE team) to expand understanding of the technologies, exact benefits associated with solar

[25] These are Galaxy Builders and Wind & Solar Tools based in Koror.

PV and SWHs, and for installing and maintaining solar PV installations.

Outcome 4

The training for technical support for the operations and maintenance, as part of the warranty for the equipment, would be transferred to the Palau Community College that has agreed to include a course on "Grid-connected Solar PV Design and Installation" as part of its Electrical Technology offerings. According to PCC[26], every year around 6-8 students would be expected to graduate in the program with skills in PV design and installation. The GSES[27] had earlier carried out targeted course on 'train the trainers', that was successfully completed by 5 individuals, one of who would be running the program at PCC.

SEDREA has helped enhance interest in renewable energy at all levels. Through the NEC, the key stakeholders: Government, PPUC, NDBP, Chamber of Commerce, the overarching decisions and directions relating to the renewable energy sector has been advanced. This helps allay genuine concerns such as erosion of its revenue base from the utility (PPUC) and the impact of an explosion in the number of small-scale residential units that would be feeding into the grid. Through targeted studies such as on-grid stability, tariffs and robust guidelines on the quality of systems and the installations, there seems to be increasing recognition of the role of RE systems in the provision of energy in Palau.

The establishment of a Renewable Energy Unit within PPUC is a testimony of the commitment of the utility to exploring renewable energy options. From private discussions with the CEO, it is clear there is a preference for large systems such as the IPP proposal on a 5MW system currently under discussion. A proliferation in numbers of smaller systems at the levels of residences and commercial buildings is a concern to the utility. However, this seems to be based on lack of clarity on the benefit that will accrue in replacing diesel fuel currently used for power generation as well as the cost of maintaining and operating these engines. The role of PEO and NEC in supporting further analysis on the various scenarios for Palau will be helpful to everyone. It seems a lot of the anxiety is based on lack of information.

NDBP's continued interest in supporting the enhancing the RESP under the ELP is very crucial. There is a core of staff with intimate knowledge about the portfolio and are making serious attempts to market the program in collaboration with the PPUC. The

[26] Private communication with Jerry Taroy, Palau Community College.
[27] Global Sustainable Energy Systems from Australia has been conducting short courses in the region on design and installations of grid-connected PV systems.

inclusion of information on the ELP with the utility bills is one such approach. It has been suggested that the information could also include meaningful calculations on savings based on typical usage, investments etc. The Palau community is very enlightened and would be more responsive to these facts rather than merely pronouncing in general terms that 'PV systems will save you $$s', for example.

The general level of awareness and interest in the PV systems is evident from the requests being received by the NDBP. After a relative lull to 2011 when 2-3 systems were installed, in the last two years all the remaining systems have been either installed or allocated. This has been helped by the feedback from the consumers who are benefitting from the new tariff arrangements. There are still niggling issues such as the methodology for the calculations as agreed to by the PPUC and NDBP, which are designed to show savings to the consumers. The lowering of the life-line tariff rate to 250 kW (previously set at 500 kW) per month means a reduction in cross-subsidies.

There is increased interest from the commercial sector for PV systems. A few businesses and at least one resort has invested in its own PV system, i.e., has not gone through the NDBP. A resort on Rock Island has expressed interest in stand-alone installation on its bungalows. The remaining stand-alone units are being considered for installation on the homes on Kayangel Island, which was devastated by the recent typhoon Haian[28]. Under the current provisions of the Electricity Act, consumers are permitted to generate power for their own use. There is scope for greater uptake by this sector if some of the issues with the PPUC can be resolved. This is being undertaken through the RE Unit which has been specifically set up to provide technical support and clarify any issues the consumers may have regarding installation, operation and maintenance, savings, billings etc.

There is a further option to use the units as part of the proposed SIDS DOCK – PIGGAREP+ project of installing solar PV power water pumping system in Kayangel. This is part of the key interventions to improve the water supply system in the island and will involve the installation of new water pumps, solar photovoltaic (PV) system to power the pumps and an overhead storage tank[29]. The project will mainly involve the provision of an alternative solar PV water pump for the water supply system in Kayangel State. This project is also in support of the country's water policy, this aims to protect and conserve Palau's water resources, ensure Palauans have access to safe, affordable, sustainable water supply and wastewater services, and

[28] Apart from installing the systems with the assistance of the SPC North REP, the TE is not sure what else can be done, given that these SHS units did not generate interest amongst the commercial sector.
[29] North Pacific: Sustaining Renewable Energy and Energy Efficiency Measures in Micronesia (SREEM).

to see that these services are managed and operated sustainably and effectively. The project will involve the Palau Water & Sewer Corporation (PWSC)[30] in coordination with the Palau Energy Office.

Through the application of solar-PV powered well water pumping system in Kayangel State., the project would lead to sustainable and environment friendly operation of well water pumping system; and reduced energy costs for well water supply.

The adoption of a building code will be a huge plus to the RE efforts. Currently the NDBP has its own guidelines in relation to the energy efficiency applications from both new and retrofitted homes. There are specific requirements also from applicants under the RESP. A building code will set a minimum guideline and enhance the number of buildings that will be eligible for support under the program.

The use of solar water heaters (SWHs) has also seen a resurgence of interest given the benefits demonstrated trough energy audits conducted by PPUC RE Unit and PEO. The installation of SWHs at the Palau and Sea Passion hotels are visible manifestations of the advantages of investment in this area.

There is a huge potential for investment in renewable energy systems in the growing tourism sector, given the number of new resorts, hotels and service industries coming up. These range from solar heaters to grid-connected PV systems. NDBP, in conjunction with the local suppliers, is assisting in identifying potential suppliers of PV and SWH equipment. There is understandable safety concerns about sourcing relatively cheap systems from the Asian market and that is why the inventory has thus far being acquired through Australia and US suppliers. However, these tend to be a lot more expensive compared to the competitive prices currently available internationally. It should be possible to set up a quality assurance arrangement that will be able to vet the goods potentially available a lot more cheaply from the neighboring Asian markets.

