FSM National & State Energy Action Plans

2012

Volume II

Department of Resources and Development

Division of Energy

… Electrifying the outer islands …

Solar systems and conventional diesel generators in Yap

Computer lab in high-school of Woleai – Yap State

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PREFACE

The National Energy Policy has as primary goal to have the Nation becoming less dependent on imported fossil fuels by implementing energy efficiency and conservation measurements and including more environmentally sound renewable energy sources that are locally available. To reach this goal the Government carries the following Vision, Objective and Major Goal:

- The **National Vision** statement for Energy is:

To improve the life and livelihood of all FSM citizens with affordable, reliable and environmentally sound energy.

- The **National Objective** for Energy is:

To promote the sustainable socio-economic development of FSM through the provision and utilization of cost-effective, safe, reliable and sustainable energy services.

Whereas energy services refer to work relating to the sale, supply, storage and distribution of energy.

- The **Major Goal** of the Policy is:

To become less dependent on imported sources of energy by having an increased share of renewable energy sources and having cross-sectoral energy conservation and efficiency standards in place; and therefore,

By 2020 the share of renewable energy sources will be at least 30% of total energy production, while energy efficiency will increase by 50%. Energy Efficiency referred here would also mean reduction of energy loss.

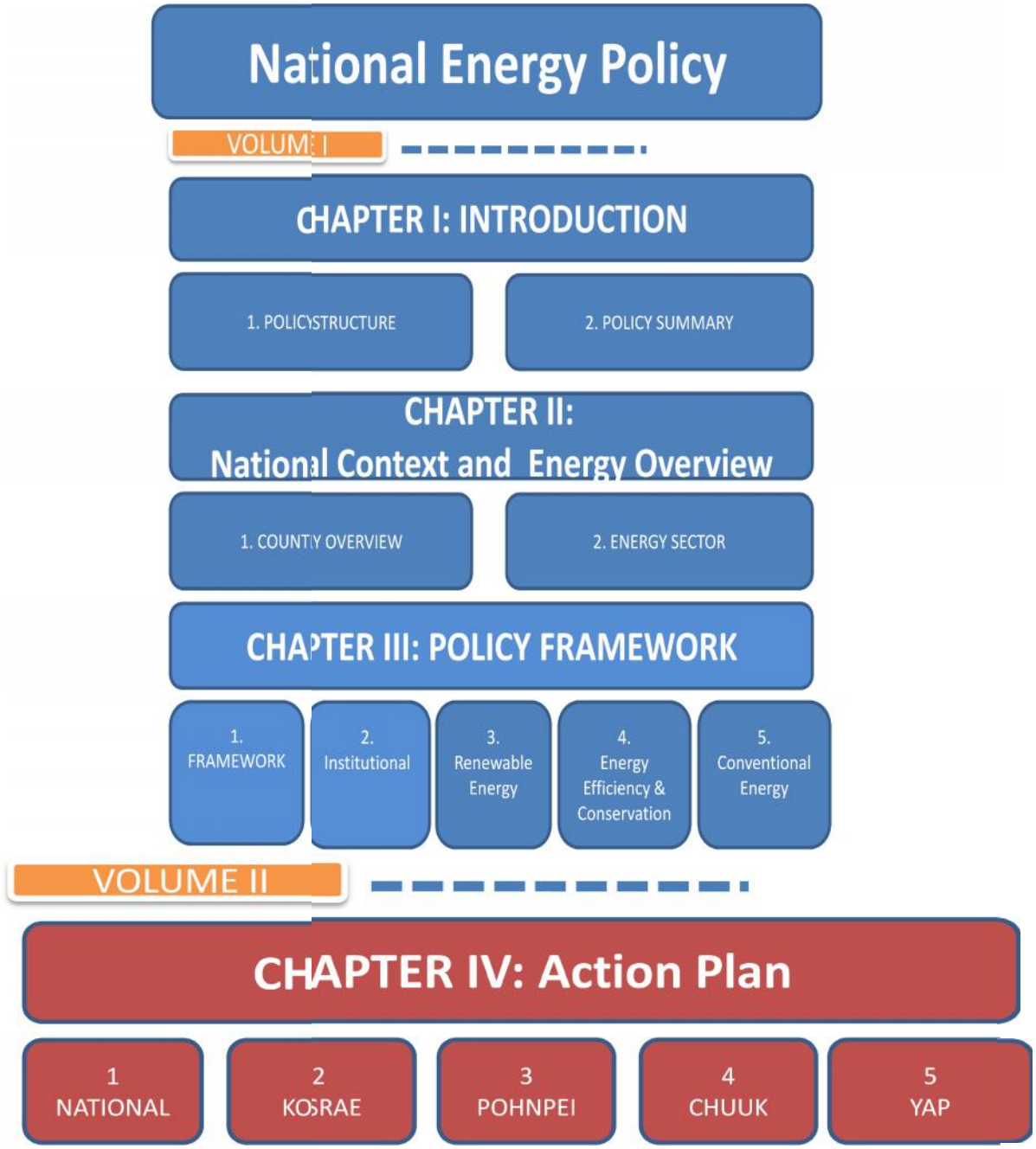
To achieve these ambitious yet realistic goals, the Government had initiated the National Energy Work Group. This group is chaired by the energy division, which works closely together with the energy sector in the four FSM states. Additionally, the National Government has prepared their own energy action plans that when combined with the various states action plans will delineate a road map that will assist the nation in achieving its goals and objectives.

The Government would like to emphasize a collaborative effort towards the bulk purchase of fuel. An important and recent achievement that contributes to a stable economy and supports the energy sector as a whole is the establishment of FSM Petroleum Corporation. Initiating bulk purchases will inherently contribute to improve cost efficiency.

Another important initiative is to improve sea vessel schedules to maximize the efficiency of the missions and to enable the various departments and offices to coordinate activities and services. The aim is to have the shipping schedules available on-line and regularly updated so that a wider public audience can be reached.

A recent example of improving this communication method was the installation of VSATs, which connected various outer islands to the internet. This important development will increase the use of sea transportation as the outer island communities can schedule their activities following the arrival of the sea vessels. This communication not only generates income, but will improve the exchange of goods from various communities to the urban centers, as well as contribute to the potential of converting coconut oil to biodiesel.

The energy action plans will lay the foundation for the FSM to achieve its goal, to become less dependent upon imported fossil fuel base-energy, that will ‘set the bar’ of sustainability as a model to follow.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NATIONAL ACTION PLANS

The national action plans can be split up into four major groups:

I. Energy Efficient Appliances
II. Energy Conservation (including renewable energy sources)
III. Energy Awareness Campaign
IV. Nationwide Energy Programs:
    - Training & Capacity Building
    - Energy Related Studies
    - Development of a Centralized Energy Database
    - Donor and Development Support Coordination


Grid connected solar PV systems on Airport building, Kosrae

1. LIGHTING - ENERGY EFFICIENT APPLIANCES

- *Public bodies are required to purchase only energy efficient lighting from fiscal year 2011 forward*
- *Replace or install Energy Star rated lighting in national government buildings*

Lighting accounts for a significant proportion of electricity use in the public sector. Most of the lights used in the offices are inefficient 40 W T12 fluorescent lights. Modern LED bulbs and luminaries provide an immediate opportunity for significant energy efficiency improvement. The National Government has committed to the use of more efficient lighting (wherever feasible) and to replace incandescent light bulbs in public buildings with modern Compact Fluorescent Lamps (CFLs) or other energy efficient lights such as LED's.

