



MID-TERM REVIEW

Action for the Development of Marshall Islands Renewable Energies (ADMIRE)

**Government of the Republic of the Marshall Islands
United Nations Development Programme
Global Environment Facility**

Final version

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
ADMIRE	Acting for the Development of Marshall Islands Renewable Energies
APR-PIR	Annual Project Review – Project Implementation Report
CMI	College of Marshall Islands
CNO	coconut oil
CREDP	Caribbean Renewable Energy Project (UNDP/GEF)
EDF	European Development Fund
EE	Energy efficiency
EPPSO	Economic Policy, Planning and Statistics Office
EU	European Union
kWh	Kilowatt-hour
GEF	Global Environment Facility
GHG	Greenhouse gas
GWh	Gigawatt-hour (1,000 million Watt-hour)
KAJUR	Kwajalein Atoll Joint Utility Resource
MEC	Marshalls Energy Company
MRD	Ministry of Resources and Development
MIVA	Marshall Islands Visitors Authority
MoU	Memorandum of Understanding
MTE	Mid-term evaluation
MW	Megawatt (million Watt)
NEP	National Energy Policy (of the Marshall Islands)
NTC	National Training Council
North-REP	North Pacific Renewable Energy and Energy Efficiency Project (SPC/EU)
O&M	Operation and maintenance
OEPPC	Office of Environmental Planning and Policy Coordination
PIC	Pacific island country
PIGGAREP	Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project
PIREP	Pacific Islands Renewable Energy Project (UNDP/GEF)
PMU	Project Management Unit
PSC	Project Steering Committee
PV	Photovoltaic
RE	Renewable energy
RET	Renewable energy technology
RETDAP	Renewable Energy Technology Development & Application Project (Maldives)
RMI	Republic of the Marshall Islands
SEDREA	Sustainable Economic Development through Renewable Energy (Palau)
SHS	Solar home system
SIDS	Small island development states
SOPAC	South Pacific Applied Geoscience Commission
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USD	United States dollar
USP	University of South Pacific
Wh	Watt-hour
WB	World Bank
WUTMI	Women United Together in the Marshall Islands



From CIA World Factbook

EXECUTIVE SUMMARY

The Republic of the Marshall Islands (RMI) is currently heavily dependent on imported fossil fuels for its energy supply, with petroleum accounting for more than 85% of the country's commercial energy consumption. Grid-connected power from diesel generators is available at the main atolls of Majuro, Jaluit, Wotje (operated by the Marshalls Energy Company, MEC) and Kwajalein. By 2010, about 1,300-1,400 stand-alone photovoltaic (PV) systems had been installed in the outer atoll households. Key donors in the past have been Japan, France, Taiwan and the European Commission. In addition, larger systems have been installed by the ministries, such as Telecommunications, Fisheries, Health and Education. If the amount of installed solar home systems (SHS) could be doubled (to about 2,800 systems) this would effectively provide PV lighting to nearly all outer island households. The EU-funded North-REP project (implemented by the Secretariat of the Pacific Community, SPC) plans to install about 1,500 solar PV systems during 2012-13.

Much of the income on the outer islands comes from copra sales handled through a national cooperative. The Tobolar Copra Processing Authority in Majuro receives copra from the outer islands and produces coconut oil for export. The relatively and often fluctuating low export price of coconut oil has led Tobolar to look for other markets, including biofuel as a diesel fuel replacement. There currently exists potential to increase copra oil output to supply a larger market, because the existing copra oil mill in Majuro has excess capacity and production could be produced in the RMI to supply 20% of MEC fuel requirements for power generation. This would have the additional benefit of stabilizing incomes from copra on the outer atolls and directly injecting additional funds into outer island economies.

To support the above-mentioned initiatives by looking at the capacity strengthening, policy formulation and financial aspects, the project "Action for the Development of Marshall Islands Renewable Energies (ADMIRE)" was formulated with the United Nations Development Program (UNDP) and presented to the Global Environment Facility (GEF) for co-funding. The project was approved by the GEF in December 2007 and the Project Documentation signed in April 2008. The project is scheduled to end by March 2014.

In accordance with UNDP and GEF regulations, a Mid-Term Review (MTR)¹ of ADMIRE has to be undertaken when a project is about halfway its implementation period. This report describes the findings and recommendations of the mid-term review. The review, also referred to as the evaluation, has looked at the project's results, issues in implementation and recommendations to address these issues.

The **project objective**² as mentioned in the GEF CEO³ Endorsement form is⁴ "Reduction of the growth rate of GHG emissions from fossil fuel use in RMI through the widespread and cost effective use of RE resources and application of feasible RE technologies".

¹ The term 'mid-term evaluation (MTE)' is also often used

² Please note the meaning of the following abbreviations; GHG: greenhouse gas emissions; RE: renewable energy; RMI: Republic of Marshall Islands.

³ Chief Executive Officer

⁴ However,

- The GEF MSP Project Brief mention as Project Goal: "the reduction of the GHG emissions from the unsustainable uses of fossil fuels (primarily diesel fuel oil) in the RMI through the utilization of the country's renewable energy (RE) resources and as Project Objective "The removal of barriers to the utilization of available RE resources in the country and application of renewable energy technologies (RETs)";
- The UNDP Project Document states on its page 8 as Objective "Promotion of the productive use of RE to reduce GHG emission by removing the major barriers to the widespread and cost-effective use of feasible RETs"

The project was designed to contribute to the objective by achieving the following five **outcomes** (as mentioned in the CEO Endorsement form)⁵:

1. RE technical capacity development: Improved understanding of RE potential and increased number of RE hardware installations on the ground, which enhances productivity and income generation;
2. RE institutional capacity strengthening: Enhancement of the institutional capacity to coordinate, finance, design, supply and maintain RE installations;
3. RE policy and regulatory support: Strengthened legal and regulatory instruments to support RE dissemination, financing and marketing;
4. RE project financing and market development: Improved availability of financial and institutional support for RE development & applications of RETs, particularly for productive uses; Creation of a RE loan portfolio in the local financing institutions;
5. RE advocacy and awareness enhancement: Improved awareness, skills and knowledge on RE, as well as understanding and the appreciation of RE and the importance of the copra industry as a RE resource among Marshallese.

The Project has been executed under the auspices of the Office of the Environmental Planning, Policy and Coordination (OEPPC) as the GEF focal point. The Project Brief mentions on its page 32 that “in terms of implementing the project activities, MRD (Ministry of Resources and Development) will play the lead role and will house the Project Manager”. However, by the time of this Mid-Term Review (January 2012) a transfer of execution responsibilities from OEPPC to MRD had not taken place yet.

The project has encountered severe **implementation** problems. Implementation did not really start after a delay of 12 month until March 2009. The first Project Manager resigned after about half a year (June-October 2009), after which a part-time Local Counterpart, the OPECC Financial Officer, was appointed. The Inception Workshop was only held in March 2010. Implementation has taken place under the auspices of OEPPC. At this workshop it was agreed and reconfirmed to transfer responsibility for ADMIRE (including financial responsibility) to MRD but this has not happened yet.

These implementation issues are related to the small human capacity of the Marshall Islands (a nation of only 55,000 people), It should be noted that the UNDP/GEF SEDREA project in Palau⁶ (with only 20,000 people) has been performing well, according the recent Mid-Term Review report; thus other issues (design, government commitment, availability of co-financing partners) play a role as well as will be explained below⁷ Nonetheless, the Reviewer observed that OEPPC does not have any real energy-specific capacity, while the Energy Team at MRD is consisting of a dedicated but small group of energy specialists and planners that may be overstretched to effectively handle the often million dollar projects provided by donors such as Japan, Taiwan, European Union or UNDP.

Technology-wise, the **project design** focusses on two main options for renewable energy, namely the electrification of the remaining outer island households that are not electrified yet as well as the option to produce copra oil for blending with diesel fuel for power generation and in maritime transport. This

⁵ The UNDP Project Document introduces the sixth component of “Learning, Evaluation and Adaptive Management Increased”, but this refers more to the project’s administrative arrangement of monitoring & evaluation and project management” rather than thematic issues

⁶ UNDP/GEF Palau Sustainable Economic Development through Renewable Energy Applications (SEDREA), Mid-Term Review (January 2012)

⁷ It is mentioned in one of the ADMIRE progress reports that “cumbersome processes within Government are a barrier to timely release of funds/advances from the UNDP”.

follows recommendation in earlier studies as well as priorities given in the National Energy Plan (2009). However, rather than taking these technologies as a starting point for further detailing of outputs, the design follows the typical GEF format by having a capacity building, policy component, institutional component, financial and awareness component with various activities that relate to the two technologies scattered over the various components. It is not always clear how specific activities in these components can advance the introduction of 1,500 PV systems and develop small-scale copra production on the outer islands. ADMIRE design would have been benefitted by formulating three components in a more theme-oriented way, 1) outer islands PV, 2) copra oil production and processing, 3) assessment of other RE (grid-connected and wind) and then detail per component the activities needed according to perceived barriers to that technology, which can be policy, institutional, capacity and finance, but these barriers may differ in importance and cannot necessarily be addressed within the same timeframe.

The GEF intervention is basically ‘soft’ assistance, but linked with supposed hardware installation of the before-mentioned technologies. Unfortunately, there is no hint given in the project documentation on the timeframe at which the PV systems will be procured or copra oil processing developed not where the funding would come from. To assume that ‘commercial’ financing (‘bankable proposals’ as mentioned in Component 4) would solve the issue is unrealistic given the fact that electrification will depend on subvention. A co-financing letter from the Ministry of Finance does refer to USD 1 million co-financing from the EU (European Union), as part of its REP-5 project.⁸ REP-5 activities in RMI focused primarily on outer island electrification through solar PV systems, with some attention paid to demand-side energy efficiency on Majuro atoll. REP-5 ended in 2009, while ADMIRE had not really taken off yet by that time. The EU is now financing a successor project, North-REP (implemented by the Secretariat of the Pacific Community, SPC), which opens a new opportunity for ADMIRE to combine the project’s technical assistance with the outer island electrification activities supported by North-REP.⁹

Within the framework of the above-mentioned issues in *implementation* and in *design*, it is not surprising there has been very limited progress in terms of **achievement of results** with only a very few specific results to show. There are some initial results in Component 1 in terms of procuring equipment for wind energy measurements in carrying out the outer island energy survey together with the EU-sponsored North-REP project. However, most focus has been given to Component 5 ‘RE Advocacy and Awareness Enhancement’, in which ADMIRE has supported the participation of officials in a number of national workshops and meetings (although not always directly related to activities planned under the project) as well as funding participation in a few overseas training events.

The overall rating in this mid-term review is as follows:

Item	Rating
Achievements of results	Unsatisfactory
Project design	Marginally satisfactory
Project implementation	Unsatisfactory
Overall rating	Unsatisfactory

On a positive note, some encouraging developments have taken place recently that may enable ADMIRE to get on track:

⁸ As part of the EU's 9th EDF (2000-2007), European Development Fund, budget cycle, which financed the regional project “REP-5, Support to the Energy Sector in Fice and Pacific Island Countries”(2006-2009), including the Marshall Islands
⁹ Under EU's 10th EDF budget cycle (2008-2012), North-REP (North Pacific Renewable Energy and Energy Efficiency Project) will support 4 nations in the Pacific region, including Marshall Islands

- A Memorandum of Understanding (MoU) between ADMIRE and the SPC/EU North Pacific Renewable Energy and Energy Efficiency Project (North-REP) was signed between OEPPC and MRD in January 2011. The MoU covers project collaboration on ‘soft-based’ activities in the outer islands for the solar PV program including surveys, trainings and awareness, while the North REP will provide funding for about 1,500 solar PV systems. This provides an opportunity for practical implementation of PV systems in the outer islands and for ADMIRE to help setting up a sustainable operation, maintenance and administration system for these (and previously installed¹⁰ PV systems)
- A new full-time project manager has been selected and should be contracted soon, once responsibility for project activities and budget is shifted from OEPPC to MRD;
- The latter has been agreed and Cabinet should formalize this transfer immediately,

With regard to ways forward for **ADMIRE key recommendations** are given below.