3.2.2 Factors affecting implementation

[30]The Palau Water & Sewer Corporation (PWSC) is an independent government owned utility with the function of managing, operating and providing water and sewer services nationwide. The act establishing the PWSC was signed by the President of Palau on 30 Sep 2011. It was established because government finds that the adequate provision, maintenance and improvement of water services are vital to the economy, health and environment of Palau. The main responsibilities of the PWSC are: (1) Centralized control and operation of existing water systems, (2) Provision of reliable water services through the establishment, maintenance and improvement of water systems; and, (3) Establishment and operation of a commercially sound water and fee structure for water customers.

The MTR alluded to a period of uncertainty following the change in the leadership at PPUC that raised a lot of issues about the utility's support for the program. There was a temporary minor setback that saw little progress in rolling out the PV systems. Fortunately this situation was resolved, and subsequently there was a marked increase in interest in RE systems resulting in major progress in terms of implementation of the key components of the project. The component implemented by the NDBP has proceeded well and resulted in tangible deliverables.

3.2.3 Project Management framework

The full time support of an Energy Planner at the PEO was helpful in the implementation of SEDREA, but given that he was the only other full-time staff in addition to the Director, his services were also diverted to other related activities such as attending meetings, conferences and workshops, some with marginal direct value to the project. Such arrangements are not unusual in Governments and small departments with limited human resources. This did inevitably affect the reporting requirements[31] as well as other activities that remain incomplete. It is assumed that the additional activities undertaken by the Energy Planner, appointed to coordinate SEDREA, was endorsed by UNDP office which should have been aware of the implications on project delivery and execution[32].

This risk was recognized in the Project Document and was expected to be ameliorated with support from the UNDP. It is not clear to what extent this direct technical UNDP support was possible as the implementation support was transferred from the RTA (with expertise in energy matters) to staff with skills in administration and financial matters. It was useful however to have the consistency in terms of the in-country position although the incumbent is jointly responsible for UNFPA and UNICEF.

3.2.4 Strategic partnerships

One of the major strengths for SEDREA was the excellent partnership between key stakeholders. The active involvement and participation of the NDBP, PPUC, PCC and the PEO were essential for the ownership and shared vision for the project. The best thing that happened for SEDREA was the responsibility for the second component, with a budget that was almost 50% of the total budget, was given to the NDBP. The Bank implemented this component competently and professionally through use of appropriate consultants and by undertaking related activities such as capacity building, training and advocacy. The early participation by the private sector, through PCC and

[31] See, for example, the email exchanges between PEO and UNDP, and subsequent APR for 2012
[32] Since the Energy Planner is funded 100% by SEDREA, he should provide full time support to the project, and this should have been overseen by UNDP and the PEC during the implementation of the project.

other local contractors was important. The personal commitment and passion shown by the leadership of NDBP and their genuine belief in the role or RE in Palau's energy sector was also instrumental in shaping the course of the project.

The NEC is the body tasked to undertake this coordinating role with support from the PEO. Its role and potential in the overall development of the energy sector in Palau is recognized. The 'Energy Framework' and the 'Energy Act' would be vital in providing a strong structure and governance arrangements for the energy sector, in the context of developments in related areas such as climate change, conservation and environment.

SEDREA also worked reasonably well with other parallel projects such as the EU funded North REP with which the PEO shared an office. With the end of the funding for the position of the Energy Planner supported by SEDREA, the incumbent is now moving across to work for the North REP project, which will also pick up some of the remaining activities that were not completed. The TE had the benefit of excellent discussions with the North REP Manager and team, based in FSM, and who were visiting Palau at the time of the evaluation. The positive and flexible attitude of the North REP Team in strengthening the synergies and partnering in the common objectives is commendable. For example, it is working with SEDREA in the finalization of the Energy Act and Energy Framework, and is providing the resources for the logistical support as well as the installation of the off-grid PV systems on the outer islands. According to the updates from the PEO[33], approximately half of the funds for the completion of the Energy Act, will be provided by SEDREA.

One of the actions under SEDREA was the creation of a dedicated website that would provide information on the outputs and other relevant information and documentation on the energy sector. According to Nyk, the website is almost complete, and is a development that has been accomplished through an arrangement with the Palau Community College. This was done after the TE country visit in December and can be verified through the website **www.palauenergyoffice.com**.

Ratings

Table 3 summarises the overall ratings for outcomes in terms of effectiveness, efficiency, impact, relevance and sustainability based on the above findings and analysis.

[33] Personal Communication with Nyk, Bonn, March 2014.

Table 3: Summary ratings by component

Outcomes	Relevance	Efficiency	Effectiveness	Sustainability	Impact	Overall
1. Clearly defined national legal, policy and institutional framework	S	MS	S	S	MS	S
2. Affordable capital and financing cost of acquiring RET	S	S	S	S	S	S
3. Established dependable and diversified local RE industry	S	U	U	MS	MS	MS
4. Improved confidence and public interest on RE projects.	S	U	MS	MS	S	S
Overall	S	MS	S	MS	S	S

Relevance

The overall objective of the project the "Facilitation of the reduction of fossil fuel consumption in power generation through the widespread application of RETs to meet household electricity needs and provide rural energy services in the country's outer islands", in line with the GEF Climate Change Strategic objective (SO-5), which is the promotion of renewable energy for the provision of rural energy services. The focus of the project design for SEDREA's GEF-4 funding was to support enabling activities that remove barriers, and to develop markets for renewable energy (RE) in Palau in its quest for a less carbon-intensive development in the long term. This has positive long term impacts for the sustainable development of Palau and its international obligation in combating climate change by cutting down on greenhouse gasses, albeit that these are at almost negligible levels in the global context. Palau is at the forefront of the debate on climate change and is recognized as an international leader in championing environmental issues including conservation.