AGENCY RESPONSIBLE FOR THIS ACTION:

Department of TC&I in coordination with Department of R&D (energy division)

ESTIMATED BUDGET:

$ 50,000

- *All the street and security lights in National Government facilities will have to be energy efficient*

There are over 10 street lights and approximately 30 security lights using (SOX 116 W light bulbs) installed in National Government facilities, representing a significant energy load. Instituting a program to replace these street and security lights will be developed by the Department of R&D, TC&I, PUC and local authorities. Most of the security lights are on 24 hours a day due to bad functioning sensors. The national government will appoint a maintenance officer that will be responsible for making sure that the lights are off during day time.

AGENCY RESPONSIBLE FOR THIS ACTION:

Department of R&D in coordination with Department of TC&I

ESTIMATED BUDGET:

$ 30,000

2. AIR CONDITIONING SYSTEMS - ENERGY EFFICIENT APPLIANCES

- *All air conditioning systems will be required to be regularly inspected by trained experts to ensure that they operate to maximum energy efficiency.*
- *The room or office temperature should be no less than 75 degrees Fahrenheit (24^{o} C)*

From July 2011, any air conditioning system with a total capacity of 6 kW~~h~~ will be advised to have the system inspected by a trained inspector in order to ensure efficient energy usage by the system.

The National Government will start this initiative by having all their air conditioning systems inspected and certified. A manual will have to be prepared to standardize a national methodology for inspections, and assist owners in fulfilling their responsibilities.

This manual will detail how and when inspections are to be carried out.

AGENCY RESPONSIBLE FOR THIS ACTION:

Department of TC&I and the department of R&D

ESTIMATED BUDGET:

$ 30,000

3. ENERGY STAR - ENERGY EFFICIENT APPLIANCES

- *The national government will strongly support and adopt the Energy Star initiative in FSM to promote energy efficiency in office equipment*

The EU has entered into an agreement with the Government of the United States of America on the coordination of energy-efficient labeling programs for office equipment under the *Energy Star* program.

The program initiated by the US Environmental Protection Agency, has now matured into a worldwide energy efficiency program, run in partnership by the US EPA, the European Union, Japan, Australia, New Zealand, Taiwan and Canada, to promote energy-efficient office equipment on a worldwide level. FSM is willing to follow the EU and US in adopting the Energy Star initiative.

The promotion of the use of Energy Star certified appliances in the FSM will lead to significant cost cutting measures, thereby saving up to 50% in energy usage. This can be accomplished through the replacement of current equipment with Energy Star certified appliances.

AGENCY RESPONSIBLE FOR THIS ACTION:

Department of R&D – trade division with support of the energy division

ESTIMATED BUDGET:

$ 10,000

4. PROCURING ENERGY EFFICIENT PRODUCTS - ENERGY EFFICIENT APPLIANCES

- *National Government agencies are required to procure energy-efficient products. R&D will produce purchasing specifications to help National Government comply with these procurement requirements.*

The Specifications for energy-efficient products will include:

- **National Government Requirements**: Draft an outline of National laws and regulations surrounding the purchase and use of energy efficient products.
- **Purchasing Specifications**: Provide energy performance requirements for energy-efficient products by category.
- **Energy Cost Calculators**: Provide tools to calculate projected energy savings by switching to more efficient products.
- **Standby Power Data Center**: Outline products with low standby power, including office equipment, consumer electronics, appliances, and many other categories.

The US Department of Energy's "Federal Energy Management Program" can be used as guidelines.
(http://www1.eere.energy.gov/femp/technologies/eep.fedrequirements.html)

Benefits

The National Government is the largest volume buyer of energy-consuming products in the FSM. By procuring energy-efficient products, buyers can reduce energy consumption and achieve enormous cost savings. The aggregate effect of these purchasing decisions is enormous.

By setting a clear standard for energy performance, Federal procurement requirements can shift the market toward greater supply of energy-efficient products in FSM. That, in turn, improves availability and reduces cost for all consumers.

AGENCY RESPONSIBLE FOR THIS ACTION:

Department of R&D with support of the Department of TC&I and Justice

ESTIMATED BUDGET:

$ 50,000

1. BUILDING ENERGY RATING

- *An energy rating system for public buildings will be developed and used starting in 2011*
- *Initiate an Energy Rating system for Government office buildings*
- *Develop a Building Energy Performance Directive*

In order to meet the Building Energy Performance Directive, all new offices/structures will be required to have their energy efficiency assessed and certified by an expert. This energy assessment will be extended to existing national government buildings. A Building Energy Rating 'table' will be developed and will provide information on the building's energy use. This table can be used to demonstrate improvements over time, while all national government buildings will be required to display their rating. Additionally, this will encourage transparency of energy performance by the building tenant.

AGENCY RESPONSIBLE FOR THIS ACTION:

Department of R&D with support of the Department of TC&I, and all public sector organizations.

ESTIMATED BUDGET:

$ 20,000

2. ASSESSMENT OF RENEWABLE ENERGY ALTERNATIVES AT DESIGN-BUILD STAGE

- *Developers of any new government building must perform an energy efficiency feasibility assessment while incorporating renewable energy resources for that structure*

Prior the construction and/or refurbishment of a new building with a floor area exceeding 2,500 ft^2, a due diligence regarding the technical, environmental and economic feasibility impact studies of installing renewable energy systems in the proposed building will be required

This action should significantly increase interest and awareness of alternative energy options.

AGENCY RESPONSIBLE FOR THIS ACTION:

Department of TC&I with support of the Department of R&D

ESTIMATED BUDGET:

$ 10,000

3. BUILDING ENERGY STANDARDS

- *The Government will encourage developers to adopt a set of energy standards well above those prescribed by law within the code of building regulations*

Building codes and energy standards are currently available in the FSM and follow US building codes. More recent codes were developed and implemented in Hawaii and Guam. These codes could be used as example and adapted in the FSM. Recent and newly constructed buildings have included energy efficiency measures have been implemented to some extent; however, by putting forth a building code standard model, developers will have an easier guide to follow.

The standardization of new construction or retro-fit projects will prepare the market for the revision of the existing Building Regulations and create movement towards a requirement of 40% improvement in the energy performance of new houses/ buildings compared to the current standard. A program must be implemented, offering support to developers to build both residential and commercial buildings with an energy performance standard of at least 60% above that required in the current Building Regulations.

This action will demonstrate the opportunities for a strong shift towards low carbon output and energy efficient housing in FSM.