Immediately:

- Transfer of all responsibility (including financial) from OEPPC to MRD;
- Expedite contracting of the new full-time project manager,
- De facto integration of ADMIRE activities with North-REP, in which ADMIRE can provide value added support ‘soft assistance’ for the installation of the planned 1,500 PV systems by looking how a sustainable technology support system can be organized in RMI that can provide operation, maintenance and administration services. A good, simple and practical work plan needs to be agreed upon with clear indicators. This report has made a first attempt in formulating such a work plan¹¹. Obviously the EU/SPC North-REP as the key partner needs to be very closely involved including fully consulted and formally agree to such de facto project integration;
- Visit of UNDP Regional Technical Advisor (RTA) to RMI to discuss and finalize the work plan with MRD and North-REP as well as assist with the detailed planning of key activities

During 2012:

- Close monitoring and technical support by UNDP Fiji office and RTA;
- Implementation of activities mentioned in the MoU, such as by means of training on grid-connected RE systems, technical training for PV technicians and awareness raising amongst the beneficiary households on the use of PV systems (including battery maintenance)¹²;
- To expedite PV-related activities, PV experts should be contracted during 2012 with good knowledge of PV systems in the Pacific region (on a short-term basis) for specific tasks, supplementing the work of the North Rep specialist and new ADMIRE project manager based in Marshall Islands;
- Sustainability should be looked into. Providing training (technical) and awareness is a necessity to do the operation and maintenance (O&M) of the systems, but without adequate funding these will not be fully realized;

¹⁰ For example, the REP-5 project mentioned earlier, installed 420 solar home systems (SHS) on Ailinglaplap atoll and PV systems to power lights and office equipment in six primary schools (on the five atolls of Arno, Ebon, Mejit, Namdrik and Nam).

¹¹ See Table A in Section 3.2, which makes suggestions for revised outcome indicators for ADMIRE linked with priorities as stated in the Marshall Islands National Energy Policy and Energy Action Plan (2009) and outputs of the EU-supported North-REP project as well as proposed grant assistance by the Asian Development Bank, which includes a component on copra oil production and processing for fuel.

¹² Examples of activities spelt out in the MoU and later reflected in the North REP work plan:

- o Establishment of permanent in-country training programs for the design, operation and maintenance of stand-alone and grid-connected PV systems
- o Use of copra as form of payment for electricity tariff for the outer islands households SHS;
- o End-user trainings and awareness campaigns in rural schools and health centers

- Continue to explore and conclude opportunity of cooperation (similar to North REP MoU) with Tobolar and ADB on copra oil processing;
- Evaluation of project activities by the end of 2012 by UNDP/RTA and based on results achieved in 2012 take a ‘go/ no-go’ decision.

On the **formulation of UNDP/GEF energy projects**, it is mentioned that the Reviewer has up to now evaluated four SIDS (small island states) projects whose origin date back in the GEF 3 funding cycle, namely the Pacific Islands Renewable Energy project (PIREP, Mid-Term evaluation, 2006), Maldives Renewable Energy Technology Development and Application Project (RETDAP – Mid-term evaluation, 2007), the Caribbean Renewable Energy Development Project (CREDP – Final evaluation, 2011) and now the Marshall Islands ADMIRE project (mid-term evaluation, 2012).

Although different, three of these projects (except PIREP) were characterized by little real progress at the time of their mid-term evaluation, which made a drastic revision of their work program necessary. Although external factors may be different in each of these projects; all three clearly lacked a good project design that did not seem to take into account the special circumstances of small island states. For example, the issue of human capacity in such small nations was underestimated¹³, while the role of (commercial) financing in these small markets was overestimated and the technology focus was too vaguely defined. It is recommended that GEF would allow more flexibility in submitting proposals. Rather than focusing on one-time interventions, one option for GEF is to allow a more long-term programmatic approach with a country or region, which would consist of several modules (smaller projects) that address specific issues and barriers, of which some would be in parallel and other ones implemented in a consecutive order. This would allow for flexibility in defining outputs and activities and fine-tune to the specific characteristics of the technology or intervention and the country’s needs that change over time.

¹³ Well-qualified people are available, but often go abroad to advance their careers.

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1. INTRODUCTION

1.1 Country context

The Republic of the Marshall Islands (RMI) consists of two groups of 29 with the capital Majuro. The current estimated population is 55,000, with roughly 51% residing on Majuro and 20% on Ebeye in Kwajalein atoll¹⁴. The outer islands are sparsely populated due to lack of employment opportunities and economic development. Life on the outer atolls is generally traditional.

The RMI is heavily dependent on external assistance, grants recently averaging USD 70 million annually, or 45% of Gross Domestic Product (GDP) and 70% of fiscal revenue, mostly through the Compact of Free Association with the USA (which went into effect on 1986, giving the Republic its independence). Much of the income on the outer islands has traditionally come from copra sales but prices have been widely fluctuating, and often low; thus, remittances from relatives on Majuro and Ebeye and pensions are also common sources of outer island cash.

1.2 Energy sector

Energy supply and demand

The Republic of the Marshall Islands (RMI) is currently heavily dependent on imported fossil fuels, with petroleum accounting for more than 85% of the country's commercial energy consumption and 78% taken into account biomass (22% of gross energy supply)¹. Fossil fuels are imported by the Marshalls Energy Company (MEC), Mobil and Pacific International Inc. (PII), mainly gasoline, diesel fuel, kerosene and LPG, of which 63% is used for transport (boats, airplanes), 30% for electricity generation and 2% for commercial and household use¹⁵. As in other widely-scattered PICs, the RMI uses a substantial amount of petroleum fuel for air and sea transport. Transport probably accounts for two-thirds of the RMI's fuel use.

MEC generates and distributes electricity in Majuro and has smaller systems on Jaluit and Wotje. Capacity on Majuro is 24.4 MW. Power sales were 50 GWh on Majuro and 1 GWh on Jaluit and Wotje in 2008. Residential consumption per household averaged 531 kWh per month. This is relatively high consumption by Pacific Island standards, offer scope for energy efficiency measures. The utility Kwajalein Atoll Joint Utility Resource (KAJUR) has 4.2 MW installed capacity on Ebeye, Kwajalein atoll, and sales were 12-14 GWh in 2008¹⁶.

Urban households in the RMI use excessive amounts of electricity for air conditioning and could probably reduce electricity use by 20% or more through relatively simple means¹⁷. More generally, buildings in Majuro account for well over half of all MEC electricity consumption mainly for cooling and lighting; the

¹⁴ Source: www.spc.int/spd (population data mid 2011); en.wikipedia.org (2000 data)

¹⁵ 2003 data. Source: National Energy Policy and Energy Action Plan (2009), RMI

¹⁶ National Energy Policy and Energy Action Plan (2009), RMI

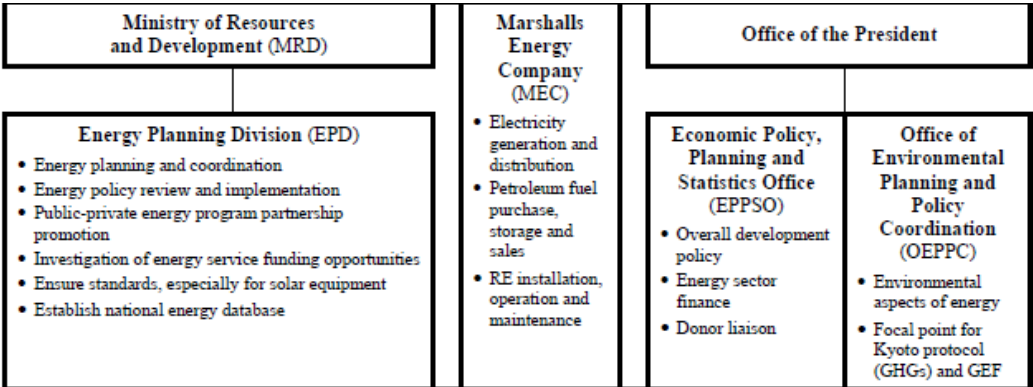
¹⁷ Based on discussions with MRD's energy team during the mid-term review;
See: National Energy Policy and Energy Action Plan (2009); Volume I, page 5

opportunities for saving are considerable. However, little has reportedly been done due to a generally low awareness of energy efficiency.

Energy administration and implementation

The following figure summarizes the main responsibilities within the government with regards to energy policy¹⁸:

- The MEC (Marshall’s Energy Company) was established in 1984 as a state-owned enterprise. It is responsible for electric power generation and distribution on Majuro and operates the power systems of Jaluit and Wotje under contract from the Government. MEC also imports, stores, distributes and re-exports petroleum fuel products. The tariff does not cover MEC’s full costs with the operations of the smaller utilities subsidized even more than Majuro and Ebeye operations.
- The EPPSO (*Economic Policy, Planning and Statistics Office*) within the Office of the President is the key national development planning agency and is involved in any Compact-related activities and major infrastructure projects. It has been closely involved in rural electrification policy. As the name suggests, it also has the main responsibility for developing and maintaining statistical databases;
- The OEPPC (*Office of Environmental Planning and Policy Coordination*), also in the Office of the President, is the RMI’s environmental focal point, which includes all Global Environment Facility (GEF) activities and programs under the UNFCCC (i.e. the Kyoto Protocol) and is, as such, a key agency regarding financial support for RE (renewable energy) and EE (energy efficiency);
- The EPD (*Energy Planning Division*) was established within *the Ministry of Resources and Development (MRD)* in 2003. Although the EPD deals with overall national energy policy and, its main focus has been on renewable energy (RE) in remote areas, particularly solar photovoltaic (PV), as well as energy efficiency (EE).



Renewable energy in RMI

According to the study PIREP (2004), has an adequate solar resource, but no geothermal or hydropower resources. It mentions solar photovoltaic (PV) technology is the most appropriate technology to produce electricity from renewable energy.

¹⁸ Taken from *Pacific Regional Energy Assessment 2004, National Report, Marshall Islands, Volume 6* (H. Wade; UNDP/GEF PIREP project). The power utility KAJUR serves Ebeye urban centre.

Solar energy

In 2010 about 1,300-1,400 solar home systems (SHS) had been installed on the outer atolls. Key donors in the past have been Japan, France, Taiwan and the European Commission. In addition, larger PV systems were installed by various ministries, such as Telecommunications, Fisheries, Health and Education. It would be interesting to have a survey commissioned on the current functioning of these system and issues in their operation and maintenance. The Annex to the SPC/EU North-REP¹⁹ mentions the following regarding maintenance and finance. “Prior to REP-5²⁰ all three countries had benefited from renewable energy projects supplied by other donors, mainly in the form of individual household solar systems, but successes were rare. The biggest cause of failure was the lack of maintenance and spare parts, inappropriate design for the harsh marine tropical environment and weak institutional arrangements. The REP-5 project learned from these mistakes by providing more appropriate equipment and by introducing user-pay systems through the utilities for on-going maintenance and capital replacement. The North-REP project shall further extend user-pay modalities ensuring that investments are sustainable. Setting tariffs that cover maintenance and the replacement of equipment and enforcing bill collection is critical to achieving long-term project goals”.

Government plans are to achieve 95% electrification of the outer atoll islands by 2015²¹. This would imply doubling the amount of installed solar home systems to about 2,800-2,900 over the coming years, thus effectively providing PV lighting to nearly all outer island households.

For household PV systems, users have until recently been charged USD 12 per month to meet in part MEC’s O&M costs but this has not covered full costs if battery replacement is included, and actual collections from users have been considerably lower than planned. In 2009, Cabinet reduced the charge to USD 5 per household per month, raising serious concerns about financial sustainability.

The study PIREP (2004) mentions that “in the past sustainability on the longer term has been compromised by poor technical designs, weak institutional capacities, ineffective policies, inadequate funds for maintenance and the lack of understanding and awareness including donor-driven aid and little ownership”. The report gives some examples on technical issues. “In 1993, the Japan International Cooperation Agency (JICA) installed solar freezers for ice making and fish storage on Ailinglaplap, Likiep and Namu atolls with an expansion in 1997. The systems functioned until 2002, when by then they had failed due to corrosion”. “About 1993, the Forum Secretariat purchased and installed 20 SHS for Jabat with two 50 Wp panels, an open cell 100 Ah battery, an SCI controller and two 15 watt Thinlite fluorescent lights. The systems were purchased from Showa Solar Far East, Singapore. There have been numerous technical problems including damage to many batteries because the local technician added acid instead of water to cells”.²²

¹⁹ Under EU's 10th EDF budget cycle (2008-2012), North-REP (North Pacific Renewable Energy and Energy Efficiency Project) will support 4 nations in the Pacific region, including Marshall Islands

²⁰ As part of the EU's 9th EDF (2000-2007), European Development Fund, budget cycle, which financed the regional project “REP-5, Support to the Energy Sector in Fice and Pacific Island Countries”(2006-2009), including the Marshall Islands. In RMI, REP-5 supported the installation of 420 solar home systems (SHS) on Ailinglaplap atoll and of PV systems to power lights and office equipment in six primary schools (on the five atolls of Arno, Ebon, Mejit, Namdrik and Nam).