Effectiveness

The project achieved some of the key objectives, although there are others where work is in progress. In some cases the outcomes would not be realised until a few years later. In a few cases the outcomes are not going to be realised unless the project is extended, and more specific strategies are put in place for the completion.

Efficiency

The implementation processes were the major setback for the project. The lack of efficient communications on the status led to the lack of alternative arrangements to deal with the situation. UNDP's direct technical assistance in the field would have been helpful in progressing many of the activities, which are being postponed. During the initial implementation of the project, the RTA from Suva undertook 3 visits and, as an expert in the field, and was intimately engaged. Subsequently, the project oversight from the MCO was undertaken by personnel, who seemed to focus more on the process, i.e., ensuring UNDP's necessary fiduciary and administrative requirements (which are clearly important as well), rather than also be in a strong position to support the technical oversight that such projects require, particularly in the Pacific, with limited capacity. It is unclear why these issues were not identified during the NEC meetings that involved UNDP, which should have flagged the issues of inadequate and untimely reporting, lack of progress on activities and discussed strategies to deal with these.

Sustainability

The issue of sustainability in inextricably linked to finances. There in understandable anxiety from NDBP if the subsidy scheme was suddenly stopped, even though it is acknowledged that it will need to wind back the subsidy over a period of time. The efforts of the Bank and the Government in sourcing other funds to continue the subsidy and wind it back gradually seem a good option. In a small population like Palau where everyone is aware of the arrangements, there inevitably are questions by intending customers as to why they do not have the benefit of subsidies while their predecessors had.

It is also important, however, for the longer-term sustainability that expectations for receiving 'free' energy from donor funded projects be managed carefully. There is the O&M costs and that of transmission. It is important to factor in true costs of producing and transmitting the energy to enable reinvestment of capital into more efficient systems and better services. This requires sustained education and awareness about the benefits of RE investment even without subsidy.

A lot of hope is pinned around the enactment of the Palau Energy Framework and Energy Act that will strengthen regulatory and institutional arrangements. The PEO needs to be strengthened as it is not possible for one person to undertake all duties in the energy sector relating to policy and also provide technical support at project level and coordinate the energy activities effectively.

Renewable energy, energy efficiency and technology will feature prominently in Palau's development, especially in the common resolve to combat climate change impacts. There are lot of opportunities, especially in the booming tourism sector, for greater investment in renewable energy technology by the resorts and hotels.

Impact

The project potentially will have significant environmental and ecological impacts in terms of reducing carbon emissions and pursuing a non-carbon pathway to development. Small island nations like Palau, which are extremely vulnerable to the impacts of climate change, want to demonstrate its commitments in reducing GHG emissions. Palau has set an ambitious target of 20% renewables by 2020, which seems achievable, thanks mainly to the role played by projects like SEDREA and others such as EU funded North REP. In terms of economic sustainability, this makes a lot of sense for Palau given its dependence on fossil fuel for power generation. A reduction in the use of diesel fuel would mean proportional savings in the balance of payments and more resources for other priorities.

Project Implementation, Formulations and Results

In terms of Project formulation, implementation and results (achievements), Table 4 summarises the overall assessment, based on the consultations, reports and deliverables. There was large variation in respect of the different components of the projects, as discussed earlier, and the summary is an attempt to give it an overall rating. The guiding questions for the evaluation are given in Annex E.

Table 4: Overall rating summary

Project	Rating	Justification
Formulation	S	The indicators and the potential deliverables were ambitious, and important for. Accurate baselines and projections would have led to more realistic targets, which would have been achievable with good adaptive management strategies.
Implementation	MU	The challenge for the PEO in executing the project was recognised in the risk analysis and flagged during the inception meetings. The coordination and communications between UNDP MCO and PEO should have been enhanced to ensure timely deliverables and management of risks. Timely and precise information exchange would have enabled more effective response measures.
Results	S	Notwithstanding the deficiencies in some components of the project, the innovative financing mechanism was a significant outcome of the project. This required the necessary enabling environment through regulations, policies, institutional frameworks, which were identified and progressed in collaboration with other partners, notably the EU funded projects. The coordination amongst the key stakeholders was strengthened and the private sector was meaningfully involved. The advocacy, capacity building, education and training activities played a huge role in the overall awareness and understanding about RE amongst the community.
Overall	S	Overall the project has delivered positive outcomes and good results. However, this could have been greatly enhanced with better implementation and execution arrangements.

More elaboration is provided for the rationale of the ratings in the following paragraphs.

Project Formulation

In retrospect, the basis of the numbers used in the baseline seems unclear. For example, the design had a ambitious reduction target of: 7,900 tons of CO_2 from a total of 4.6 MW RE capacity that was expected to be installed during the SEDREA project implementation; post-project reduction target of 53,000 tons of CO_2 from replication projects of about 19.6 MW capacity (installed during the 5 years after the SEDREA project end); and an indirect savings target of 31,800 tons of CO_2 from an additional unspecified extra capacity, for a total project CO_2 reduction of 92,700 tons.

However the main Koror-Babeldoab grid's weekday peaks are just around 12 MW and under 20 MW if the private generation (not connected to the PPUC grid) are included. Moreover there has been no electricity demand growth for some time in Palau. There was a decrease in total energy generated from around 102 MWH in 2008 to around 75 MWH in 2012. So this means that the wider SEDREA GHG reduction targets are based on more than 100% of RE penetration of the daily main Palau electricity grid peak loads without any storage – which is clearly not physically possible.