AGENCY RESPONSIBLE FOR THIS ACTION:

Department of TC&I with support of the Department of R&D

ESTIMATED BUDGET:

$ 30,000

1. INFORMATION AND ADVICE TO PRIVATE SECTOR AND THE PUBLIC

- *Set-up an information desk and website that supports the networking and exchange of best energy efficiency practices by the energy users through the **Association of Micronesian Utilities (AMU)***

AMU's secretariat is temporarily housed in R&D. They will establish and administer the program for energy users. AMU, in operation for more than 2 years, already engaged the 4 FSM utilities that are the main suppliers of electricity in FSM.

The aim is for AMU is to utilize their energy experts to assist the utilities with their ongoing site visits to customers, holding workshops on energy efficiency and annual performance reporting. AMU members share information on energy saving technologies and techniques to maximize savings and maintain competitiveness.

The National Government will continue to work with AMU to improve networking and information exchange opportunities. The emphasis will be on continued implementation of efficiency programs and measures.

- *Develop an Energy Management Action Plan*
- *Assist the private sector to improve their energy management through the **Energy MAP** initiative*

The Energy MAP (Energy Management Action Plan) will be designed to target and engage the private sector to practice energy management by maximizing their renewable energy usage. The concept is centered on a website that provides advice, training, interactive energy efficiency opportunities and potential funding assistance. In conjunction with the College of Micronesia and AMU, training courses will be available that offer introductory workshops/classes for energy management. These courses are tailored for specific groups or sectors, and include on-site assessments for participating firms. The Energy MAP website resource will be designed as a toolkit for NSA and SMEs on both the managerial and technical aspects of energy efficiency.

AGENCY RESPONSIBLE FOR THIS ACTION:

Department of R&D and AMU with support from SPC

ESTIMATED BUDGET:

$ 100,000

2. AWARENESS CAMPAIGN –*"THE SAVE AND GAIN CAMPAIGN"*

- *The target of this campaign will be the National Government employees, through the "***Save and Gain Campaign**" *initiative, a new element of the National Energy Efficiency Campaign, to promote an understanding of the need for efficient energy use in the workplace*

The "**Save and Gain"** campaign, will work in tandem with the EDF-10 awareness campaign. The campaign will deliver the message of energy efficiency and conservation to households of government employees instituting an awareness and understanding that together, we can have a positive impact on energy efficiency. This particular group will set an example within the community to adapt to renewable resources whether it's implemented in offices, shops, homes and other locations. It will empower committed individual employees to change their own behavior and encourage their colleagues to do the same. The messages will focus on what each individual can do, including switching off equipment when not in use, and turning off lights whenever possible. It will emphasize the importance of such individual behavior, coming together as a whole, while encouraging the government to engage strategically in energy efficiency.

AGENCY RESPONSIBLE FOR THIS ACTION:

Department of R&D with the PIO

ESTIMATED BUDGET:

$ 50,000

3. NATIONWIDE EE AWARENESS CAMPAIGN – POWER FOR ALL

- *This will address the need for efficient energy use in the home through the National Energy Efficiency Awareness Campaign - Power for All.*

During the REP-5 program an awareness campaign was started and achieved significant benchmarks in terms of awareness about renewable energy and energy efficiency. It delivered the message of the importance of energy efficiency to all consumers and also offered them initial and simple basic steps in improving their way of using energy through small changes in behavior and choices. These messages have been delivered through sports events, workshops, web and print, as well through online communities and social networks.

The campaign's messages will be strengthened in the future and thus will offer advancement opportunities to homeowners and motivating change in the private and public sectors.

AGENCY RESPONSIBLE FOR THIS ACTION:

Department of R&D with AMU

ESTIMATED BUDGET:

$ 50,000

IV. NATIONWIDE ENERGY PROGRAMS

1. NATION WIDE ENERGY STUDIES

- *To provide support to the four FSM states by initiating, funding and conducting nation-wide energy studies that can lead to energy enhanced projects*

The four FSM States have common energy needs and face the same challenges. After evaluating the energy action plan, it was clear that there are commonalities amongst the states. Rather than focusing on performing a certain study for just one state, the studies can be conducted in all of the states under one contract, otherwise the smaller states will be left behind.

Studies that could be done on a nation-wide scale are but not limited to:

- Wind studies (inclusive of wind mapping)
- Waste characterization study and Waste-to-Energy feasibility study
- Wave and Ocean Energy Technology
- Bio fuel including Bio diesel using coconut oil feasibility study

AGENCY RESPONSIBLE FOR THIS ACTION:

Department of R&D in cooperation with AMU

ESTIMATED BUDGET:

$ 250,000

2. NATIONWIDE ENERGY CAPACITY BUILDING PROGRAMS

- *Start a capacity building program that will serve the four FSM States*

Over the years many energy initiatives are being realized in the four FSM states. '*Capacity building'* was in most cases part of the programs and built on a project base structure. The four FSM states have set forth '*capacity building'* as a priority and the National Government has seen the importance of a more structured and regulated program that would build on the existing programs, ultimately increase the participants knowledge with international recognition. The areas of training workshops to be held are:

Module 1:

- PV Grid connected systems
- PV off grid systems

Module 2:

- Energy Efficiency
- Energy Auditing

Module 3:

- General Renewable Energy, e.g. hydro, wave, tide, etc.
- Biomass
- Wind data analyzing and other wind related studies
- Workshops related coconut oil and Bio-fuels
- Workshops on Biogas

Module 4:

- DSM and Utility SSM training

The trainings/workshops will be conducted at least one module to be done a year. The College of Micronesia will host the training sessions and will be the recipient of the developed curriculum. This activity will support the establishment of the Centre of National Resources and Energy within the COM.

AGENCY RESPONSIBLE FOR THIS ACTION:

Department of R&D in cooperation with AMU and COM

ESTIMATED BUDGET:

$ 500,000

3. DEVELOPMENT OF A CENTRALIZED – NATIONWIDE – ENERGY DATABASE

- *As part of the Nationwide Energy Sector a centralized energy database will be developed and managed by the Department of Resources and Development - Energy Division*

As of 2011, the four FSM States have their own electricity sector organized with a state utility as the electricity provider. A nationwide operating petroleum corporation (FSM PC) was being established in 2008 as the sole petroleum based fuel provider. Furthermore, there are some private companies who are currently selling propane gas and PV solar systems. In order to monitor the development of the energy sector, and to improve joint efforts that will bring FSM closer to achieving its goals set in this policy, it is crucial to set up and maintain this a centralized energy database, which will help in monitoring the current situation and its evolution over time. The database will correlate with the sub-regional and regional energy database and serve as a source of information for the energy sector.