²¹ See National Energy Policy and Energy Action Plan, Volume I (2009), RMI, page iv

²² *Pacific Regional Energy Assessment, Marshall Islands National Report, Volume 6*, by H. Wade, UNDP/GEF PIREP

A recent study on PV electrification of Namdrik Atoll²³ gives some interesting ‘lessons learnt’ on organizational aspects:

- Generally the consumers are willing to pay, but not if they feel they are not being serviced, and are less likely to pay if they feel they are not being charged in a manner equal to what others are paying;
- The management structure may vary a little from atoll to atoll, but the active involvement of local government in management decisions increases ownership;
- Cash on the Outer Islands can at times be in generally short supply. Pre-pay meters are an attractive concept but in practice suffer badly and need close management to operate. Consumers struggle with large monthly bills and tend to prefer smaller more regular payments;
- Solar home systems can meet initial requirements for higher quality and safer lighting, but will soon be followed with demands for higher demand appliances (consumer electronics; entertainment). In this respect, one size does not fit all. Some households in Namdrik have struggled with the bill and would have been better off with solar lanterns, while others found power supply inadequate. The study hints at using generator sets based on diesel or biofuels for households that need more power.

Biofuels

Due to the small size and poor atoll soils, energy production from biomass is impractical with the possible exception of biofuel from coconut oil to replace diesel, since copra production is the mainstay for the outer islands and the oil can be produced, in principle, at small scales. Much of the income on the outer islands comes from copra sales handled through a national cooperative. The Tobolar Copra Processing Authority in Majuro receives copra from the outer islands and produces coconut oil for export²⁴. Production varies from year to year but recently has been around 5,000 tons per year. The relatively low export price of coconut oil has led Tobolar to look for other markets, including biofuel as a diesel fuel replacement. There have been some trials of coconut oil as a fuel for small-scale power production in outer islands and for vehicle use on Majuro in the past, but these had not been technically or economically successful. In fact, a study on coconut oil (CNO) recommends using it in the Majuro power plants as first priority, and only as second priority on the outer islands due to technical and non-technical challenges²⁵. The study on biofuels in Ebon Atoll²⁶ mentions that constructing and operating a mini electricity grid on the islets of Ebon would be possible in principle, although feasibility would be constrained by the low purchasing power (and low power consumption) of households on the atoll. Having a mini mill to supply CNO for the sole purpose of supplying it for the power generator would not be feasible and require Government subsidies.

Since the export value of coconut oil is highly variable, rising and falling dramatically, there has been renewed interest among coconut producers and processors in exploring this option. Currently, Tobolar is interested in producing CNO for blending with diesel in the main power stations in Majuro and Ebeye. A recent ADB (Asian Development Bank) proposal estimates that using CNO blends could increase cash flows to the outer islands initially by USD 1.0 million per annum, increasing to USD 2.5 million per annum if the CNO content would be increased to 20%. This has the potential to almost double the demand for copra in RMI. Technically it would be possible for CNO output to supply a larger market, because the existing CNO mill in Majuro has excess capacity and CNO production could be produced in the RMI to supply the before-mentioned 20% of MEC fuel requirements for power generation.

²³ *Review of Namdrik Atoll Solar Project, RMI, Empower Consultants Ltd. (2005)*

²⁴ Copra, the meat of the coconut, yields coconut oil (1 liter for every 6 to 10 coconuts)

²⁵ *Potentials of Coconut Oil as Diesel Substitute in Pacific Island Countries*, by D. Fürstenweth (M.Sc. thesis)

²⁶ *Biofuels Electrification on Remote Atolls in the Marshall Islands* (Government of RMI, MEC, UNDP, SOPAC), 2007

Establishing long-term contracts between Tobolar and MEC for the supply of CNO would have the additional beneficial impact of stabilizing incomes from copra on the outer atolls and directly injecting additional funds into outer island economies²⁷.

Biofuel use should be environmentally benign as spills are biodegradable and pollutants are minor. However, the economic viability of locally produced biofuels (compared to central production in Majuro) may be a serious issue and needs to be carefully assessed.

Other renewable sources of energy

In recent years, there have been various suggestions for the large scale development of other forms of renewable energy on Majuro but there have been constraints regarding their practicality. Systems based on ocean energy, particularly ocean thermal energy conversion (OTEC) have been suggested, but the technology is not mature. For wind energy there has been no assessment undertaken yet of the RMI's resource, which is essential to evaluate its practicality²⁸. In addition, wind systems that match local requirements of relatively small size, low operating costs and long life under the difficult environmental conditions on atolls may not be economically available. Grid-connected solar PV systems have been suggested for Majuro.

Barriers to renewable energy

The project documents mentions a number of barriers, which should be addressed in order to allow for the widespread utilization of RE²⁹:

- Inadequate capacity within the government to regulate, develop, implement and monitor renewable energy and energy efficiency projects;
- There are legislations, policies and energy pricing practices which are not coherence with the effort to promote RE;
- Lack of standards or certification for components and training;
- Irregular incomes on outer islands, making it difficult for households to make regular cash payments;
- RMI's small size and the wide dispersion of its constituent atolls;
- Poor shipping services to the outer atolls;
- Low level of public awareness; and,
- Lack of RE resource data and appreciation of the technical and commercial viability of RE applications.

Energy and climate change policy

RMI is well aware that it is economically vulnerable to upward trends in fossil fuel prices. In 2008 the Government officially declared a 'State of Economic Emergency' stemming from crises caused by 'unprecedented' increases in the cost of imported fuel and staple food items. Regarding electricity, the Government provided about USD 9 million in 2008 to the power utilities (on a reimbursable basis). Power

²⁷ Grant Assistance Report, RMI: Improved Energy Supply for Poor Households, ADB, July 2010

²⁸ This is an activity proposed to be supported with ADMIRE funds. In fact, with ADMIRE support wind resource monitoring equipment was procured in 2011

²⁹ This is a summary of barriers as mentioned in the Project Brief of the ADMIRE project

tariffs have been raised, which led to a drop in power consumption, but the power utility MEC still had not been able to retire the debt bill by 2012³⁰.

Furthermore, RMI, like the other Pacific Island Countries (PICs), has long been concerned about the serious impacts of human-induced climate change, natural climate variability and sea level rise in the region, particularly those impacts affecting the low-lying atolls. Not surprisingly, the country's National Climate Change Policy Framework focusses on the vulnerability to impacts of climate change. Most RMI atolls are lying at an average of 2 meters above sea levels. National data collection monitoring in RMI indicates that sea-level rise is already being observed, and at increasing rates. Nearly all of the land within the Marshall Islands consists of fragile atolls.

The Climate Change Policy³¹ mentions that 'while the net emissions of RMI are nil, its emission per capita by PICs standard from fossil fuel consumption per capita is relatively high' In view of the above, the country has considered the use of renewable energy as instrumental in achieving its sustainable socio-economic development.

The Climate Change Policy mentions the following priority areas:

- Sustainable financing for climate change
- Energy security and low-carbon future;
- Adaptation for a climate-resilient future;
- Disaster risk reduction preparedness and response capacity;
- Education, awareness, community mobilization, culture and gender.

Within the area of 'energy security and low-carbon future', specific goals for the development of energy services are mentioned:

- Electrification of 100% of all urban households and 95% of rural outer atoll households by 2015;
- Provision of 20% of energy through indigenous renewable resources by 2020;
- Improved efficiency of energy use in 50% of households and businesses, and 75% of government buildings by 2020;
- Contributing to global greenhouse gas (GHG) emissions reduction through promoting energy efficiency (EE) and accessing affordable renewable energy (RE) and reduce supply side energy losses from MEC by 20% by 2015.
- National target to reduce greenhouse gas (GHG) emissions to 40% below 2009 levels by 2020, based on the national energy plan (and taking into account the GHG Inventory aspect of RMI's forthcoming Second National Communication under the UNFCCC);

1.3 Project objectives and strategy; project set-up

The National Renewable Energy (RE) Assessment in RMI, which was carried out under the regional UNDP/GEF Pacific Islands Renewable Energy Project (PIREP; 2003-2006) identified the country as having excellent potential for harnessing solar energy to provide electricity to the 60% of its population who still do not have access to electricity. It also identified that copra oil has an excellent potential to substitute diesel oil use in power generation and in land and sea transportation. It confirmed the often

³⁰ Sources: *Responding to the Emergency, Update Report on the RMI State of Economic Emergency* (September 2008, Energy Task Force, RMI); *Pacific Islands Report*, www.pireport.org (February 2012)

³¹ *National Climate Change Policy Framework*, OEPPC, SPREP, SOPAC (2010)

disappointing experiences with the failure of RE-based energy system installations in many of the outer in the past.

RMI decided to formulate its own proposal, which was called “Action for the Development of Marshall Islands Renewable Energies (ADMIRE)”. The project was approved by GEF Secretariat in November 2007 although implementation activities did not really start until early 2009. The project is scheduled to end by March 2014 (closing data was originally planned at January 2011)³².

The **project objective**³³ as mentioned in the GEF CEO³⁴ Endorsement form is³⁵ “Reduction of the growth rate of GHG emissions from fossil fuel use in RMI through the widespread and cost effective use of RE resources and application of feasible RE technologies”.

The project was designed to contribute to the objective and mitigation of the above-mentioned barriers by achieving the following five **outcomes** (as mentioned in the CEO Endorsement form)³⁶:

1. RE technical capacity development: Improved understanding of RE (renewable energy) potential and increased number of RE hardware installations on the ground, which enhances productivity and income generation;
2. RE institutional capacity strengthening: Enhancement of the institutional capacity to coordinate, finance, design, supply and maintain RE installations;
3. RE policy and regulatory support: Strengthened legal and regulatory instruments to support RE dissemination, financing and marketing;
4. RE project financing and market development: Improved availability of financial and institutional support for RE development & applications of RETs, particularly for productive uses; Creation of a RE loan portfolio in the local financing institutions;
5. RE advocacy and awareness enhancement: Improved awareness, skills and knowledge on RE, as well as understanding and the appreciation of RE and the importance of the copra industry as a RE resource among Marshallese.

The Project has been executed under the auspices of the Office of the Environmental Planning, Policy and Coordination (OEPPC) as the GEF focal point. The Project Brief mentions on its page 32 that “in terms of implementing the project activities, MRD (Ministry of Resources and Development) will play the lead role and will house the Project Manager”. However, by the time of this mid-term evaluation (January 2012) a transfer of execution responsibilities from OEPPC to MRD had not taken place yet.

³² Based on the PIREP studies and recommendations, RMI formulated ADMIRE, Palau the SEDREA project (Sustainable Economic Development through Renewable Energy), while 11 other PICs (Cook Islands, Fiji, Kiribati, Nauru, Niue, Papua New Guinea, Samoa, Solomon Island, Tonga, Tuvalu and Vanuatu) work together since 2007 in PIGGAREP (Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project), implemented by SPREP (Secretariat of the Pacific Regional Environment Program)

³³ Please note the meaning of the following abbreviations; GHG: greenhouse gas emissions; RE: renewable energy; RMI: Republic of Marshall Islands.

³⁴ Chief Executive Officer

³⁵ However,

- The GEF MSP Project Brief mention as Project Goal: “the reduction of the GHG emissions from the unsustainable uses of fossil fuels (primarily diesel fuel oil) in the RMI through the utilization of the country’s renewable energy (RE) resources and as Project Objective “The removal of barriers to the utilization of available RE resources in the country and application of renewable energy technologies (RETs)”;
- The UNDP Project Document states on its page 8 as Objective “Promotion of the productive use of RE to reduce GHG emission by removing the major barriers to the widespread and cost-effective use of feasible RETs”

³⁶ The UNDP Project Document introduces the sixth component of “Learning, Evaluation and Adaptive Management Increased”, but this refers more to the project’s administrative arrangement of monitoring & evaluation and project management” rather than thematic issues

The Project Brief mentions the **Project Advisory Committee (PAC)** to give advice on project implementation to be made up of representatives from OEPPC, MRD, MEC, other Government Ministries (Finance, Statistics, Health and Education), the Tobolar Copra Processing Authority and UNDP.