This obviously has implications in demonstrating the targets as identified in the verifiable indicators. There have been other projects with similar situations where the evaluations may not look as good when measured against the original indicators. There should be the flexibility to revisit the numbers and revise the indicators to show an accurate picture. There is a case for better scrutiny of the project as it goes through the various stages for consideration. It is in the interest of both the implementing agency and the country hosting the project to ensure greater precision to avoid inflated expectations.

There also seems a lack of recognition about the length of time it takes the Government machinery to have policies approved by the legislature, right from the time these are conceived and formulated and goes through the various processes such as public hearings, committees and other bureaucracies. The target of having certain policies established and enforced by year 3, for example, are not practical especially when the finalisation of certain laws and regulations depends on other relevant pieces of legislation that need to be in place. The finalisation of the Energy Framework and Energy Act are good examples where these will benefit from the other legislations such as the Net Metering Act, Tariff Review, RE Framework etc.

Some of the targets e.g., "at least 20% annual growth" in business volume and 5 service providers/suppliers by year 2, given there were none at the beginning seemed optimistic. It is not clear how these numbers were derived.

Similarly the target for training '10 bank staff by year 2 and 25 by year 3' is not practical given that the NDBP has a total staff component of 16, that include administration. There are 2 staff in housing and 4 in commercial, who have all been trained under the programme.

The length of time involved in getting legislation approved could be better reflected in the risks and managed with the benefit of the activities and progress on the ground.

The Project Organisation Structure, although well intentioned, was not used as

envisaged in the project management. It is not clear what the envisaged roles of Team A (Trainer) and Team C (Community) were and seemed to have been designed to support the PEO. The Project Assurance (Palau Energy Working Group) did not exist and apparently the roles were taken up by the National Energy Committee (NEC). It is not clear, in the absence of any records of meetings etc., how regularly the NEC met and the scope of discussion on relevant items. This is the body that should have flagged any deficiencies in the management and reporting arrangements and should have tracked progress according to the project work matrix.

Project Implementation

The PEO with a workforce of 2 was clearly challenged in executing the project. In cases where major components were given to other entities such as the NDBP for the financing, the project did well. The logical thing would have been for the NEC to recognise this and provide workable solutions such as contracting sub-components to other entities. For example, the creation of a website and data base could have been accomplished by a local IT contractor; the schools' curriculum design could have been given to the Ministry of Education Curriculum Unit and the Palau Community College, right at the beginning of the project.

The delays in disbursement of funds from the Government system was identified and was resolved by getting these directly from UNDP MCO in Suva. Consequently the disbursements have been in line with budgets and there is no evidence of any over expenditure in specific budget lines. However, the disbursements depended on timely reporting and acquittals, which were also affected by the ability of an overstretched PEO. Perhaps the UNDP could have had other strategies to assist by sending appropriate personnel to help with the progress of the project. Such issues should have been flagged at the NEC that could have given directions and recommended changes to the log-frame matrix.

The NEC was expected to be the key coordinating mechanism between all stakeholders such as NGOs, Government agencies and the private sector. From all evidence, the consultants hired for the different activities completed the tasks effectively and efficiently. The reports were of excellent quality and in line with the terms of reference. NDBP established excellent rapport with its consultants who showed a lot of commitment and passion for the project's goals in carrying out their work.

There should have been more effective monitoring of the progress with respect to the original indicators and targets. This would have helped with the early identification of

the bottlenecks and issues that were impeding the project's progress.

It does seem, communication (or the lack of it) was a major issue and continues to be so for the project. The success of the project is dependent on identifying issues, communicating these to relevant entities and taking remedial action as and when necessary. The Joint UN presence in Koror should be a help and, in this modern era of easy access to the internet, there should really not be an issue in communicating effectively, efficiently and in a timely manner.

The budgeting has been effective, and disbursements made in line with annual budgets. However any delay in the receipt of the quarterly and annual progress reports, undoubtedly had implications on the approval of the budget for the next phase.

Project Results

The REFW is probably the most significant achievement of the project and has demonstrated a meaningful approach to the important issue of financing not just for Palau but also for other Pacific Island countries. The success required commitment by the leadership and a genuine belief in the cause. However, there is a risk that any change in leadership may not show as much enthusiasm or may have different priorities. In the case of Palau, however, there is also much needed support from the Government, which is keen to continue the loans program. The GOP's intention to use some of the UAE's development assistance funds for the subsidy program underlines the Government's commitment to provide a transition period before the complete phasing out of the subsidy, which could threaten its viability.

The trainings and capacity building undertaken as part of the bank's program have been rewarded with the genuine interest by the private sector and the involvement of at least 2 local contractors. While many of the personnel who were initially trained have moved on to more lucrative jobs abroad, there is a core of trained individuals who remain and are now engaged in further training. The involvement of the Palau Community College assures sustainability to the training program.

The database and website are important for the dissemination of the results of the project and for the general update on renewable energy and energy efficiency issues. The schools' curriculum development would be another useful way of further enhancing the interest of the school children, parents and the community on renewable energy and should be actively pursued. This activity could be easily undertaken learning from a previous ACP-EU funded project on Energy Conservation and Awareness Programme for

Schools (ECAPS)[34] carried out in Fiji and Tonga.

It is important that any fears or concerns about RE, the role of individual scale PV systems through participation of residential and commercial units, be managed through mechanisms like NEC. The PPUC has concerns about the impact on maintenance and quality assurance through the proliferation of such systems, which, in the future, may be sourced cheaply from a number of overseas suppliers. The other fear of loss in revenue based on the claim that 'some consumers are not paying anything under the net-metering arrangement', need to be allayed through modelling that will show the revenue to be saved due to decrease in the purchase of fossil fuels will more than offset the small apparent decline in revenue from residences.