AGENCY RESPONSIBLE FOR THIS ACTION:

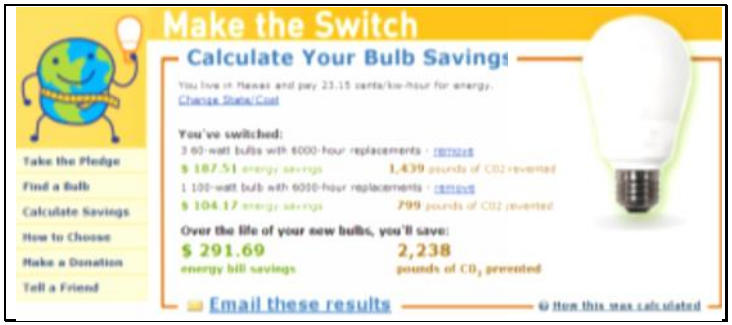
Department of R&D – Energy Division in cooperation with AMU and relevant state agencies

ESTIMATED BUDGET:

$ 50,000

TABLE OF

THE NATIONAL ENERGY ACTION PLANS



NATIONAL PRIORITY LIST AND ACTION PLANS

REFERENCE	ACTIVITIES/PROGRAMS	TIME FRAME	PRIORITY
I. ENERGY EFFICIENT APPLIANCES	TO CONSERVE ENERGY IN THE NATIONAL GOVERNMENT FACILITIES		HIGH
1. (lighting)	• *Public bodies are required to purchase only energy efficient lighting from mid 2010 forward.* • *By installing or replacing lighting in national government buildings only energy star rated lights and fixtures will be used.* • *All the street and security lights in National Government facilities will have to be energy efficient*	**2010 – 2012**	
2. (air conditioners)	• *All air conditioning systems will be required to be regularly inspected by trained experts to ensure that they operate to maximum energy efficiency.*	**2010 – 2011**	
3. (energy star)	• *The national government will strongly support and adopt the Energy Star initiative in FSM to promote energy efficiency in office equipment*	**2010-2015**	
4. (procurement)	• *National Government agencies are required to procure energy-efficient products. R&D will produce purchasing specifications to help Federal buyers comply with these procurement requirements.*	**2010-2013**	
II. ENERGY CONSERVATION INCL. RENEWABLE ENERGY SOURCES	REGULATE THE BUILDING AND CONSTRUCTION SECTOR WITH ENERGY CONSERVATION AND EFFICIENCY	**2011 – 2015**	MEDIUM
5. (energy rating)	• *The Government will encourage developers to adopt building energy standards well above those prescribed by law in the building regulations*	**2010**	
6. (assessment at design stage)	• *Developers of new government buildings will have to carry out a feasibility assessment of using renewable energy systems for the building*	**2012**	
7. **(building energy standards)**	• *The Government will encourage developers to adopt building energy standards well above those prescribed by law in the building regulations*		

III. AWARENESS CAMPAIGN 8. **(Information and advice)** 9. **(awareness campaign)** 10. **(nation-wide campaign)**	AWARENESS CAMPAIGNS FOR ENERGY EFFICIENCY AND CONSERVATION • *Set-up an information desk and website that supports the networking and exchange of best energy efficiency practices by the energy users through the Association of Micronesian Utilities (AMU)* • *Develop an Energy Management Action Plan framework* • *Assist the private sector with limited resources to improve their energy management through the Energy MAP initiative* • *The target of this campaign will be the National Government employees, through the "Safe and Gain Campaign" initiative, a new element of the National Energy Efficiency Campaign, to promote an understanding of the need for efficient energy use in the workplace* • *This will address the need for efficient energy use in the home through the National Energy Efficiency Awareness Campaign - Power for All.*	**2010** **2010-2012** **2011-2013**	HIGH
IV. NATIONWIDE ENERGY PROGRAMS 11. **(nation-wide studies)** 12. **(nation-wide trainings)** 13. **(nation-wide energy database)**	CONDUCT NATION WIDE ENERGY STUDIES • *Support the four FSM states in initiate, fund and conduct nation-wide energy studies that can lead to feasible energy projects* TRAINING AND CAPACITY BUILDING PROGRAMMES IN RENEWABLE ENERGY AND ENERGY EFFICIENCY • *Start a capacity building program that will serve the four FSM* DEVELOPMENT OF A CENTRALIZED ENERGY DATABASE • *As part of the Nationwide Energy Sector the development of a centralized energy database will be developed and managed by the Department of Resources and Development - Energy Division*	**2011-2013** **2010-2012** **2010-2012**	MEDIUM

Priority	Objectives	Targets	Activities, programs, strategies	Governance/ Responsibilities	Budget in USD	Time frame
HIGH	I. ENERGY EFFICIENT APPLIANCES TO CONSERVE ENERGY IN THE NATIONAL GOVERNMENT FACILITIES	Reduction of energy consumption of 20% by 2012	**1. LIGHTING** • *Public bodies are required to purchase only energy efficient lighting from mid 2010 forward.* • *By installing or replacing lighting in national government buildings only energy star rated lights and fixtures will be used.* • *All the street and security lights in National Government facilities will have to be energy efficient* **2. AIR CONDITIONING SYSTEMS** • *All air conditioning systems will be required to be regularly inspected by trained experts to ensure that they operate to maximum energy efficiency.* **3. ENERGY STAR** • *The national government will strongly support and adopt the Energy Star initiative in FSM to promote energy efficiency for office equipment* **4. PROCURING ENERGY-EFFICIENT PRODUCTS** • *Federal agencies are required to procure energy-efficient products. R&D will produce purchasing specifications to help Federal buyers comply with these procurement requirements.*	Department of TC&I in coordination with Department of R&D (energy division) Department of TC&I in coordination with Department of R&D (energy division) Department of TC&I and the department of R&D Department of R&D – trade division with support of the energy division Department of R&D with support of the Department of TC&I and Justice TOTAL BUDGET NEEDED:	$ 50,000 $30,000 $30,000 $10,000 $50,000 **$ 170,000**	2010 - 2012 2010 – 2011 2010-2015 2010-2013

MEDIUM	II. ENERGY CONSERVATION INCL. RENEWABLE ENERGY SOURCES REGULATE THE BUILDING AND CONSTRUCTION SECTOR WITH ENERGY CONSERVATION AND EFFICIENCY	Increase the energy efficiency of all public facilities to achieve a 15% saving in the energy consumption of the national government by 2015	**5. BUILDING ENERGY RATING** • *The Government will encourage developers to adopt building energy standards well above those prescribed by law in the building regulations* **6. ASSESSMENT OF RENEWABLE ENERGY ALTERNATIVES AT DESIGN STAGE** • *Developers of new government buildings will have to carry out a feasibility assessment of using renewable energy systems for the building* **7. BUILDING ENERGY STANDARDS** • *The Government will encourage developers to adopt building energy standards well above those prescribed by law in the building regulations*	Department of TC&I with support of the Department of R&D Department of TC&I with support of the Department of R&D Department of TC&I with support of the Department of R&D TOTAL BUDGET NEEDED:	$30,000 $10,000 $30,000 **$70,000**	2011 – 2015 2010 2012