1.4 Mid-term and final evaluation; structure of the report

In accordance with UNDP and GEF regulations, a Mid-Term Review (MTR) of ADMIRE had to be carried out after 2.5 years of project initiation. For this purpose, a 1-week mission to RMI was carried by the independent³⁷ consultant, Mr. Johannes (Jan) Van den Akker in January 2012 (see Annex B on the mission schedule).

This report describes the findings and recommendations of this **mid-term review**.. The Reviewer has applied the following **approach** in the collection of data, in accordance with the Terms of Reference of the review:

- i) Review of project documentations, such as the Project Documents, APR-PIRs (annual project implementation reviews), background information, quarterly progress reports (see Annex B for a list of available information);
- ii) Meetings with representatives from OEPPC and MRD;
- iii) Discussion over Skype with UNDP staff in the Fiji multi-country office as well with the Regional Technical Advisor (RTA).

The review has looked at the main areas³⁸ as mentioned below. The supporting questions are taken from the Terms of Reference (see Annex A), although presented in a different order.

- a) Progress towards achievement of results

Criteria	Supporting questions	Rating
<u>Effectiveness and results:</u> 1. Achievement of objective and outcome; Attainment of outputs; Overall impacts (section 2.1)	<ul style="list-style-type: none"> • Is the Project making satisfactory progress in achieving project outputs vis-à-vis the targets and related delivery of inputs and activities? • Given the level of achievement of outputs and related inputs and activities to date, is the Project likely to achieve its Immediate Purpose and Development Objectives? 	
<u>Sustainability</u> (section 3.1)	<ul style="list-style-type: none"> • Extent to which the benefits of the project will continue after it has come to an end and can be replicated 	

³⁷ Independent should be interpreted here 'as not having been involved in project design, management or implementation of activities of ADMIRE'

³⁸ The underlined words refer to the GEF criteria of relevance, effectivity, efficiency, results and sustainability

b) Project formulation

Criteria	Supporting questions	Rating
Conceptualization and design (<i>section 2.3</i>)	<ul style="list-style-type: none"> The approach used in design and an appreciation of the appropriateness of problem conceptualization and whether the selected intervention strategy addressed the main barriers; Is the project logical framework and design still relevant in the light of the project experience to date? Validate whether the risks originally identified in the project document and, currently in the APR/PIRs, are the most critical and the assessments and risk ratings placed are reasonable 	
<u>Relevance</u> and ownership (<i>section 2.3</i>)	<ul style="list-style-type: none"> Is the project well-placed and integrated within the national government development strategies, such as community development, poverty reduction, etc., and related global development programs to which the project implementation should align? 	

c) Project implementation (efficiency)

Criteria	Supporting questions	Rating
Effectiveness of project management (<i>section 2.2.1</i>)	<ul style="list-style-type: none"> Are the direct partners and project consultants able to provide necessary inputs or achieve results? Given the level of achievement of outputs and related inputs and activities to date, is the Project likely to achieve its Immediate Purpose and Development Objectives? 	
Monitoring and evaluation (<i>section 2.4.1</i>)	<ul style="list-style-type: none"> Assess the use of the project logical framework and work plans as management tools and in meeting with UND P-GEF requirements in planning and reporting? How have the APR/PIR process helped in monitoring and evaluating the project implementation and achievement of results? 	
Budget and co-financing (<i>section 2.2.2</i>)	<ul style="list-style-type: none"> On the financial management side, assess the cost effectiveness of the interventions and note any irregularities 	
Involvement of partners and other stakeholders (<i>section 2.4.3</i>)	<ul style="list-style-type: none"> Are the project partners and their other similar engagements in the ADMIRE project, strategically and optimally positioned and effectively leveraged to achieve maximum effect of the RE program objectives for the country? Asses how project partners, stakeholders and co-financing institutions are involved in the Project's adaptive management framework. 	

d) Conclusions and recommendations

Criteria	Supporting questions	Rating
Conclusions (chapter 3)	<ul style="list-style-type: none"> • Is the project implementation and achievement of results proceeding well and according to plan, or are there any outstanding issues, obstacles, bottlenecks, etc. that are affecting the successful implementation and achievement of project results? • Are there critical issues relating to achievement of project results that have been pending and need immediate attention in the next period of implementation? • To what extent does the broader policy environment remain conducive to achieving expected project results, including existing and planned legislations, rules, regulations, policy guidelines and government priorities? 	
Recommendations (chapter 3)	<ul style="list-style-type: none"> • Do the Project's purpose and objectives remain valid and relevant, or are there items or components in the project design that need to be reviewed and updated? • Do the Project's purpose and objectives remain valid and relevant, or are there items or components in the project design that need to be reviewed and updated? • Describe additional risks identified during the review, if any, and suggest risk ratings and possible risk management strategies to be adopted. • Identify opportunities for stronger collaboration and substantive partnerships to enhance the project's achievement of results and outcomes. • Identify opportunities for stronger collaboration and substantive partnerships to enhance the project's achievement of results and outcomes. • Are the project information and progress of activities disseminated to project partners and stakeholders? Are there areas to improve in the collaboration and partnership mechanisms? 	

These three main areas are given a **rating** (in chapter 3) that can range between:

- Unsatisfactory (US): major shortcomings
- Marginally unsatisfactory (MU): significant shortcomings
- Marginally satisfactory (MS): moderate shortcomings
- Satisfactory (S): minor shortcomings
- Highly satisfactory (HS): no shortcomings

2. FINDINGS

2.1 Achievement of project outcomes and outputs

For each of the five outcomes, as mentioned in paragraph 1.2, this section assesses the progress in the implementation of the project's outcomes and outputs. The information is based on info provided in the annual UNDP/GEF APR-PIRs (Annual Project Review-Project Implementation Reports) and the interviews held during the mission.

The outputs in the first columns of the tables are taken from the UNDP Project Document (ProDoc). The progress indicators are from the Annual Project Review – Project Implementation Report (APR-PIR). These were defined after revision of the Strategic Results Framework (GEF Logical Framework) at the Inception workshop (March 2010).

2.1.1 Component 1 RE Technical Capacity Development

Outcome: Improved understanding of RE potential and increased number of RE hardware installations on the ground, which enhances productivity and income generation

Outputs (as given in the ProDoc)	Indicators/targets (as given in APR-PIRs)	Achievements by 2011
<ul style="list-style-type: none"> RE Resources Assessment (mainly on solar and wind energy); Technical Assessments of RE Applications; RE-based Energy System Applications Demonstrations, which covers (a) Enhancement of some of the installed SHSs in Ailinglaplap to accommodate productive use, livelihood support and social service applications; and, (c) Other RE-based energy system applications; and, Provision of Technical Support through the development and implementation of RE resource assessment and simulation methodologies; the formulation and adoption of technical 	<p>A1. Solar and wind monitoring studies and training are started in 2 atolls by Year 2</p> <p>A2. Study of the nation-wide copra oil potential and technical viability for power generation initiated by Year 2</p> <p>A3. Technical viability of solar, wind and biomass RE applications confirmed by Year 4</p> <p>A4. Installation of 1,000 solar PV systems completed by Year 4</p> <p>A5. Electrify, maintenance and/or monitoring of 20 schools and 15 health centers with RE/PV by Year 4</p> <p>A6. RE technical standards for PV, wind and biomass</p>	<p><i>Baseline 2011:</i></p> <p>By 2011, about 1400+ solar PVs had been installed in the outer island atolls as well as in Majuro, with funding from other donors, such as Japan, European Union (EU) etc.</p> <p><i>ADMIRE:</i></p> <ul style="list-style-type: none"> Only A1 has been partly carried out, in which monitoring systems are procured (from NRG) and sites have been identified (in Majuro at MIHS³⁹ Campus) and at KAJUR power station. Installation is expected in 2012⁴⁰; A4: MRD and OEPPC have signed a MoU for the "Joint Implementation of North REP (SPC-EU)⁴¹ and ADMIRE (UNDP-GEF). One activity of North-REP will be to provide (and finance) PV electricity to most of the approximately 1500 households that remain un-electrified. ADMIRE will provide 'soft'

³⁹ Marshall Islands High School

⁴⁰ ADMIRE funded RMI participation in a number of training. Examples are a) PIGGAREP regional Workshop on Wind Data Analysis held in Nadi, Fiji, 26-30 April, 2010; b) SMA Australia Training held in Denarau, Fiji April 7 – 8, 2010; c) PIGGAREP regional Follow-up Workshop on the Installation and Maintenance of Grid-connected Photovoltaic Systems, Fiji (March 2011)

⁴¹ Secretariat of the Pacific Community; EU: European Union

standards for RE-based energy system components; and capacity building in the installation, operation and maintenance of RE-based energy systems.	prepared and adopted by Year 3	support (1) technical training on grid connected PV and stand-alone systems, (2) awareness and basic maintenance, (3) community consultations and surveys. Of these activities, the latter (3) has been initiated with ADMIRE financial support
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2.1.2 Component 2 RE Institutional Capacity Strengthening

Outcome: Enhancement of the institutional capacity to coordinate, finance, design, supply and maintain RE installations

Outputs (as given in the ProDoc)	Indicators/targets (as given in APR-PIRs)	Achievements by 2011
<ul style="list-style-type: none"> Review and development of appropriate legislations to strengthen the Energy Office; Collection of baseline energy data for the development of the National Energy Balance for RMI; Formulation of an integrated energy plan based on the National Energy Balance; Institutional capacity building of personnel from relevant agencies that are directly responsible in the implementation and enforcement of the national energy planning; Conduct of in-house training courses for the relevant government agencies in the areas of integrated energy planning, energy surveys; and energy reporting and monitoring. 	<p>B1. Review of the MRD and OEPPC legislations completed by Year 1</p> <p>B2. Complete the Energy Balance by end of Year 1</p> <p>B3. A reviewed National Energy Policy adopted by end of Year 2</p>	<p><i>Baseline:</i></p> <p>At the time of formulation of ADMIRE and before its implementation start a number of studies were carried out. Examples are: a) the 2003 <i>Marshall Islands National Energy Policy</i> and the <i>Outer Islands Feasibility Study of RMI</i> (ADB, 1995); b) <i>Outer Island Electrification Strategy</i> and c) <i>Biofuel Electrification on Remote Atolls in RMI</i> (2006, UNDP, RMI/MEC, SOPAC)</p> <p>The RMI has now formulated the <i>National Energy Policy and Energy Action Plan</i> (2009) as well as a <i>National Climate Change Policy Framework</i>. (adopted in 2011)</p> <p><i>ADMIRE:</i></p> <p>While the above-mentioned energy and climate change plans have been formulated, it has been unclear as to how or if at all ADMIRE contributed to these efforts, apart from some stakeholder consultations</p>

2.1.3 Component 3 RE Policy and Regulatory Support

Outcome: Strengthened legal and regulatory instruments to support RE dissemination, financing and marketing

Outputs (as given in the ProDoc)	Indicators/targets (as given in APR-PIRs)	Achievements by 2011
<ul style="list-style-type: none"> Review of all the legislations, regulations and policies of the national and local governments, ministries and government-owned corporations for supporting the use of RE and copra oil as a fuel; Drafting and implementation of a coherent National Energy Policy (NEP), the associated Action Plans, implementing rules and regulations; Establishment of National Coordination Mechanisms that would oversee the effectiveness of the energy policies and the progress with the implementation of the national energy plan; Conduct of training courses for the relevant government agencies in the areas of energy policy formulation and decision making. 	<p>C1. Existing legislations and policies (including the copra industry) are reviewed by Year 2 and new amendments and enactments by mid-Year 4</p> <p>C2. Commercial energy pricing policies and practices reviewed by Year 2</p> <p>C3. Policies relating to the copra industry are reviewed by Year 2</p>	<p><i>Baseline:</i> See Component 2 for a summary of energy and climate change plan. In addition, An (2011) Amendment to the Import Duties Act (Section 206) exempts certain RE⁴² and EE⁴³ equipment from import duties.</p> <p><i>ADMIRE:</i> Discussions on biofuel study was held by the ADMIRE Steering Committee at its 2011 first quarter meeting. TOBOLAR's new management is in discussion with the OEPPC on the most appropriate options to consider; e.g. demonstration through small copra mills</p>

2.1.4 Component 4 RE Project Financing and Market Development

Outcome: Improved availability of financial and institutional support for RE development & applications of RETs, particularly for productive uses; Creation of a RE loan portfolio in the local financing institutions.