Overall

Based on the criteria in Annex F, the project can be classified as **satisfactory** - marginal in some aspects but satisfactory in others. The financing window established under the project and the enabling environment created helped remove two of the most important barriers to renewable energy diffusion and uptake. The REFW is a great model and has been shown to work in Palau under the project. It is a great example of how the commercial sector, including development banks, can be involved in the process and contribute tangibly to their social responsibilities in the context of small island countries. The positive results of SEDREA are now being considered in the Pacific through ADFIP and a partnership with IUCN with its Italian and Austrian funding as well as via the UNDP-GEF PIGGAREP project.

The rating corresponds with the DO ratings by UNDP for the years 2010, 2011 and 2012 and up to June 2013.

UNDP was assisting the PEO during the time of the terminal evaluation to progress some of the pending activities. It has not been communicated clearly which activities are being progressed and the expected times of completion. There is also reference to UNDP not agreeing to the request for an extension to the project after mid-2013, and that the Project Manager has finished his contract with SEDREA. Hence the current dynamics relating to this direct assistance by UNDP and its relationship to the terminal evaluation, which is being timed at their request since it had been pending for about 6 months, are confusing.

[34] Under the ECAPS project pupil workbooks and teacher guides were developed for different age groups at primary and secondary schools under unique partnership between the Fiji Ministry of Education, Curriculum Development Unit, Fiji Department of Energy and USP.

Chapter 4 CONCLUSIONS, RECOMMENDATIONS & LESSONS LEARNT

SEDREA, borne out of the earlier PIREP and PREFACE studies was one of the two national projects, the other being ADMIRE in RMI, and has been successful in achieving some significant outcomes. The REFW through the NDBP was able to demonstrate an innovative financing mechanism, often the biggest barrier to the uptake and diffusion of renewable energy technology. The process was accomplished via an inclusive and coordinated approach that involved key stakeholders: government, PPUC, the PCC and the private sector, in creating the necessary enabling environment by bringing in the necessary policy and regulatory changes. This was associated with necessary training, capacity building and awareness amongst all the key stakeholders as well as the community. The project catalysed various studies on issues ranging from tariff review, net metering and initiated work on the Energy Framework and Energy Act. These outputs completed by consultants were professionally done and generally of good quality.

The project also benefitted from the earlier work arising out of the EU funded REP5, in particular the emphasis on energy efficiency, which was also taken by IUCN, and its successor the North REP project, which is still being implemented. There were great opportunities to realise the synergies and complement the various activities. In many ways SEDREA was able to find a niche that addressed a major gap in the ongoing parallel projects.

After the enthusiastic beginning of the project in 2009, there was a slight lull in the progress given the changes in the views of PPUC leadership in 2011, a risk that was not anticipated. Fortunately for the project, the situation reverted back within a few months when the status quo was restored.

The successful execution of the project required a robust project management structure with good technical input from the Implementing Agency. It seems the institutional arrangements were not effective leading to lack of precise and timely reporting on the status of the work. This was necessary to take necessary measures such as realignment of the strategies to ensure progress. This can be contrasted to the component that was given to NDBP to execute. This component was carried out efficiently and effectively.

The terms of reference of the Steering Committee, a role supposedly taken up by NEC, should have been well developed, in consultation with all stakeholders, and firm

communication lines established between the PEO and NEC. It is the PEO's responsibility that the NEC is kept regularly informed of the status of all activities (i.e. between committee meetings, not only shortly before meetings) and should ask that all decisions are explicit and clearly recorded in meeting minutes. Where there is no clear decision, this should be noted. The NEC should approve national work plans and budgets. The NEC's meeting schedules should be approved and adhered to. The UNDP should be included in all NEC meetings and participate via Skype. The important aspect is communication between members and regular updates through electronic means. Often discussions on SEDREA were a minor item on an otherwise intense agenda for the NEC and the discussions did not do justice to the project. There was probably a need to organise separate targeted meetings to discuss SEDREA.

The NEC should have played an active and prominent role in the design, implementation and monitoring of the project's progress. This role should have been reinforced by UNDP at every opportunity and endorsed by all stakeholders at the inception meeting. Given that the project was supporting an Energy Planner, UNDP should have ensured that the incumbent is involved full time on the project and participation in any tangential activities is an exception rather than the norm. Moreover, UNDP should have a roster of experts to draw upon to assist the national execution in cases of difficulties, in situations where it is not able to provide this from within its technical staff, as seemed to have been the case for this project.

Whist the requirement of quarterly reporting was adhered to, it seems accurate status reports were not always forthcoming. The narratives from the reports were not always translated and measured against the deliverables in the Project log frame. The reporting by activities seemed to be rare, and the annual reports did not always capture these systematically. It was important to report actual activities and achievements according to targets rather than reporting on areas of activity. Again, the NEC's role in this would have been crucial.

MTR Recommendations

The key recommendations from the mid-term review were addressed by the time of the terminal evaluation. All the on-grid systems were allocated and the off-grid systems identified for the outer islands with logistical arrangements in place to ensure the installation during the first half of 2014. The industry was assisting in the identification of suppliers of solar water heaters that could bring in equipment, which would overcome the plumbing issues identified. The energy audit undertaken by the RE division of PPUC has galvanised interest in solar heaters and many commercial operations, particularly hotels and resorts, are taking a more serious interest in SWH.

There has been a request for further extension of the project from the PEO, considering that a number of the remaining activities could be completed using the balance of funds amounting to approximately $156,000. The need to complete the remaining activities is strongly supported but how best this is done should be addressed carefully. The PEO is down to one full time person whose responsibilities seem to be expanding. It is possible to look at expanded MOUs with the ongoing North REP project to allocate the remaining funds for targeted activities such as database development and curriculum design. There is apparently (the TE was not able to physically get a copy!) a MOU between SEDREA and North-REP under which North REP would provide the logistical support for the installation of the off-grid systems in the outer islands. There is scope for more capacity building activities and continued advocacy.