HIGH	III. AWARENESS CAMPAIGN AWARENESS CAMPAIGNS FOR ENERGY EFFICIENCY AND CONSERVATION	Increase the public awareness on energy related issues what will lead to a smooth introduction of energy saving appliances Assist the utilities in the demand side management programs	**8. INFORMATION AND ADVICE TO PRIVATE SECTOR AND THE PUBLIC** • *Set-up an information desk and website that supports the networking and exchange of best energy efficiency practice by the energy users through the Association of Micronesian Utilities (AMU)* • *Develop an Energy Management Action Plan framework* • *Assist the private sector with limited resources to improve their energy management through the Energy MAP initiative*	Department of R&D with support from SPC and the four State Utilities	$ 100,000	2010
			9. AWARENESS CAMPAIGN – SAFE POWER GAIN MORE • *The target of this campaign will be the National Government employees, through the "Safe and Gain Campaign" initiative, a new element of the National Energy Efficiency Campaign, to promote an understanding of the need for efficient energy use in the workplace*	Department of R&D with the PIO	$50,000	2010-2012
			10. NATIONAL EE AWARENESS CAMPAIGN – POWER FOR ALL • *This will address the need for efficient energy use in the home through the National Energy Efficiency Awareness Campaign - Power for All.*	Department of R&D with AMU	$50,000	2011-2013
				TOTAL BUDGET NEEDED:	**$200,000**	

HIGH	IV. NATIONWIDE ENERGY PROGRAMS CONDUCT NATION WIDE ENERGY STUDIES	There is a great need for the four FSM states to become less dependent on imported fuels. The studies are needed to find an optimal energy mix that is reliable and will reduce the usage of fossil fuels	**11. NATION WIDE ENERGY STUDIES** • *Support the four FSM states in initiating, funding and conducting nation-wide energy studies that can lead to feasible energy projects* *For example:* ➢ *Wind Assessment studies (incl. wind mapping)* ➢ *Waste characterization study and Waste-to-Energy feasibility study* ➢ *Wave and Ocean Technology* ➢ *Bio fuel and Bio diesel using coconut oil feasibility study*	Department of R&D in cooperation with AMU	$ 250,000	2010-2013
	TRAINING AND CAPACITY BUILDING PROGRAMMES IN RENEWABLE ENERGY AND ENERGY EFFICIENCY	Training and capacity building programs will be more regulated and structured The College of Micronesia will have a curriculum developed that enables them to train the trainers	**12. NATION WIDE ENERGY CAPACITY BUILDING PROGRAMS** • *Start a capacity building program that will serve the four FSM*	Department of R&D in cooperation with AMU and COM	$500,000	2010-2012
	DEVELOPMENT OF A ENERGY DATABASE	A database will be online that assist with monitoring the development in the energy sector	**13. NATION WIDE ENERGY DATABASE** • *As part of the Nationwide Energy Sector the development of a centralized energy database will be developed and managed by the Department of Resources and Development - Energy Division*		$50,000	2010-2013
				TOTAL BUDGET NEEDED:	**$800,000**	

Total Budget needed for FSM National Government Energy Actions: $ 1,190,000

– Summary Sheet

National Government - energy efficiency demonstration building

Summary: Implement the recommendations of the energy audit of the National Government building. An information campaign regarding the efficiency upgrades would also be launched.	**Initial cost:** $65,000 **Expected savings:** $ per month on electricity bill **Timeframe:** Two months for procurement of equipment, one month for works.

Lighting retrofits for FSM National Government buildings

Summary: Replace all incandescent lights in GoFSM buildings with energy saving lightbulbs, and replace all T12 lights and magnetic ballasts with T8 lights and electronic ballasts	**Initial cost:** $60,000 **Expected savings:** 5% on power bill **Timeframe:** Five months

Roof painting of Government buildings

Summary: Paint the iron corrugated roofs on all air-conditioned GoFSM buildings white in order to reduce solar heat gain, thereby decreasing the amount of air conditioning necessary.	**Initial cost:** $5/m^2, $50,000 **Expected savings:** Unable to accurately quantify **Timeframe:** Four months

Window and door sealing and upgrades of Government buildings

Summary: Install weather stripping on doors and windows to reduce infiltration of warm air into air-conditioned GoFSM buildings.	**Initial cost:** $7,000 **Expected savings:** 2% on power bill **Timeframe:** Two months

Audit State potable water and sewage pumping system

Summary: Determine location of leaks in water distribution system, as well as charge tariffs for potable water and sewage treatment that would allow cost recovery.	**Initial cost:** To be determined **Expected savings:** **Timeframe:** Depending on scope of study

Electricity consumption reduction programme

Summary: Reduce electricity consumption of end users through awareness campaigns, office specific energy audits, and create a completion amongst the offices.	**Initial cost:** $15,000 **Expected savings:** 7% on power bill **Timeframe:** Three months for preparation, ongoing monitoring **Timeframe:** Five months

Installation of kWh meters per building or even department

Summary: There is only one kWh meter for the whole capital compound. This reduced the possibility of adequate monitoring of the electricity consumption and implement energy saving programmes fit to the end-users. It is highly recommended to install kWh meter per department or at least one per building	**Initial cost:** $15,000 **Expected savings:** 5-10% on power bill **Timeframe:** Three months for installation, ongoing monitoring **Timeframe:** Five months

Total savings possible: 20% from current electricity bill of the national government buildings (Palikir). This equals to a yearly saving of $60,000

STATE ACTION PLANS

The state action plans has four parts:

1. Yap State Energy Action Plans
2. Chuuk State Energy Action Plans
3. Pohnpei State Energy Action Plans
4. Kosrae State Energy Action Plans

YAP STATE ACTION PLANS



PLAN OF ACTION STATE OF YAP

Yap State Priority List

Reference	Activities/Programs	Time frame	Priority
1.1	1.5MW (continuous rating i.e. equivalent 1.8MW prime) high speed generator to be purchased	2010	**1**
2.1	Purchase 4 fuel meters for power plant	2010	**1**
2.2	Recalculate distribution lines/ transformer losses and recalibration: OPTIMA unit & distribution meters	2010 and every year	**1**
2.4	Energy audits jointly conducted by YSPSC staff, Government's buildings' staff	2010	**1**
2.4	Installation of prepayment meter for each building	2010	**1**
3.1	7 new outer islands to be electrified with 100% renewable energy	2010 - 2011 - 2012	**1**
3.2	Yap Hospital 80kWp Solar	priority number 1	**1**
3.3	Establish dual electrification systems for PV solar and conventional energy in the outer-islands already electrified	2010 - 2011 -2012	**1**
3.4	Wind energy measurements and wind study	2010- 2011	**1**
1.1	1.5MW (continuous rating i.e. equivalent 1.8MW prime) high speed generator to be installed	2011	**2**
1.2	Replacement and upgrade of the High Voltage bus (4.16kV) inside the plant	2010 -2011	**2**
1.2	Modern HV cubicles with adequate protective equipment are estimated to 516,000 USD	2010 - 2011	**2**
2.1	Purchase & install electric meters and accurate I.T.s at power plant after HV bus renewal	2011	**2**
2.3	LED street lighting pilot project	2010 and latter	**2**
2.6	Minimize Water and Waste Water systems electric consumption	2010 and latter	**2**
3.1	7 other new outer islands to be electrified with 100% renewable energy	2012 - 2013 - 2014	**2**
3.2	Yap PV solar grid tied-systems to be installed on government and admin buildings up to 240 kWp	2010 - 2015	**2**
3.5	Secure land through warranty deeds for 4 sites	2011	**2**
2.1	Start computerized supervision with computerized monitoring	2012	**3**
3.6	Secure funding for the wind farm (1MW to 1.2MW)	2012	3
3.7	Select equipment and build the wind farm with interconnection to the grid	2013 - 2015	4
3.8	Add the necessary short time energy storage to keep the grid stable		5