Outputs (as given in ProDoc)	Indicators/targets (as given in APR-PIRs)	Achievements by 2011
<ul style="list-style-type: none"> Improved/enhanced availability of financial and institutional support for RE development 	<p>D1. Confirmed list of bankable projects by Year 3</p> <p>D2. At least one training</p>	<p><i>Baseline:</i> Absence of capital funds and lack of known viable RE investment and market</p>

⁴² Warranted solar water heaters, PV panels, array frames, regulators, inverters, complete solar PV kits (including batteries) and complete wind kits

⁴³ Initially air conditioning units, refrigerators and freezers, fluorescent and LED lighting, which have an Energy Star label or equivalent

<p>and applications of RETs particularly for productive uses;</p> <ul style="list-style-type: none"> • Creation of a RE loan portfolio in the local financing institutions. Among the activities that are planned include: (1) Conduct of a full study of the viability and the means for atolls and/or group of atolls to establish their own copra trading company and copra-based power generation; (2) Development of a portfolio of “bankable RE projects” in RMI; (3) Provision of technical assistance to the private sector to enable them to invest on these technically and economically viable RE projects; (4) Capacity building for the government’s Finance Ministry, banking and financial institutions; and, (5) Establishment of a Micronesian Renewable Energy Forum and Trade Exhibition. 	<p>workshop and technical assistance to financing institutions annually</p> <p>D3. Technical assistance to atolls on business opportunities in copra trading and shipping by Year3</p>	<p>opportunities. RE electrification is de facto financed by donors.</p> <p><i>ADMIRE:</i> MRD and OEPPC have signed a MoU for the “Joint Implementation of North Rep (SPC-EU) and ADMIRE (UNDP-GEF). One activity of North will be to finance PV electricity to most of the approximately 1500 households that remain unelectrified (see Component 1)</p>
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2.1.5 Component 5 RE Advocacy and Awareness Enhancement

Outcome: Improved awareness, skills and knowledge on RE, as well as understanding and the appreciation of RE and the importance of the copra industry as a RE resource among Marshallese

Outputs (as given in ProDoc)	Indicators/targets (as given in APR-PIRs)	Achievements by 2011
<ul style="list-style-type: none"> • Incorporation of RE into the curriculum of primary and secondary schools, as well as in the establishment of a special course on RE in the technical and post-secondary training institutes; • Establishment of a self-financing RE Information Centre (RIC) and library within the energy office in MRD; • Development of a RE Website, which will be used to 	<p>E1. RE in schools’ curriculum by Year 3</p> <p>E2. RE public awareness programmes are operational through the local media by end of Year 1</p> <p>E3. Two local university graduates on RE by end of Year 4</p> <p>E4. More than 100 trainees per year participate in the RE training activities of the ADMIRE</p>	<p><i>Baseline:</i> Insufficient awareness, skills and knowledge about RE technology, although there has been some public awareness through local radio and media associated with earlier projects</p> <p><i>ADMIRE:</i></p> <ul style="list-style-type: none"> • "E1 and E2. RE has not been incorporated into school curriculum at this time, but there has been on-going key awareness and knowledge building exercises. A first demonstration Science Camp was sponsored by

<p>supplement RE promotion activities and will have access to relevant databases in the PICs and in the Pacific;</p> <ul style="list-style-type: none"> • Conduct of study (towards a university degree) in the areas of RE engineering and RE economics; and, • Development and conduct of various public awareness programs utilizing posters, leaflets, radio and TV programs, newspaper articles, etc. 		<p>ADMIRE and USP⁴⁴.</p> <ul style="list-style-type: none"> • In 2011, awareness creation has focussed on collaboration with two major conferences, i.e. (1) the (Women United Together in the Marshall Islands (WUTMI) as well as (2) the Mayor's Conference. In addition to this, designing and printing of brochures for the Outer Islands (OI) survey (and also translations into the vernacular language are completed for distribution by the Survey Team (see Component 1). • E3. No know suitable candidate at the point. • E4. Initiated possible collaboration with National Training Council (NTC)/ College of Marshall Islands (CMI) to include RE technical training supported by the ADMIRE into its National Vocational Training Programs
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2.1.6 Conclusions

The project was approved by GEF in November 2007 and the project documentation was signed on April 2008. However, implementation did not really start after a delay of 12 month until March 2009. The Inception Workshop was only held in March 2010. This implies that the project is thus officially nearly halfway (assuming a 5-year project period) and should therefore have completed several major planned activities (with associated delivery rate) or at least have clearly initiated (i.e. planned or started) the majority of remaining key activities.

However, this is not the case. Overall there has been very limited progress with only a very few specific results to show. Of the five project components so far the *de facto* focus has been given to only one, i.e. 'RE Advocacy and Awareness Enhancement'. Apart from supporting the outer island energy survey together with the EU-sponsored North-REP project, the support provided for increased awareness seems to have been to support the participation of officials in a number of ad-hoc national workshops and meetings (several not directly related to activities planned under the project) as well as funding participation in a few overseas training events (including participation in 2-3 workshops organized by the regional SPREP/UNDP/GEF PIGGAREP project).

⁴⁴ University of South Pacific

2.2 Project implementation

2.2.1 Effectiveness of project implementation; monitoring and evaluation

Despite the above-mentioned lack of results, a significant proportion of resources has been used on project management with the project paying for the following positions:

- Project Manager, who resigned less than half a year after project inception (June to October 2009)
- ADMIRE Local Counterpart' (a position that is not mentioned in the Project Document)', as de facto 'Acting Project Manager', a position filled part-time by OEPPC's financial officer
- Administration/Finance Officer.

Despite this staffing, there are no associated substantial results to show up to now. In March 2010 as part of the Inception Workshop, UNDP stressed the need for immediate progress and a lot of follow-up action items were subsequent agreed to, such as:

- The ADMIRE PMU needs to take an increased proactive approach when implementing activities and should immediately initiate consultations with key stakeholders such as MRD, MEC and Tobolar about key activities to be undertaken in 2010 and beyond;
- A majority recommended that the ADMIRE Project Management Unit (PMU) needs to be located at Ministry of Resources & Development (MRD) in accordance with what was agreed to in the Project Document;
- MRD is ready to commence activities that is to be supported by ADMIRE such as technical training of technicians and master trainers in context of the outer islands photo-voltaic (PV) systems installed as part of EDF-9⁴⁵, as well as wind and bio-fuel resource assessments;

However these actions recommended at the Inception Workshop are yet to be implemented.

Concerning what has caused this situation there seem to be two principal issues:

- *Institutional and capacity issues.*
 - As mentioned in the Project Document: 'In the context of MRD which shall house the ADMIRE Project Management Office...', i.e. the Project Management Office (PMO) including the Project Manager and any other project paid staff is to be physically located at MRD. This was reconfirmed at the Inception Workshop that was held in March 2010. However, up to now (January 2012) the transfer of the project from OEPPC to MRD has still not taken place;
 - Capacity at both OEPPC and MRD to implement larger international projects is small. The current 'energy team' at MRD consists of 3-4 people. Workwise, they are already over-stretched with various government and donor-funded initiatives and can only be involved in ADMIRE on a part-time basis. Having a full-time project manager would help to address the capacity issue;
 - The 2011 APR-PIR mentions "cumbersome processes within Government are a barrier to timely release of funds/advances from the UNDP Fiji Multi-country Office".
- *Project-specific capacity issues.*

In the Project Document (p. 15) it is stipulated that '...the PM will work exclusively on the project'. Nonetheless, up to date, there has not been a full time Project Manager (PM) on board (the first PM left within half a year). A OEPPC staff member has been acting on a part-time basis as Project Manager since the beginning of 2010. This has clearly shown not to be an adequate set-up as this person had to share ADMIRE activities with her duties as Chief Financial Officer for OEPPC. This is

⁴⁵ Funding cycle of the European Development Fund (2000-2007), the main instrument to provide development aid for the European Union

linked with the above-mentioned limited capacity on RMI, a small nation with only 55,000 people. It is mentioned in one of the progress reports that advertisements for the PM post were carried out 4 times to obtain appropriate candidates. No appropriate candidates were identified either due to qualification issues or very high salary requests.

At the moment of writing this report, the process of transferring budget and management responsibility from OEPPC to MRD was in progress, but still depending on a formal Cabinet decision. A new project manager,⁴⁶ has been selected, but will only be contracted once the transfer OEPPC-MRD has been formalized.

2.2.2 Financial planning and delivery of co-financing

The following table gives an overview of original budget and co-financing as committed in the Project Brief as well as disbursement figures during 2006-2011. It is estimated by the Reviewer that a total of USD 227,000 had been spent by December 2011. This 23% of the total GEF budget of USD 975,000; quite large a sum in comparison with the significant under-delivery in terms of progress in outputs of the project (as described in Section 2.1).

Components	GEF Budget	Expenditures 2008-2011 (USD)					Unspent (USD)
		Total	2008	2009	2010	2011	
1. RE potential and installations	356,000	83,972	444	7,173	51,334	25,022	272,028
2. RE institutional capacity	118,000	38,874				38,874	79,126
3. Policy and regulatory	86,000	1,659			906	753	84,341
4. RE business and financing, copra	190,000	272				272	189,728
5. RE advocacy and awareness	127,500	35,320		28,320	7,000		92,180
6. PM	97,500	67,481	469	32,044	18,871	16,098	30,019
	975,000	227,578	913	67,537	78,110	81,019	747,422

Source: data compiled by the Reviewer from Combined Delivery Reports (CDRs), 2008, 2009, 2010 and 2011

2.3 Project design and relevance

The PIREP report correctly identifies two main options for renewable energy, namely electrification through PV (photovoltaics) of the outer islands as well as biofuel production from coconut oil. These recommended options also form the core of the ADMIRE project. The project's **relevance** is also confirmed in the 2009 National Energy Policy which mentions:

- Arrange wind measurements over 12- 18 months and obtain an independent analysis of the wind energy potential for Majuro;
- Develop and implement training of trainers programs covering PV system design, installation and management; develop training programs for village level O&M (operation and maintenance);
- Develop and implement consistent mechanisms for the design and O&M of PV systems of different ministries to provide for consistent management, operational and financial mechanisms;

⁴⁶ Ms. Dolores deBrum-Kattil, formerly with the Marshall Islands Visitors Authority (MIVA)

- Continue the program of outer island household solar energy installations and develop a mechanism for covering full user costs

The Project Document roughly follows the recommendations of the PIREP report, namely to focus on solar photovoltaics (PV) for electricity generation and the use of copra oil to blend with fossil fuels (diesel) in power generation or in transport applications, as described in Section 2.1. In this sense, the project focusses on the most relevant technologies.