Lessons Learnt and Recommendations

The largest proportion of SEDREA's budget was allocated to overseas consultants. The use of consultants was necessary for the timely completion of relevant studies, analysis and to undertake various training programmes. The use of local consultants was limited mainly because the expertise did not exist locally. One of the ways to ensure that local capacity is built is to assign a local understudy with the overseas consultants, and should be intimately involved in all facets ranging from consultations, development of methodology and materials, analysis and compiling reports. It is recommended that future UNDP funded projects make specific provision for the use of local understudies who should be closely involved with the consultants. This will allow the acquiring of useful skills and knowledge on the methodology and greater understanding of the issues. In the final analysis this will result in much needed capacity development.

During the evaluation, it was revealed that some bilateral projects were 'gifted' to countries without the usual scrutiny in terms of quality, durability and desirability. The result is that certain projects, notably the solar powered street lighting, have become an embarrassment as they have stopped working, especially since these are placed in prominent locations such as in the town area and on causeways. These are unnecessary bad publicity and diversion for renewable energy technology. These would undoubtedly impact on SEDREA's efforts to promote RE as credible alternative. This is an issue for the NEC, which should have been consulted before the installations. It seems the problem is with the design (under sizing) and the Government is looking at the UAE funds for its possible rehabilitation. The recommendation to the PEO is to ensure that new activities help with the overarching goal in raising awareness and attractiveness of renewable energy technology is not compromised through such projects, presumably designed for short-term political gains.

The MTR recommendation to roll out the REFW model to the other countries based on SEDREA's experiences is underscored. The regional project, PIGGAREP is including financing as part of its activities for a future phase and NDBP has been invited to share their experiences for a possible loans program in Yap (FSM), and RMI has secured services of the former CEO, under the ADMIRE project, to assist with its efforts in this area. The recommendation is for greater communications and knowledge sharing on this successful loans program. This would be a good candidate for a viable 'south-south' cooperation. UNDP could assist in highlighting this positive outcome and extending this to other countries of the region, most of which are keen to increase the share of renewables in the energy mix.

The grid stability studies undertaken by IRENA and commissioned by the North Rep are also useful case studies for many of the regional countries, which are grappling with the issue of the impact of PV systems on the power distribution arrangements.

There is also need for modelling of the various scenarios of PV power inputs during the day when there is a peak demand for cooling and the implications for a second surge in power requirement when the lights come on, and the implications on issues such as storage. It is recommended that some of the remaining funds be utilised as a short-term targeted consultancy to undertake this modelling. The consultants utilised earlier and who are familiar with the project and the Palau context could be approached in the first instance.

To allay anxieties of utilities and get the support for greater installation of PV systems connected directly to the grid, there is need for modelling to demonstrate the savings as a result of the reduced fuel use for power production using traditional diesel engines as well as the operation and maintenance of the diesel sets. This is recommended as a short targeted consultancy, that could be undertaken as a desk study by a local consultant who is familiar with the net metering and the relevant tariff regulations of the PPUC.

The immediate priority should be the Palau Energy Act and Energy Framework that will address institutional issues such as the PEO and coordination issues amongst PPUC, PEO etc., and essentially bring together the various pieces of legislations relating to the electricity sector, renewable energy and other relevant regulations. It is hoped that this may result in a strengthened PEO that will more effectively deal with the important issue of energy at a holistic level. It is recommended that the PEO take the draft bills through the necessary processes and get the approval from the legislature at the first

available opportunity this year. The TE was given the impression that this indeed is a priority and is being actively pursued by the PEO.

In relation to the off-grid installations, there are 2 options:

(i) UNDP enters into an agreement with EU North Rep project to complete this activity. The North Rep is working with SEDREA in a number of areas and is already doing activities on these islands. It makes sense to expand the scope by combining these additional tasks.
(ii) Work with the SIDS Dock - PIGGAREP + project and utilise the equipment for the proposed solar PV desalination systems on Kayangel.

Clearly this needs detailed discussions with the PEO and the North Rep project team to define the timeline and other logistics. This recommendation is based on the TE's discussions in Palau that indicated a strong interest in completing this activity in the first quarter of 2014.

The TE recommends that the project funds be used to complete the remaining activities as suggested, but these should be completed within a fixed timeframe, say by the second quarter. Given the capacity constraints with the PEO, the only feasible way of completing the targeted activities is through short-term consultancies, which UNDP should manage. The curriculum development should be given to PCC, which is already working with the North REP project on the introduction of a new course on Solar PV Design and Installation. The website development should be contracted to a local IT company.

The TE can only make the recommendations that the activities be completed, within a specified timeframe, and feels these can be accomplished. This is more useful than returning unused funds to GEF, which will not benefit anyone. Where possible, the TE has suggested how these could be progressed. But it is not in a position, nor is it a requirement of the terminal review, to provide specifics on the design of the future work.