OBJECTIVE 1: CONVENTIONAL ENERGY PROJECTS:

- Reduce fuel consumption at Yap power plant
- Save significantly on maintenance cost
- Improve reliability and continuity of service at generation site
- Accommodate power supply for possible major fisheries activities
- Reduce electric power plant losses

Activity Priority	Activity	Organization(s) Responsible		Performance indicators	Budget (USD)	Potential Source	Time Frame for Initiation
		Lead Agency	Participating / Supporting				
HIGH	**1.1/** 1.5MW (continuous rating i.e. equivalent 1.8MW prime) high speed generator to be purchased and installed by 2011 Funding solicited by OPB from CFSM, USDA and other external sources (1,000,000 USD) Reliability and continuity of service of the generation system will improve (3rd back up) Surplus of generation capacity for eventual fisheries activities is accommodated.	**YSPSC** manages the project, purchase after bidding, install and commission	Yap State Government and OPB to secure funding	This project will save 4% of diesel consumption. Generator will run at night time and during weekends. Maintenance costs for the Deutz units will be reduced by 50% by alternating use with the new generator.	1,000,000	CFSM USDA Other donors	2010 2011
MEDIUM	**1.2/** Replacement and upgrade of the High Voltage bus (4.16kV) inside the plant is required since 5 years by the FSM Infrastructure Plan. Modern HV cubicles with adequate protective equipment are estimated to 516,000 USD	**YSPSC** technical assistance	ADB loan with YSPSC support	Reduction of electric power plant losses.	516,000	ADB with YSPSC	2010 2011

	1.3/ Together with 1.2, removal of 4 old and inoperative gen-sets as well as old HV bus is required. Provisions should be included for heavy equipment handling and recycling. In the opposite, this may generate some revenue, if sold for metal recycling abroad.	**YSPSC**	AMU assistance	The 4 generators are inactive and beyond repair. The space generated by removing these generators can be used for other purposes	150,000	YSPSC	2010 2011

OBJECTIVE 2 A: ENERGY EFFICIENCY: SUPPLY SIDE MANAGEMENT (SSM) • Improve fuel consumption monitoring • Improve electric metering • Maintain or reduce level of losses on the distribution grid							
Activity Priority	**Activity**	**Organization(s) Responsible**		**Performance indicators**	**Budget**	**Potential Source**	**Time Frame for Initiation**
		Lead Agency	**Participating / Supporting**				
MEDIUM	**2.1/** Purchase four fuel meters for power plant Purchase & install electric meters and accurate I.T.s at power plant after HV bus renewal (Each source & feeder)	**YSPSC** (after budget approval of HV bus renewal for electric metering)		Start computerized supervision with computerized monitoring. This leads to better efficiency of the plant	10,000 10,000 10,000	**YSPSC**	2010 2011 2012
HIGH	**2.2/** Recalculate distribution lines/ transformers losses and recalibration OPTIMA unit & distribution meters – normal campaign	**YSPSC**	PPA	Reduction of losses and monitoring of performance of plant	Part of the PPA project	N/A	2010 and every year
	2.3/ LED street lighting pilot project	**YSPSC**	with US grant	Street lights consume a lot of energy (115Wh/light), by replacing them with LED light would provide energy savings to the utility	15,000	USDA	2010 and later

OBJECTIVE 2 B: ENERGY EFFICIENCY: DEMAND SIDE MANAGEMENT (DSM) • Energy conservation program • Continuous advice to users • Appliances improvement program							
Activity Priority	**Activity**	**Organization(s) Responsible**		**Performance indicators**	**Budget**	**Potential Source**	**Time Frame for Initiation**
		Lead Agency	**Participating / Supporting**				
HIGH	**2.4/** Energy audits jointly conducted by YSPSC staff, Government's buildings' staff including all the agencies to determine the right monthly amount of kWh that should be used in each building with the required comfort. These audits should give short term and long term recommendations for each building. Installation of prepayment meter for each building and prepayment sub-meters if necessary for services within the next 8 months	**Yap State / OPB**	with technical, operational and commercial collaboration of YSPSC		25,000	EDF-9 EDF-10 ADB	2010
MEDIUM	**2.5/** Newsletter and policy directives to instill energy conversation measures and best energy efficient appliances available on the local market (or necessary to introduce in Yap) / twice every year as minimum	**YSPSC**	advised by EU EDF10 Energy efficiency program	More people will be aware of the need to conserve energy and to purchase energy star labeled appliances	3,000		2010

HIGH	**2.6/** Waste characterizing study and a feasibility study for waste to energy production	**YSPSC**	ADB, EIB or EDF10	Look into the possibility of producing energy out of waste incl. waste water. If feasible that we move to 2.7	75,000		
MEDIUM	**2.7/** Minimize Water and Waste Water systems electric consumption. Although not especially part of this plan: Water Network renewal planning should be accurate to replace N mileage of old water pipes (cast iron, etc) every year until less than 10% water leaks is observed Water Treatment Plant renewal and modernization with Funding already allocated will increase energy efficient measures and pumping equipment. Waste Water Lift Stations with Funding allocated shall be more energy efficient.	**YSPSC**	with the necessary expertise of external consultants and with funding support of Yap State	an energy efficient or even a zero energy consumption by producing its own electricity with waste	IDP already allocated 1,000,000		2010 for planning & design – until 2020 for works

OBJECTIVE 3 A: ALTERNATIVE/ RENEWABLE ENERGY – SOLAR SECTION / OUTER ISLAND ELECTRIFICATION 100% of the Outer-islands population of Yap State to be electrified by 2015 with 100% renewable energy systems Which is 14 islands with approximate total population of 2,600 islanders							
Activity Priority	**Activity**	**Organization(s) Responsible**		**Performance indicators**	**Budget**	**Potential Source**	**Time Frame for Initiation**
		Lead Agency	**Participating / Supporting**				
HIGH	**3.1/** Electrifying 4 of the non-electrified outer-islands taking into account the order as follows: Fais (648,000), Ifalik (807,000), Lamotrek (485,000), Satawal (777,000), Faraulap (305,000), Euaripik (155,000), Elato (131,000), Ngulu (31,000), Woleai (661,000 except Falalop) Priorities are by order of population. Remoteness and logistics are also factors for consideration. The first island to be electrified is Fais as it is the closest for logistics reasons. Mini-grid for Fais with land easements Fais, being a high island (increase of population on the long term) has 2 potentials: solar electrification and wind energy	**Yap State YSPSC** **Operation & Maintenance YSPSC**	with EU assistance EDF10 and others	Poverty aviation and improvement in health and education. Better communication between the main island and the outer islands will lead to a better and more efficient use of sea transportation leading to fuel savings.	4,400,000	EDF-10 May be with co-financing from EIB or Energy Facility	2010-2012 7 islands and all the others by 2015