However, the **design** has basic flaws:

- The project documentation (Project Document, Project Brief) refers to a list of ‘bankable proposals’ in the financing component. This is puzzling as there are basically only two proposals ‘rural electrification’ and ‘copra oil blending’ in the project documentation and none of these are bankable per se, but highly dependent on donor and/or government support, at least for the initial investment. For example, outer island electrification is implemented with a high subsidy element, as households on outer islands are generally too poor to be able or willing to buy a SHS up front. It seems to be assumed that RE can be implemented on a commercial basis without given any justification why this would be the case in the context of RMI and for which RE technologies this could apply. There is some link made with copra oil processing, assuming that these could function as RESCOs (renewable energy service companies) without presenting any case on their feasibility or appropriateness in the RMI context;
- With the ‘smallness’ of RMI, human capacity to implement projects is limited. Apart from MEC, typically around 4 people work on energy in MRD. This capacity problem is ignored in the Project Document. Training is rightly identified as a need, but the question is how many people are available to be trained people and should be trained. For example, if MRD has only 4 people working on energy, how can the goal of E4 in the project document, training 100 people, be reached? Where will these 100 people come from? Lessons learned from the already 1,500 PV systems installed are not clearly presented. Are these still functioning
- GEF supports ‘soft’ activities, capacity building, awareness raising and policy formulation support. However, there is no clear linkage with the ‘hardware’. It is suggested that Tobolar will process copra oil, but there is no co-financing letter suggesting they will actually do so. The goal of 1,500 households to be electrified is mentioned, but the source of financing is not fully identified in the project documentation, nor is the timeline in which the funding will realize and the hardware procured. A co-financing letter from the Ministry of Finance does refer to USD 1 million co-financing from the EU (European Union), as part of its REP-5 project⁴⁷. REP-5 activities in RMI focused primarily on outer island electrification through solar PV systems, with some attention paid to demand-side energy efficiency on Majuro atoll. This illustrates the danger of project design with different donors without formal cooperation mechanisms, whereby different procedures and timeframes for project implementation lead to de facto no cooperation. REP-5 ended in 2009, while ADMIRE had not really taken off yet by that time. The EU is now financing a successor project, North-REP, which opens a new opportunity for ADMIRE to combine the project’s technical assistance with the outer island electrification activities supported by North-REP.⁴⁸
- There is need for energy efficiency improvements, as mentioned by the MRD energy staff during the interview with the Reviewer. This is also referred to in the ADB’s 2008 Rapid Energy Assessment, which concluded that “there were significant cost effective opportunities for improved energy

⁴⁷ As part of the EU’s 9th EDF (2000-2007), European Development Fund, budget cycle, which financed the regional project “REP-5, Support to the Energy Sector in Fice and Pacific Island Countries”(2006-2009), including the Marshall Islands

⁴⁸ Under EU’s 10th EDF budget cycle (2008-2012), North-REP (North Pacific Renewable Energy and Energy Efficiency Project) will support 4 nations in the Pacific region, including Marshall Islands

efficiency but that renewable energy investments in urban electricity production would require capital grants to compete with petroleum fueled electricity, at least in the short term”. In layman’s terms this translates as that it is cheaper to save a kWh than to expensively generate a kWh with RE technology. Also, the PIREP report on Marshall Islands states on its page 54 that “Any program for renewable energy for electricity generation or providing fuels for transport on the urban islands should be closely linked with energy efficiency programs so that the high cost energy is used as efficiently as possible”. The project would have benefitted in its design by including energy efficiency, at least as part of the awareness campaign component. The Reviewer acknowledges that ADMIRE has been approved by GEF as a RE project and at this stage the objective cannot be changed.

3. CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

As per Terms of Reference (see Annex A), this evaluation needs to provide a rating, as mentioned in Section 1.4. Based on the findings as described in Chapter 2, ‘achievement of results’ is rated as ‘unsatisfactory’. This related to both to flaws in project design, rated as ‘marginally satisfactory’, and difficulties in project implementation, which is as ‘unsatisfactory’.

The following table explains the ratings given by the Evaluator, based on the consideration presented in Chapter 2:

Criteria	Rating	Rating	Item
Achievement of objective and outcome; Attainment of outputs; Overall impacts	U	U	Achievement of results
Sustainability	U		
Conceptualization and design	U	MS	Project design
Relevance and ownership	S		
Effectiveness of project management	U	U	Project implementation
Monitoring and evaluation	MS		
Budget and co-financing	U		
Involvement of partners and other stakeholders	MS		

The all-over rating of the project is **U (unsatisfactory)**.

To recommend further continuation some drastic changes need to take place. On a positive note, some encouraging developments have taken place recently that may enable ADMIRE to get on track:

- A Memorandum of Understanding (MoU) between ADMIRE and the SPC/EU North Pacific Renewable Energy and Energy Efficiency Project (North-REP) was signed between OEPPC and MRD in January 2011. The MoU covers project collaboration on ‘soft-based’ activities in the outer islands for the solar PV program including surveys, trainings and awareness, while the North Rep will provide funding for about 1,500 solar PV systems. This provides an opportunity for practical implementation of PV systems in the outer islands and for ADMIRE to help setting up a sustainable operation, maintenance and administration system for these (and previously installed PV system)

- A new full-time project manager has been selected⁴⁹, and should be contracted soon, once responsibility for project activities and budget is shifted from OEPPC to MRD;
- The latter has been agreed and Cabinet should formalize this transfer immediately.

3.2 Recommendations

With regard to ways forward for ADMIRE key **recommendations** are given below.

Immediately:

- Transfer of all project responsibility (including financial) from OEPPC to MRD;
- Expedite contracting of the new full-time project manager;
- De facto integration of ADMIRE activities with the EU/SPC North-REP project, in which ADMIRE can provide value added 'soft assistance' for the installation of the planned 1,500 PV systems by looking how a sustainable technology support system can be organized in RMI that can provide operation, maintenance and administration services. A good, simple and practical work plan needs to be agreed upon with clear indicators. This report has made a first attempt in formulating such a work plan (see Table A in this Section). Obviously North REP as the key partner needs to be very closely involved including fully consulted and formally agree to such a de facto project integration;
- Visit of UNDP Regional Technical Advisor (RTA) to RMI to discuss and finalize the work plan with MRD and North-REP as well as assist with the detailed planning of key activities.

During 2012:

- Very close monitoring and technical support by UNDP Fiji office and RTA;
- Implementation of activities mentioned in the MoU, such as by means of training on grid-connected RE systems, technical training for PV technicians and awareness raising amongst the beneficiary households on the use of PV systems (including battery maintenance);
- To expedite PV-related activities, a PV expert should be contracted during 2012 with good knowledge of PV systems in the Pacific region. If not possible to contract a full-time person, no time should be lost in time-consuming application procedures, but consultants should be hired on a short-term basis;
- Continue to explore and conclude opportunity of cooperation (similar to North REP MoU) with Tobolar and ADB on copra oil processing;
- Evaluation/review of project activities by the end of 2012 by UNDP/RTA and, based on results achieved in 2012, take a 'go/ no-go' decision.

The following Table A on the next pages makes initial suggestions for revised outcome indicators for ADMIRE linked with priorities as stated in the Marshall Islands National Energy Policy and Energy Action Plan (2009) and outputs of the SPC-EU North-REP project as well as the proposed ADB grant assistance for the Improved Energy Supply of Poor Households. Table B provides linkages in terms of budget allocation of the unspent budget of ADMIRE (USD 747,422 by December 2011) with the North-REP budget for the RMI component and the budget of the ADB-supported copra oil activities.

There is some proposed re-organization of activities in the various components:

⁴⁹ Ms. Dolores deBrum-Kattil has been selected

- Activities related to PV or copra oil are now as much as possible in one component (component 1 and 4 respectively) rather than being divided over various components); This makes comparison with the North-REP and ADB-supported activities more straightforward;
- Component 2 (institutional capacity building) has been re-oriented to training of staff of institutions as well as technicians, mainly on PV applications;
- With the National Energy Policy formulated, the Component 3 has been re-oriented towards evaluation and monitoring and how the results can be translated into recommendations for future revisions of the Policy and Energy Action Plan in terms of technology support, financing, tariff setting, capacity need assessments, etc.

The project would have benefitted in its design by including energy efficiency, at least as part of the awareness campaign component (Component 5). In a small country such as RMI it does not make sense to have separate campaigns on RE and EE, and in fact the two are intimately linked as explained in Section 2.3. The Reviewer acknowledges that ADMIRE has been approved by GEF as a RE project and at this stage the objective cannot be changed. Nonetheless, omitting EE is a *'missed opportunity'* in the opinion of the Reviewer. GEF should be more flexible in its own bureaucracy and allow future project submissions that mix RE and EE if the project proponents clearly indicate the necessity.

The Evaluator has up to now evaluated three SIDS (small island states) projects whose origin date back in the GEF 3 funding cycle, namely the Maldives Renewable Energy Technology Development and Application Project (RETDAP – Mid-term evaluation, 2007), the Caribbean Renewable Energy Development Project (CREDP – Final evaluation, 2011) and now the Marshall Islands ADMIRE project (mid-term evaluation, 2012)⁵⁰.

Although different, all three were characterized by little real progress at the time of their mid-term evaluation, which made a drastic revision of their work program necessary. Although external factors may be different in each of these projects; all three clearly lacked a good project design that does not seem to take into account the special circumstances of small island states. In all three, the concepts were not particularly geared towards the characteristics of small islands states, e.g. the issue of human capacity in such small nations was underestimated, while the role of commercial financing in these small markets was overestimated.

The following quotes from earlier reviews of UNDP/GEF projects are also relevant for ADMIRE:

CREDP - Final Evaluation (Caribbean region, 2011).

- Rather than focusing on one-time 4 to 5 years interventions, one option for GEF is to allow a more long-term programmatic approach with a country or region, which would consist of several modules (smaller projects) that address specific issues and barriers, of which some would be in parallel and other ones implemented in a consecutive order. This would allow for flexibility in defining outputs and activities and fine-tune to the specific characteristics of the technology or intervention and the country's needs (changing over time). Rather than defining a package of activities worth several millions of dollars from the onset, this would also allow for more targeted, bottom-up based budgeting per module and teaming up with projects and programs of other bilateral and multilateral donors.

⁵⁰ In fact, the Evaluator also reviewed a fourth project, PIREP (final evaluation, 2006), but since the objective of the project was different (to formulate successor projects) it is left out of the discussion here.

Kazakhstan Wind Power – Final Evaluation (2011)

- All projects seem to have a similar format, with a policy-institutional component, awareness raising and capacity building and demonstration component. Also, budgets and co-financing are relatively ‘fixed’ with always a couple of USD million as GEF contribution, which needs to be matched by co-financing with a ratio 1:3 or 4 or higher, irrespective of the size of a country, type and importance of barriers to be removed and of technology involved. It also assumes that all barriers can be addressed simultaneously and within the same timeframe and co-financing can be realized irrespective of the often different timeframes and priorities of donors and other co-financiers. Rather than focusing on one-time 3 to 5 years interventions, one option for GEF is allow a more long-term programmatic approach which would consists of several modules (smaller projects) that address specific issues and barriers, of which some would be in parallel others in a consecutive order. This would allow for flexibility in defining outputs and activities and fine-tune to the specific characteristics of the technology or intervention and the country’s changing needs over time

This is not to say that ‘financial components’ in UNDP-GEF project do not work, but their function should be clearly linked with a specific technology and target group and conditions under which these will function. The NAMREP project (Namibia Renewable Energy)⁵¹ had a financial scheme for solar water heaters, for example, which boosted an existing scheme successfully. Nor does it imply that GEF should not support projects in SIDS; a recent mid-term evaluation of Palau’s UNDP/GEF SEDREA projects hints at early successes⁵².

Table A. Suggested ADMIRE activities 2012-2014 and linkage with North REP

1. Technical Capacity Development (resource assessment)

Outcome: Improved understanding of RE potential and increased number of PV hardware installations

Suggested indicator for progress reporting	Energy Action Plan priority	Planned North Rep outputs and activities	Activities carried out by North REP or ADMIRE (Dec.'11)	Planned or suggested activities (ADMIRE)
A1. Wind monitoring study carried out during 2012-2013	<ul style="list-style-type: none"> • Review existing data and carry out a proper wind energy resource survey for Majuro • Analyze the wind data and prepare a wind energy assessment report including a wind map for Majuro 	Could be linked with North-REP Federated States of Micronesia (Chuuk) and Palau wind assessment activities	<ul style="list-style-type: none"> • Procurement of NRG wind monitoring systems (ADMIRE) 	<ul style="list-style-type: none"> • Installation and decommissioning of wind masts • Contract for an international consultant (wind expert) to facilitate installation, training on data downloading and etc.

⁵¹ Evaluated by the Evaluator in 2006

⁵² Quote from the Mid-Term evaluation report: “In summary, the SEDREA project has a generally sound problem definition and design and has made an impressive start with the development of appropriate technical specifications, the procurement of standard and appropriate PV systems, the development of a suitable RE funding mechanism (REFW), and the successful deployment of initial residential grid-connected PV systems through an appropriate and strongly committed local financing institution (NDBP)”.