ANNEXES

Annex A: List of People consulted for Terminal Evaluation

Tmetuchl Baules	Public Information Officer, PPUC
Judy L Dean	Grants Coordinator, Office of the President
Dolores deBrum	Project Manager, ADMIRE, RMI (email communication)
Greg Decherong	Director, Palau Energy Office
Brynn Elilai Demei	Loan Officer, National Development Bank of Palau
Jennifer Koskelin Gibbons	Executive Director, Palau Chamber of Commerce
Kione J Isechal	CEO/General Manager, Palau Public Utilities Corporation
Thomas Lynge Jensen	UNDP/GEF, Regional Technical Advisor for Climate Change Mitigation in the Pacific, UNDP Pacific Centre (PC)
Peter Johnston	Private Consultant, Suva (email communication)
Nyk Kloulubak	Energy Planner, PEO (National Project Officer, SEDREA)
Rupeni Mario	Manager, North-REP Project, SPC
Charlene Mersai	National Environmental Planner & Climate Change Coordinator, Office of the President
Sandra D Mincer	President/CEO, National Development Bank of Palau
Gandhi Ngirmidol	Grants Management Officer, Ministry of Finance, National Government
Sharon Sakuma	Country Development Manager, UNICEF/UNDP/UNFPA, Palau
Kiblas Soaladaob	National Coordinator, GEF Small Grants Programme, UNDP
Ken Sugiyama	Renewable Energy Manager, PPUC

Jerry Taroy	Palau Community College
Josua Turaganivalu	Environmental Financial Service Associate, UNDP
Kaleb S Udai Jr.	Finance and Development Consulting, previously CEO, National Development Bank of Palau
Ken T Uyehara	Micronesian Appraisal Associates, former PPUC CEO
Herbert Wade	Private Consultant, Bangkok (email communication)
Karla T. West	Commercial Loan Officer, National Development Bank of Palau

Annex B: Relevant Documents Reviewed

Annual Progress and Quarterly Reports for SERDREA for 2009, 2010, 2011 and 2012.

Capacity Assessment and Development Program. Preparatory Phase Consultancy for the Establishment of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP). Prepared by ReExCapitalAsia & Dr Herbert Wade, December 2009.

Capacity Assessment and Training Plan Public Utilities Corporation Renewable Energy Framework Consultancy, September 2012. Produced by IT Power Australia, for the North Pacific ACP Renewable Energy and Energy Efficiency Project (North Rep).

Combined Delivery Report by Project (SEDREA), UNDP, 2009, 2010, 2011, 2012, 2013.

De-Briefing Notes – Final Note for Capacity Building and Market Development for Supplementary Consultancy for the Establishment of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP).). Prepared by ReExCapitalAsia & Dr Herbert Wade, May 2010.

De-Briefing Notes – Mission #1 for Preparatory Phase Consultancy for the Establishment of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP). Prepared by ReExCapitalAsia & Dr Herbert Wade, October 2009.

De-Briefing Notes – Mission #2 for Preparatory Phase Consultancy for the Establishment of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP). Prepared by ReExCapitalAsia & Dr Herbert Wade, November 2009.

De-Briefing Notes – Mission #2 for Supplementary Consultancy for the Establishment of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP).). Prepared by ReExCapitalAsia & Dr Herbert Wade, August 2010.

De-Briefing Notes – Mission #3 for Preparatory Phase Consultancy for the Establishment of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP). Prepared by ReExCapitalAsia & Dr Herbert Wade, December 2009.

De-Briefing Notes – Mission #3 for Supplementary Consultancy for the Establishment of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP). Prepared by ReExCapitalAsia & Dr Herbert Wade, October 2010.

Development of the Palau National Energy Policy, NEPF/PAL5/NPE2, Inception Report, Gerhard Zieroth (International Consultant) in co-operation with Kathy Kesolei & Associates, Palau, April 2009.

Draft Power Purchase Agreement Template between Palau Public Utilities Corporation and Company, 2012.

Draft Report (including Presentations, Notes, Publicity Material and Evaluations) on NDBP Energy Loan Program Replication Workshop, 3-6 October 2011.

Executive Order 234, 9 September 2005.

Final Inception Report for Preparatory Phase Consultancy for the Establishment of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP). Prepared by ReExCapitalAsia & Dr Herbert Wade, December 2009.

Final Report MID TERM REVIEW Palau Sustainable Economic Development through Renewable Energy Applications (SEDREA), Project. Frank Pool, Independent Evaluation Consultant, 31 January 2012.

Final Report Palau Public Utilities Corporation Renewable Energy Framework Consultancy, November 2012. Produced by IT Power Australia, for the North Pacific ACP Renewable Energy and Energy Efficiency Project (North Rep).

Final Report REFW Operating Procedures from Fund Application through Analysis and Selection of Projects [based on Nov. 30, 2009 report "Palau REFW – Final Design and Operating Procedures.pdf"] for Consultancy for Supplementary Activities for the Establishment of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP). Prepared by ReExCapitalAsia & Dr Herbert Wade, November 2009.

Grid Stability Report Public Utilities Corporation Renewable Energy Framework Consultancy, September 2012. Produced by IT Power Australia, for the North Pacific ACP Renewable Energy and Energy Efficiency Project (North Rep).

Grid-connected Solar PV Design and Installation, New Course Proposal, Palau Community College, School of Technical Education, 2013.

Inception Report Palau Public Utilities Corporation Renewable Energy Framework Consultancy, May 2012. Produced by IT Power Australia, for the North Pacific ACP Renewable Energy and Energy Efficiency Project (North Rep).

Palau Country Energy Security Indicator Profile, 2009, SPC, euei pdf.

Palau Energy Conservation Strategy (PECS): Strategies and Action Plans to Reduce Energy Consumption by Government, September 2007.

Palau Energy Policy, August 2010.

Palau Net Metering Act of 2009, Republic of Palau, Senate Bill No 8-68.

Pilot Study on Grid Stability Assessment for the Island of Palau (Preliminary results) by Flavio Fernández, Stefan Weigel, José Gomez and Julius Susanto DIgSILENT GmbH, Germany.

Power Utility Policy Paper, October 2012. Produced by IT Power Australia, for the North Pacific ACP Renewable Energy and Energy Efficiency Project (North Rep).

Power Utility Policy Paper, October 2012. Produced by IT Power Australia, for the North Pacific ACP Renewable Energy and Energy Efficiency Project (North Rep).

Preparatory Phase Consultancy for the Establishment of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP): Call for Tenders, July 2009.

Presidential Directive No. 04-005, 7 December 2004.

Presidential Directive No 234, September 2005.