OBJECTIVE 3 B: ALTERNATIVE/ RENEWABLE ENERGY – SOLAR SECTION / MAIN ISLANDS & YAP PROPER 10% RE by 2015 (in preparation of 50%) for Yap Main island: Replace 10% of present diesel electricity consumption by electricity produced by renewable energy sources Such as wind energy (1.1 MW) photovoltaic solar energy (400kWp) by 2015							
Activity Priority	**Activity**	**Organization(s) Responsible**		Performance indicators	Budget	Potential Source	Time Frame for Initiation
		Lead Agency	**Participating / Supporting**				
MEDIUM / HIGH	**3.2/** Yap PV solar grid tied-systems to be installed on government and administration buildings up to 240 kWp: - Yap Hospital 80kWp - Department of Education - Government Administration Building - Legislature Building - Public Works - YSPSC 160kWp could be reserved for net-metering arrangements with residential and commercial customers	**Yap State YSPSC**	AMU and EU N-REP PMU	The PV installation will cut the peak load and will reduce the fuel consumption and thus lead to savings	2,600,000	with EU, Japan & US assistance and others	2010 -2015
HIGH	**3.3/** Establish dual electrification systems for PV solar and conventional energy in the outer-islands already electrified: - Ulithi-Mogmog hybrid solar-diesel - Ulithi-Falalop dual solar-diesel - Woleai-Falalop dual solar-diesel Making the operations more sustainable by using PV Currently these operations are too fragile to supply power with extremely high and volatile price of diesel fuel	**Yap State YSPSC**	with EU assistance EDF10	A stable and affordable energy supply in the mentioned islands.	240,000 575,000 500,000		2010 –2012

OBJECTIVE 3 C: ALTERNATIVE/ RENEWABLE ENERGY – WIND SECTION

10% RE by 2015 (in preparation of 50%) for Yap Main island:
Replace 10% of present diesel electricity consumption by electricity produced by renewable energy sources
Such as wind energy (1.1 MW) photovoltaic solar energy (400kWp) by 2015

Activity Priority	Activity	Organization(s) Responsible		Performance indicators	Budget	Potential Source	Time Frame for Initiation
		Lead Agency	Participating / Supporting				
HIGH	*WIND SECTION* **3.4/** - Continuing Yap wind energy measurements in Gagil and Merry Tower (5.4m/s -12mph) and (6.2m/s - 14mph) average wind speed from July2009 to January2010 on each site respectively. - When the one year data is compiled in July 2010, start wind study and assessment. - Start wind measurement on Fais.	**YSPSC**	N-REP PMU and AMU	Gather enough data to start a more in-depth study and a wind pilot project	12,000	EDF10 with France assistance (French Pacific Fund)	2010 2010-2011
MEDIUM	**3.5/** After selecting the best suitable locations, secure land through warranty deeds for 4 sites with compensation of $30,000 USD per site	**Yap State**		Land secured for the use of a wind farm	120,000		2011 depending of wind assessment
LOW	**3.6/** Secure funding for the wind farm (1MW to 1.2MW)	**Yap State**			4,400,000	EIB or ADB	2012
LOW	**3.7/** Select equipment and build the wind farm with interconnection to the grid. Add the necessary short time energy storage to keep the grid stable.	**YSPSC**	with private companies & contractors after bidding process	Prepare technical specs, bid out and install - 10 % replacement of fossil fuel by RE			2013-2015 Minimum three wind turbines installed by 2015

10 YEAR ENERGY ACTION PLAN						
Objectives	**Activities/Programs**	**Responsibilities**	**Possible Funding Source**	**Time Frame:**	**Estimated Cost**	
					Project Cost	**Yearly Maintenance**
A/ CONVENTIONAL ENERGY PROJECTS:						
REDUCE FUEL CONSUMPTION AT POWER PLANT Save significantly on maintenance cost Improve reliability and continuity of service at generation site Accommodate power supply for possible major fisheries activities Reduce electric power plant losses	**1.1)** 1.5MW (continuous rating i.e. equivalent 1.8MW prime) high speed generator to be purchased and installed by 2011 Funding solicited by OPB from CFSM, USDA and other external sources. *Benefits:* - This project will save 4% of diesel consumption. - Generator will run at night time and during weekends. - Maintenance costs for the Deutz units will be reduced by 50% by alternating use with the new generator. - Reliability and continuity of service of the generation system will improve (3rd back up). - Surplus of generation capacity for eventual fisheries activities is accommodated. **1.2)** Replacement and upgrade of the High Voltage bus (4.16kV) inside the plant is required since 5 years by the FSM Infrastructure Plan. - Reduce electric power plant losses. **1.3)** At the same time, removal of 4 old and inoperative gen-sets as well as old HV bus is required. (incl. provisions for heavy equipment handling and recycling	**Yap Sate and OPB to secure funding** **YSPSC manages the project, purchase after bidding, install and commission** **YSPSC technical assistance** **YSPSC with AMU assistance**	ADB loan with YSPSC support	2011 2010-2011	1,000,000 516,000	40,000
TOTAL COST/INVESTMENT CONVENTIONAL ENERGY: $1,666,000						

Objectives	Activities/Programs	Responsibilities	Possible Funding Source	Time Frame:	Estimated Cost	
					Project Cost	Yearly Maintenance
B/ ENERGY EFFICIENCY:						
Supply Side Management (SSM) Improve fuel consumption monitoring and Improve electric metering Maintain or reduce level of losses on the distribution grid	**2.1)** Purchase 4 fuel meters for power plant. Purchase & install electric meters and accurate I.T.s at power plant after HV bus renewal (Each source & feeder). Start computerized supervision with computerized monitoring. **2.2)** Recalculate distribution lines/ transformers losses and recalibration OPTIMA unit & distribution meters – normal campaign **2.3)** LED street lighting pilot project -	***YSPSC (after budget approval of HV bus renewal for electric metering)*** ***YSPSC (in collaboration eventually with PPA project)*** ***YSPSC***	YSPSC US grant ADB / EU EDF-10	2010 2011 2012 2010 and every year 2010	10,000 10,000 10,000 15,000	