				<ul style="list-style-type: none"> • Measurements of at least 1 year
A2. Outer island energy need and demand survey carried out 2011-2012	<ul style="list-style-type: none"> • Complete electrification of outer island homes; 	<ul style="list-style-type: none"> • Demand and load survey communities, schools and clinics 	<ul style="list-style-type: none"> • Energy needs & demand survey (North-REP with ADMIRE support; 10 islands complete, 	<ul style="list-style-type: none"> • Continuation early 2012 in 4 more atolls
<p>A3. Installation of :</p> <ul style="list-style-type: none"> • PV systems in the outer island communities (1500 SHS and • Larger systems in 10-15 schools by 2012 and upgrade of 22 PV systems in rural health centers <p>(these are actually North REP activities, and not implemented by ADMIRE, but are linked with ADMIRE's 'soft' based activities and included here as indicator for realized co-financing</p>	<ul style="list-style-type: none"> • Complete electrification of outer island homes; • Continue with solar based electrification of outer island schools and other public facilities 	<ul style="list-style-type: none"> • Provide 1500 households with stand-alone (PV) systems in outer islands communities; • Install 4-kW (PV) solar systems for 10-15 rural schools; <p>Activities to achieve these include:</p> <ul style="list-style-type: none"> • Draw up technical specifications, tender docs and evaluation process • Call for tenders • Evaluation of tender • Supply of SHS equipment; • Testing of SHS equipment • Installation in communities and atolls and commissioning • Spare parts (light fittings, ballasts, cables, solar panels, batteries (??) • Maintenance contract MRD-MEC and MoU MRD-communities • Maintenance contracts MRD with Health and Education ministries and MoU MRD with ministries and communities 	<ul style="list-style-type: none"> • Final evaluation of tender completed; will negotiate with successful bidder before final award to ensure that all technical specifications are met • Installation will start 1st or 2nd quarter 2012 	<ul style="list-style-type: none"> • Provide TA support during installation (2012) and on an as-needed basis during monitoring (see C.1, 2013) • Linked with Component 5 (indicator E3): end-user training and awareness campaign on RE and (2012)
A4. Program for the safe replacements of batteries defined and implemented by 2013		<ul style="list-style-type: none"> • Develop storage, disposal, shipping plans for used batteries 	<ul style="list-style-type: none"> • Discussions have started 	<ul style="list-style-type: none"> • Provide technical inputs (2012-13)

2. RE Institutional Capacity Strengthening

Outcome: *Enhancement of the institutional and human capacity to coordinate, finance, design, supply and maintain RE installations*

Suggested indicator for progress reporting	Energy Action Plan priority	Planned North Rep outputs and activities	Activities carried out by North REP or ADMIRE (Dec.'11)	Planned or suggested activities (ADMIRE)
B1. Training program defined and implemented (for MEC (other relevant institutions and communities) given each year	<ul style="list-style-type: none"> Develop a capacity building program 	<ul style="list-style-type: none"> Establish permanent in-country training programs and provide training; Refresher technical training courses for MEC & communities technicians 	<ul style="list-style-type: none"> Discussions with Guam's Trades Academy to provide certified trainings for technicians, designers and installers with American accreditation (North-REP) Participation MRD staff in workshops sponsored by ADMIRE 	<ul style="list-style-type: none"> Offer internships Cooperation agreements with training institutions (e.g. National Training Center) (2012) Design program with North REP and other donors (e.g. JICA) (2012) Undertake training and do training course evaluation (2012-13)
B2. Support provided for RE technical assistance and capacity development	<ul style="list-style-type: none"> Determine the human resources needed to effectively implement RE policy and regulations 	<ul style="list-style-type: none"> Local counterpart for Energy Specialist to be provided by North REP 		<ul style="list-style-type: none"> PV expert or consultants for 1 year (2012), possibly extended in 2013/14 or part-time with copra oil expert

3. RE Policy and Regulatory Support

Outcome: *Strengthened planning and regulatory instruments to support RE dissemination, financing and marketing*

Suggested indicator for progress reporting	Energy Action Plan priority	Planned North Rep outputs and activities	Activities carried out by North REP (Dec.'11)	Planned or suggested activities (ADMIRE)
C1. Installed PV systems monitored during 2012-2013	<ul style="list-style-type: none"> Monitoring and evaluation of CMI solar and wind installations. 			<ul style="list-style-type: none"> Add any needed data logging and instrumentation to the solar systems installed (2012)
C2. Installed 3000 (incl. North REP's 1500 PV systems evaluated in 2013	<ul style="list-style-type: none"> Evaluate the performance of solar energy systems on the 	Develop/review project management structure, Tariff Collection Structure	Tariff review and economic analysis currently being undertaken	<ul style="list-style-type: none"> Evaluation by end of 2013 of performance of solar energy systems (issues in

with comments on techno-economic viability and recommendations for further action	<p>outer islands relative to the professed needs of the residents and agencies receiving services and the requirements of the project management ;</p> <ul style="list-style-type: none"> • Technical guidelines and regulations for grid connected self-generation through RE sources 	<p>by utilizing existing cultural, communities, NGO networks;</p> <p>Develop policy approaches to top up current tariff for viable outer islands electrification program</p>		<p>operation, maintenance and management; user satisfaction) with recommendations (e.g. improvements in technology support system and PV system management, including budget needs and review of tariff collection and structure);</p> <ul style="list-style-type: none"> • Study on issues and options in grid-connected RE (solar or wind), including pre-paid metering and feed-in tariffs (2013)
C3. Data on RE collected and linked with national energy statistics	Develop database & input project (technical, economic, social, etc.) data on regular basis	Inputs to the region-wide energy indicators activities (through SPC)	Currently being developed - starting with excel format of data storage and will explore further how to integrate with existing data storage systems	<ul style="list-style-type: none"> • Data on RE collected (incl. from earlier surveys and assessments) and linked with national energy statistics (2013)
C4. Review of plans, legislation and regulation on RE systems (PV, copra oil) with recommendations for future National Energy Policy revisions (2013)	Review of all the legislations, regulations and policies of the national and local governments, ministries and government-owned corporations for supporting the use of RE and copra oil as a fuel			<ul style="list-style-type: none"> • Review of plans, legislation and regulation w.r.t RE systems with recommendations for National Energy Policy, incl. technical standards (2014)

4. RE Project Financing and Market Development (for copra oil)

Outcome: *Improved availability of financial and institutional support for the development & applications of copra-based power generation*

Suggested indicator for progress reporting	Energy Action Plan priority	Planned ADB project outputs and activities	Activities carried out (Dec.'11)	Planned or suggested activities (ADMIRE)
D1. Study of the nation-wide copra oil potential and technical and financial viability for power generation and transport applications, including review of existing policies and regulations D2. Trainings provided on copra oil applications	<ul style="list-style-type: none"> Determining the present and potential coconut oil resource of RMI Assessment and study of the technical, economic, environmental) practicality of developing local coconut based biofuels as a fuel for transport and electricity generation. Based on the above, select an atoll as a pilot area for local 	Utilizing local fuels in power generation to provide alternative income for the poor (including blending coconut oil as a fuel in the Majuro diesel-fired power station): <ul style="list-style-type: none"> Upgrade MEC generator to operate on CNO-diesel blend Supply contract from Tobolar mill Quality control Biofuels assessment 	OEPPC held discussions with the new TOBOLAR Management, twice in 2011 and TOBOLAR recommended that it is sensible to invest in installation of mini copra mills in outer islands and that bio-fuel, still in its infancy, will need much more investments.	<ul style="list-style-type: none"> Determining the present and potential coconut oil resource of RMI (2012; with ADB and Tobolar): <ul style="list-style-type: none"> Update past reports; Where needed, visit outer islands and do on site surveys of the existing and potential resource; Assessment of technical and financial options for using CNO as biofuel in power generation and (maritime) transport applications (2013); Training on copra oil production and use as fuel blend in power generation and transport applications

5. RE Advocacy and Awareness Enhancement

Outcome: *Improved awareness, skills and knowledge on RE , as well as understanding and the appreciation of RE*

Suggested indicator for progress reporting	Energy Action Plan priority	Planned North Rep outputs and activities	Activities carried out by North REP or ADMIRE (Dec.'11)	Planned or suggested activities (ADMIRE) ⁵³
E1. RE and EE in schools curriculum	<ul style="list-style-type: none"> Student participation in RE 	Focus is on the CMI curriculum	Discussion with CMI (College of the	<ul style="list-style-type: none"> Technical assistance (TA)

⁵³ Although the objective of ADMIRE related to 'renewable energy' (RE), where possible, links should be made with the efficient use of energy (EE)

	and EE		Marshall Islands)	provided on incorporating RE (2013)
E2. Campaigns in local media on RE (and EE) in 2012-13	<ul style="list-style-type: none"> Public events and information services 	Energy documentary that will eventually be broadcast in the Pacific Way Program		<ul style="list-style-type: none"> TA provided for design and implementation of awareness program (2012-13)
E3. End-user training (PV usage) & Awareness campaigns on benefits & uses of PV systems (with A3)		End-user training (PV usage) & Awareness campaigns on benefits & uses of PV systems	First round completed as part of energy survey.	<ul style="list-style-type: none"> End user training on PV usage (2012)
E4. Studies on EE A/C and other household appliances carried out in 2013 and on building guidelines and codes in 2014 ⁵⁴	<ul style="list-style-type: none"> Survey retailers to determine source of air-cons, refrigerators and freezers by country imported for sale to the public, the standards followed for efficiency labeling; Develop energy efficiency standards for new buildings and renovations 			<ul style="list-style-type: none"> See footnote. Not an ADMIRE activity

⁵⁴ The Reviewer observes the following. If ever grid-connected PV would be considered, this would be a very costly option in comparison with looking for ways for the rational use of energy. The energy team at MRD mentioned during the interviews that much can be gained by looking at air conditioning and refrigerators as well as looking at energy efficient buildings in general.

Table A. Relation between ADMIRE activities with North-REP and ADB-supported activities and co-financing

ADMIRE main outcomes	Unspent budget (USD)			Related North-REP and ADB-supported activities	Currency	Original	Work plan
	2012	2013-14				budget	Total
1. Improved understanding of RE potential and increased number of PV hardware installations	190,000	100,000	90,000	1. Supply and installation of SHS in the outer islands (North-REP) - Provide 1500 HHs with solar PV systems - Install 4 kW systems for rural schools and health centres - Troubleshoot , tariff setting and maintenance - Battery replacement programme	EUR	3,500,000	2,965,000 991,500 220,000 40,000
2. Enhancement of the institutional and human capacity to coordinate, finance, design, supply and maintain RE installations	120,000	65,000	55,000	2. Technical assistance (MEC, NRD) - North REP - Establish training programmes and provide training - Increase in RE/EE staffing at MRD and MEC		400,000	0 127,000 65,000
3. RE policy and regulatory support	80,000	20,000	60,000				
4. Improved availability of financial and institutional support for the development & applications of copra-based power generation	180,000	75,000	105,000	ADB project - Component C; Utilising local fuels in power generation to provide	USD	1,060,000	
5. Improved awareness, skills and knowledge on RE and EE, as well as understanding and the appreciation of RE of EE	90,000	45,000	45,000	3. Implementation of EE measures (North-REP) - RE (sustainable energy) training and awareness campaigns	EUR	200,000	0 47,000 0
6. Project management; M&E	87,422	40,000	47,422	4. M&E; contingencies (North-REP)	EUR	400,000	44,500
TOTAL	747,422	345,000	402,422	TOTAL - ADB TOTAL NORTH-REP	USD EUR	1,060,000 4,500,000	4,500,000

ANNEX A. TERMS OF REFERENCE (TOR)

Title: UNDP/GEF ADMIRE Project Mid-Term Review Consultancy

Project: Action for the Development of Marshall Islands Renewable Energies (ADMIRE) Project

Duration: 20 days

Tentative Start Date: 7th November

Supervisor(s): Acting Team Leader Environment Unit, UNDP Multi Country Office; Climate Change Mitigation Technical Adviser, UNDP Asia Pacific Regional Centre in coordination with national executing agency

Duty Station: Republic of Marshall Islands (RMI)

1. Introduction

1.1. Country Context

As a Small Island Developing State (SIDS) which has not fully exploited its potential indigenous energy sources, RMI is currently heavily dependent on imported fossil fuels, with petroleum accounting for more than 85% of the country's commercial energy consumption. Petroleum consumption is largely responsible for GHG emissions in the RMI, mainly from the combustion of fossil fuels for power generation and in transportation. RMI, like the other Pacific Island Countries (PICs), has long been concerned about the serious impacts of human-induced climate change, natural climate variability and sea level rise in the region, particularly those impacts affecting the low-lying atolls. While it is not obligated under the UNFCCC to lower its emissions, the RMI accepts that its total emissions are nil, yet its emission per capita by PICs standard is high. To mitigate GHG emissions, the country has considered the use of renewable energy (RE) as instrumental in achieving its sustainable socio-economic development. Although a number of small-scale rural renewable energy (RE)-based electrification and small energy efficiency projects have been carried out in the country over the last two decades, their impacts have been minimal. Despite these difficult experiences, the improved understanding of the vulnerability of RMI to the adverse effects of climate change and the opportunities that RE can offer to the country's sustainable development are key reasons for the continued but renewed effort to promote RE utilization. Furthermore, the RMI is well aware that it is economically vulnerable to the upward trend in fossil fuel prices.