Presidential Executive Order 350, 17 October 2013.

Project Document Palau Sustainable Economic Development through Renewable Energy Applications (SEDREA), UNDP/GEF, December 2007.

Proposed Guidelines, Standards and Regulations for Renewable Energy Generation Systems Connecting to the Palau Central Grid, May 2012. Report produced by GSES and IT Power Australia, for the North Pacific ACP Renewable Energy and Energy Efficiency Project (North Rep).

Report on the Design and Operating Procedures of the REFW from Project Analysis and Acceptance through Monitoring and Evaluation. Preparatory Phase Consultancy for the Establishment of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP). Prepared by ReExCapitalAsia & Dr Herbert Wade, November 2009.

Report on the Initial Training for NDBP Officers and other Stakeholders of the REFW. Preparatory Phase Consultancy for the Establishment of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP). Prepared by ReExCapitalAsia & Dr Herbert Wade, December 2009.

Report on the Marketing Plan and Identification of Bankable Renewable Energy Projects to be supported by the REFW. Preparatory Phase Consultancy for the Establishment of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP). Prepared by ReExCapitalAsia & Dr Herbert Wade, December 2009.

Report on the Renewable Energy Technologies Appropriate for REFW Finance and the Market for those Technologies in Palau. Preparatory Phase Consultancy for the Establishment of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP). Prepared by ReExCapitalAsia & Dr Herbert Wade, October 2009.

Republic of Palau Country Action Plan, SEDREA Annual Work Program 2010, 2011, 2012, 2013.

Republic of Palau Energy Efficiency Action Plan: Developed as part of the European Union's Assistance to the Energy Sector in Five ACP Pacific Islands (REP-5), February 2008.

Request for Proposals Template for Renewable Independent Power Producers, November 2012. Produced by IT Power Australia, for the North Pacific ACP Renewable Energy and Energy Efficiency Project (North Rep).

Review of Base Tariff of Palau Utility Corporation, Stakeholder Workshop Report (final), Prepared by Ridgway Capital Projects Limited, December 2009.

Review of Tariff of Palau Utility Corporation, Report prepared by Ridgway Capital Projects Limited, January 2010.

Strategic Action Plan Energy Sector: A Framework for the Implementation of Palau's National Energy Policy, Palau Energy Policy Development Working Group, October 2009.

Tariff Analysis Report for PPUC, October 2012. Produced by IT Power Australia, for North Pacific ACP Renewable Energy and Energy Efficiency Project (North Rep).

The Palau Energy Act 2013: Final Draft for comments, 16 June 2013.

The Penthouse Energy Audit, June 2010. Prepared by PPUC Renewable Energy Unit.

Towards an energy secure Pacific: A Framework for Action on Energy Security in the Pacific, June 2010.

UNDP-GEF Terminal Evaluations Terms of Reference.

UNDP-GEF Terms of Reference for SEDREA.

Update Brief Palau Public Utilities Corporation Renewable Energy Framework Consultancy, June 2012. Produced by IT Power Australia, for the North Pacific ACP Renewable Energy and Energy Efficiency Project (North Rep).

Annex C: Evaluation Questionnaire

Project Formulation

- Were there any particular aspects of the project design that were either not relevant or not realistic?
- If the project was to be implemented again, are there any changes in project design and results framework that you would suggest?
- Were there any project risks that were not identified or adequately considered, and how could they have been better anticipated and managed?
- How relevant or useful has the project been to the national development priorities of the government?
- How effective and efficient was the project structure and organization in facilitating implementation? Would you have changed anything in hindsight?

Project Implementation

- What have been the major challenges or issues in implementing the project? What are the main reasons for any delays?
- Has annual work planning and budgeting been effective, and have disbursements been in line with annual budgets?
- What changes in project strategy were required during project implementation and what adaptive management measures undertaken? (Basis for revised log-frames and responses to the MTR etc.)
- Have the project modalities for delivery of activities through government agencies, NGOs and consultants been effective and efficient? What are the key factors that affected project delivery?
- How effective has project coordination and communication been within the project and with relevant stakeholders?
- Have the project monitoring indicators been effective and feasible for reporting on progress?

Project Results

- What are the most important or significant achievements of the project to date in relation to the original or amended project results framework?
- What expected results have not been achieved or are not fully satisfactory?
- What follow-up assessment of training program results has been undertaken? What gaps remain in staff capacity development?
- What changes in institutional capacity could be attributed to the project?
- Has the project had any unanticipated positive or negative results?
- How likely is it that the main results – capacity building, etc., can be sustained? What will be the effects of project closure? What preparations are being made for closure?
- What are the key lessons for future projects that have been learned during the implementation of the project?

Annex D: Rating Criteria

Highly Satisfactory (HS)	Project is expected to achieve or exceed all its major global environmental objectives, and yield substantial global environmental benefits, without major shortcomings. The project can be presented as 'good practice'.
Satisfactory (S)	Project is expected to achieve most of its major global environmental objectives, and yield satisfactory global environmental benefits, with only minor shortcomings.
Marginally Satisfactory (MS)	Project is expected to achieve most of its major relevant objectives but with either significant shortcomings or modest overall relevance. Project is expected not to achieve some of its major global environmental objectives or yield some of the expected global environment benefits.
Marginally Unsatisfactory (MU)	Project is expected to achieve its major global environmental objectives with major shortcomings or is expected to achieve only some of its major global environmental objectives.
Unsatisfactory (U)	Project is expected not to achieve most of its major global environment objectives or to yield any satisfactory global environmental benefits.
Highly Unsatisfactory (HU)	The project has failed to achieve, and is not expected to achieve, any of its major global environment objectives with no worthwhile benefits.

Annex E: SEDREA Presentation

Annex F: Terms of Reference for Terminal Evaluation