1.2. Project Summary

The Medium Sized Project (MSP) on Action for the Development of Marshall Islands Renewable Energies (ADMIRE) Project is a Global Environment Facility (GEF) funded project through the United Nations Development Program (UNDP). While the Office of Environmental Planning and Policy Coordination (OEPPC) is overall project responsible, day-to-day management rest with the Ministry of Resources and Development (M R&D). The five year project began operation in June 2009 and is planned to end in June 2014. The goal of the project is the reduction of the GHG emissions from the unsustainable uses of fossil fuel (primarily diesel fuel oil) in the RMI through the utilization of the country's renewable energy (RE) resources. The project objective is the removal of barriers to the utilization of available RE resources in the country and application of renewable energy technologies (RETs). The objectives of the projects will be achieved through: (i) Increased number of RE hardware installations on the ground which enhances productivity and income generation; (ii) Enhanced institutional capacity to coordinate, finance,

design, supply and maintain RE installations; (iii) Improved accessibility of capital for RE business; (iv) Strengthened legal and regulatory instruments to support RE dissemination, financing and marketing, and (v) Improved awareness, skills and knowledge.

13. Project Expected Outcomes

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:* Improved understanding of RE potential and increased number RE installations on the ground which enhances productivity and income generation
- *Outcome 2:* Enhanced institutional capacity to coordinate, finance, design, supply and maintain RE installations
- *Outcome 3:* Strengthened legal and regulatory instruments to support RE dissemination, financing and marketing
- *Outcome 4:* Improved accessibility of capital for RE businesses
- *Outcome 5:* Improved awareness, skills and knowledge
- *Outcome 6:* Learning, Evaluation and Adaptive Management Increased

2. Objectives of the Mid-Term Review

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 specific objective is to undertake an independent and objective mid-term review (MTR) of the ADMIRE as per UNDP/GEF requirements and procedures.

3 Scope of the Mid-term Review

The scope of the mid-term review (MTR) covers the entire UNDP/GEF-funded project and its components as well as the co-financed components of the project.

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

The evaluation will involve analysis at two levels: component level and project level. On the component level, the following shall be assessed:

- 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.
- 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.
- 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.

Components/Activities		Budget		
Planned Activities	Actual Accomplishment	As per ProDoc	Actual Expenditures	% of Actual vs. Project Budget

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; c) Project Management framework; and d) Strategic partnerships.

3.1 Progress towards achievement of results (internal and within project’s control)

- Is the Project making satisfactory progress in achieving project outputs vis-à-vis the targets and related delivery of inputs and activities?
- Are the direct partners and project consultants able to provide necessary inputs or achieve results?
- Given the level of achievement of outputs and related inputs and activities to date, is the Project likely to achieve its Immediate Purpose and Development Objectives?
- Are there critical issues relating to achievement of project results that have been pending and need immediate attention in the next period of implementation?

3.2 Factors affecting successful implementation and achievement of results (beyond the Project’s immediate control or project-design factors that influence outcomes and results)

- Is the project implementation and achievement of results proceeding well and according to plan, or are there any outstanding issues, obstacles, bottlenecks, etc that are affecting the successful implementation and achievement of project results?
- To what extent does the broader policy environment remain conducive to achieving expected project results, including existing and planned legislations, rules, regulations, policy guidelines and government priorities?

- Is the project logical framework and design still relevant in the light of the project experience to date?
- To what extent do critical assumptions/risks in project design make true under present circumstances and on which the project success still hold? Validate these assumptions as presently viewed by the project management and determine whether there are new assumptions/risks that should be raised
- Is the project well-placed and integrated within the national government development strategies, such as community development, poverty reduction, etc., and related global development programs to which the project implementation should align?
- Do the Project's purpose and objectives remain valid and relevant, or are there items or components in the project design that need to be reviewed and updated?
- Are the Project's institutional and implementation arrangements still relevant and helpful in the achievement of the Project's objectives, or are there any institutional concerns that hinder the Project's implementation and progress?

3.3 *Project management* (adaptive management framework)

- Are the project management arrangements adequate and appropriate?
- How effectively is the project managed at all levels? Is it results-based and innovative?
- Do the project management systems, including progress reporting, administrative and financial systems and monitoring and evaluation system, operate as effective management tools, aid in effective implementation and provide sufficient basis for evaluating performance and decision making?
- Is technical assistance and support from project partners and stakeholders appropriate, adequate and timely?
- Validate whether the risks originally identified in the project document and, currently in the A PR/PIRs, are the most critical and the assessments and risk ratings placed are reasonable.
- Describe additional risks identified during the review, if any, and suggest risk ratings and possible risk management strategies to be adopted.
- Assess the use of the project logical framework and work plans as management tools and in meeting with UND P-GEF requirements in planning and reporting.
- Assess the use of electronic information and communication technologies in the implementation and management of the project.
- On the financial management side, assess the cost effectiveness of the interventions and note any irregularities.
- How have the A PR/PIR process helped in monitoring and evaluating the project implementation and achievement of results?

3.4 *Strategic partnerships* (project positioning and leveraging)

- Are the project partners and their other similar engagements in the ADMIRE project, strategically and optimally positioned and effectively leveraged to achieve maximum effect of the RE program objectives for the country?
- Assess how project partners, stakeholders and co-financing institutions are involved in the Project's adaptive management framework.
- Identify opportunities for stronger collaboration and substantive partnerships to enhance the project's achievement of results and outcomes.

- Are the project information and progress of activities disseminated to project partners and stakeholders? Are there areas to improve in the collaboration and partnership mechanisms?

4 Evaluation Methodology

The successful MTR consultant is 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 document review, group and individual interviews and site visits

At the beginning of the mission in RMI, the successful MTR consultant will conduct an inception meeting with key stakeholders including OEPPC, M R&D, Marshall Energy Company (MEC), and the RMI Country Development Manager (UNDP/UNICEF/UNFPA) be followed by a de-briefing meeting to discuss the preliminary findings and recommendations (prior to the submission of the draft Final Report).

Prior to the mission to RMI, the successful MTR consultant shall review relevant documents including:

- UNDP ADMIRE Project Document and GEF MSP Brief
- ADMIRE Inception Workshop Report
- Annual Work Plans/Budgets
- Annual Project Report/Project Implementation Review (API/PIR) for 2009-2010 and 2010- 2011 respectively
- Quarterly progress reports (QPRs)
- Financial reports (FRs)
- Combined Delivery Reports (CD Rs)
- Minutes from ADMIRE Project Steering Committee meetings
- Internal monitoring results including UNDP mission reports
- MoU - ADMIRE/North REP

The successful MTR consultant should at least interview the following people and organisations:

- OEPPC, Director
- Acting Project Manager, ADMIRE, OEPPC
- M R&D, Secretary
- Energy Advisor, M R&D
- Energy Specialist, North REP
- RMI Country Development Manager (CD M), UNDP/UNICEF/UNFPA
- UNDP Fiji Multi-country Office (MCO) in Suva
- UNDP/GEF UNDP Regional Technical Advisor for Climate Change Mitigation in the Pacific (based in Suva)

With the aim of having an objective and independent review, the MTR consultant is expected to conduct the project review according to international criteria and professional norms and standards as adopted by the UN Evaluation Group (http://www.unevaluation.org/documentdownload?doc_id=21 &file_id=562).

5 Qualifications and Experience

The successful Individual consultant is expected to have the following qualifications and experience:

- a) Professional and academic qualifications in the areas of energy and environment or other relevant fields;
- b) Proven track record of very extensive experience in project and program monitoring and evaluation (M&E) preferably in the context of GEF, in general, and UNDP/GEF, in particular;
- c) Knowledge of renewable energy and climate change projects and national context of renewable energy project and program implementation in Pacific Island Countries (PICs) including RMI (or alternatively familiarity in similar country or regional situations relevant to that of RMI);
- d) Experience in RMI or other PICs is considered an asset; and,
- e) Excellent working knowledge of English both spoken and written

6. Evaluation Schedule and Deliverables

The MTR mission to RMI is tentatively planned to commence on 7th November, 2011. A review report will be produced, highlighting important observations, analysis of information and key conclusions including its recommendations. The Mid-term Review Report will include, among others:

- Findings on the project implementation achievements, challenges, and difficulties to date;
- Assessments of the progress made towards the attainment of outcomes;
- Recommendations for modifications and the future course of action; and,
- Lessons learned from the project structure, coordination between different agencies, experience of the implementation, and output/outcome.

The draft report will be initially shared with the ADMIRE PMO to solicit comments or clarifications and will be presented to the UNDP Country Office (CO) in Suva, Fiji for further deliberations. Consequently, the final MTR Report will be made and submitted to the UNDP CO with a copy to the ADMIRE PMO.

There will be two main deliverables:

- A de-brief power-point presentation with preliminary findings and recommendations of the MTE; and,
- Mid-Term Review report, including an executive summary, fulfilling the requirements set out in this Terms of Reference (TOR). The final report is to be cleared and accepted by UNDP MCO in Suva, Fiji before final payment. The final report (including executive summary, but excluding annexes) should not exceed 50 pages.

Proposed Methodology and Timelines

The successful consultant shall be engaged to undertake the review working according to a planned schedule to be completed before end of November 2011. The successful contractor will have the responsibility of organizing and completing the review, submitting the final report.

The successful consultant is expected to propose a detailed work plan to achieve the expected outputs within time.

ANNEX B. ITINERARY OF THE EVALUATION TEAM AND LIST OF DOCUMENTS

B.1 Mission schedule and list of people met

The Reviewer stayed in Marshall Islands during 12-18 January 2012.

The following people were interviewed. MRD and UNDP staff helped to review the draft versions of this evaluation report.

At OEPPC:

- Yumiko Cristosomo (Director, OEPPC)
- Warwick Harris (Deputy Director)

At MRD:

- Thomas Kijiner (Secretary)
- Energy Planning Division:
 - Nick Wardrop (Energy Advisor)
 - Walter Myazoe (Energy Officer)
 - Angeline Heine (Energy Planner)
- Arieta Gonelevu (Energy Specialist SPC, North-REP).

By phone with UNDP Fiji:

- Thomas Jensen (Regional Technical Advisor, UNDP Pacific Center)
- UNDP Fiji Country Office:
 - Laiakina Waqanisau
 - Losana Mualaulau

B.2 List of documents reviewed

ADB Grant Assistance Report (July 2010)

RMI: Improved Energy Supply for Poor Households (financed by the Japan Fund for Poverty Reduction)

ADMIRE documents

Annual work plan, 2011

APR-PIRs (annual progress reports; 2010, 2011)

Combined delivery reports (budget expenditures, 2008, 2009, 2010, 2011)

Inception workshop report (2010)

Mission report, UNDP Multi-Country Office Fiji (2010)

PSC Minutes of meeting (April 2010)

UNDP Project Document and GEF Project Brief

Biofuel Electrification on Remote Atolls in the Marshall Islands

Government of RMIO, MEC, UNDP, SOPAC

Energy Rapid Assessment (PowerPoint presentation)

Peter Johnston; Herbert Wade (2008)

National Climate Change Policy Framework (draft, November 2010)
Republic of Marshall Islands (RMI)

National Energy Policy and Energy Action Plan (September 2009)
Republic of Marshall Islands (RMI)

North-REP
Various documents (progress report 2011, SPC website; Steering Committee Minutes of meeting, 2011)

Outer Island Electrification Strategy
Ministry of Resources and Development, RMI (2006)

Potentials of Coconut Oil as Diesel Substitute in Pacific Island Countries
Daniel Fürstenwerth; Rheinisch-Westfälische Technische Hochschule Aachen

PIREP (2004)
Pacific Regional Energy Assessment, Vol 6. Marshall Islands; Pacific Islands Renewable Energy Project (PIREP), 2004

Update Report on the RMI State of Economic Emergency stemming from the Energy and Food Crisis
Energy Task Force, RMI (2008)

Review of Namdrik Atoll Solar Project, RMI
Empower Consultants Ltd. (October 2005)