Demand Side Management (DSM) Energy conservation program Continuous advice to users on EE Appliances improvement program	**2.4)** Energy audits; Government's buildings' staff including all the agencies to determine monthly amount of kWh that should be used in each building with the required comfort. These audits should give short term and long term recommendations for each building. Installation of prepayment meter for each building and prepayment sub-meters if necessary for services within the next 8 months. **2.5)** Newsletter and policy directives to instill energy conversation measures and best energy efficient appliances available on the local market (or necessary to introduce in Yap) **2.6)** Minimize Water and Waste Water systems electric consumption. Although not especially part of this plan: - Water Network renewal planning should be accurate to replace N mileage of old water pipes (cast iron, etc) every year until less than 10% water leaks is observed. - Water Treatment Plant renewal and modernization with Funding already allocated will increase energy efficient measures and pumping equipment. - Waste Water Lift Stations with Funding allocated shall be more energy efficient. - Waste Water Treatment Plant Reconstruction with Funding allocated shall be energy efficient and why not net zero energy consumption by producing its own electricity with waste (study to be done).	***Yap State and OPB with technical, operational and commercial collaboration of YSPSC*** ***YSPSC (eventually advised by EU EDF10 EE program)*** ***YSPSC with the necessary expertise of external consultants and with funding support of Yap State***	Infrastructure Maintenance Funds (allocated)	2010 2010 2010 for planning & design – until 2020 for works	75,000 25,000 3,000 1,000,000	

TOTAL COST/INVESTMENT ENERGY EFFICIENCY AND CONSERVATION: $1,148,000 OF WHICH $ 1,000,000 IS ALLOCATED

Objectives	Activities/Programs	Responsibilities	Possible Funding Source	Time Frame:	Estimated Cost	
					Project Cost	Yearly Maintenance
C/ ALTERNATIVE/ RENEWABLE ENERGY:						
100% of the Outer-islands population of Yap State to be electrified by 2015 with 100% renewable energy systems Which is 14 islands with approximate total population of 2,600 islanders **10% RE by 2015 (in preparation of 50%) for Yap Main island:** Replace 10% of present diesel electricity consumption using electricity produced by renewable energy sources such as wind energy (1.1 MW) photovoltaic	*SOLAR SECTION* **3.1)** Electrifying 4 of the non-electrified Atols taking into account the order as follows: - Fais (Estimated amount: $ 700,000) - Ifalik (Estimated amount: $ 880,000) - Lamotrek (Estimated amount: $ 530,000) - Satawal (Estimated amount: $ 800,000) Electrifying all the other populated islands: - Faraulap (Estimated amount: $ 350,000) - Euaripik (Estimated amount: $ 200,000) - Elato (Estimated amount: $ 180,000) - Ngulu (Estimated amount: $ 60,000) - Woleai (Estimated amount: $ 700,000) Priorities are by order of population. Remoteness and logistics are also factors for consideration. Mini-grid for Fais with land easements. Fais, being a high island (increase of population on the long term) has 2 potentials: solar electrification and wind energy. **3.2)** Yap PV solar grid tied-systems to be installed on government and administration buildings up to 240 kWp: - Yap State Hospital - Department of Education - Government Administration Building - Legislature Building - Public Works - YSPSC 160kWp reserved for net-metering arrangements **3.3)** Establish dual or hybrid electrification systems for PV solar and conventional energy in the already electrified outer-islands: - Ulithi-Mogmog - Ulithi-Falalop	**Yap State and YSPSC with technical assistance EDF10 PMU and others** **Operation & Maintenance YSPSC**	EDF-10	2010-2012 2012-2015 2010-2015	2,910,000 1,490,000 2,600,000 250,000	 66,000 26,000 4,000

solar energy (400kWp) by 2015	- Woleai-Falalop Making the operations more sustainable by using renewable energy. Currently the islands have diesel mini-grids and the power generation is too expensive to be sustainable.	**Yap State and YSPSC** **Operation & Maintenance YSPSC**	EU, Japan , ADB or US	2010 -2012 2010 2010-2011	590,000 520,000	9,600 8,400
	WIND SECTION **3.4)** Continuing Yap wind energy measurements in Gagil and Merry Tower (5.4m/s -12mph) and (6.2m/s -14mph) average wind speed from July2009 to January2010 on each site respectively. When one year's worth of data is collected by July 2010, start wind study and assessment. Start wind measurement on Fais **3.5)** After selecting the best suitable locations, secure land through warranty deeds for 4 sites with compensation of $30,000 UDS per site **3.6)** Technical and financial proposal for secure funding for the wind farm (1MW to 1.2MW) **3.7)** Select equipment and construction of wind farm with interconnection to the grid. Add necessary short time energy storage to keep the grid stable.	**Yap State and YSPSC** **Operation & Maintenance YSPSC** **YSPSC** **Yap State** **Yap State & YSPSC** **YSPSC**	EU EDF-10 France (French Pacific Fund) EDF-10 / ADB EDF-10 European Investment Bank / ADB	2010-2011 2011 2011- 2012 2013-2015	6,000 60,000 6,000 120,000 50,000 4,400,000	

TOTAL COST/INVESTMENT RENEWABLE ENERGY: $13,002,000

CHUUK STATE ACTION PLANS

Reference	ACTIVITIES/PROGRAMS – PRIORITY LIST	Time frame	Priority
1.1/	A. Procurement of 2no. 1 MW diesel generator to replace the old and inefficient existing ones B. Overhaul of 1no. 1 MW existing generator (as back up for 2 no. 1 MW generators in A.)	2011	**1**
1.2/	New power plant (OMNIBUS project) – 7 MW (5 MW Slow speed generators; 2 no. 1 MW medium speed generators from 1.1 above)	2011-2013	**1**
1.3/	Reduction of line losses	2010 - 2011	**1**
1.4/	Reduction of commercial losses	2011	**1**
1.5/	Recruitment of engineers and outsource of CPUC management	2010	**1**
1.6/	Capacity Building Programs	2010 - 2012	**1**
1.7/	Implementation of the DSM recommendation consumption and decrease trade deficit.	2011-2012	**2**
2.1/	Formulate, recommend, and implement Public Awareness and Education on Energy Conservation and Energy Efficiency Measures,	2012	**2**
2.2/	Formulate and recommend Directives or Regulations on energy conservation and energy efficiency on new infrastructure design and construction	2012	**2**
3.1/	PV solar grid tied-systems to be installed on government and administration buildings up to 120 kWp Assess viability of PV stand-alone system for the water and sewage pumps	2012 - 2015	**2**
3.2/	Hybrid systems using PV and either diesel, wave or wind energy as appropriate for the unelectrified Truk Lagoon Islands	2012 - 2015	**2**
3.4/	Start Chuuk wind energy measurements in Weno, Tonoas and other Truk Lagoon islands.	2012- 2013	**2**
3.8/	Select wave data for the Islands close to the reef and do energy measurements for the Lagoon islands and bigger outer islands. Prepare a feasibility study for technology selection.	2012 – 2013	**2**
3.11/	Solid waste characterization study and collect sewage and biomass data in Weno. Prepare a feasibility study for technology selection.	2012-2013	**2**
2.3/	Perform Energy Audits on all Government Buildings	2012	**3**
3.3/	Electrification of lagoon islands and other un-electrified islands.	2011 – 2020	**3**
3.9/	After selecting the best suitable locations, secure land through long lease agreements for wave sites	2012-2013	**3**
3.12/	After selecting the best suitable location, secure land through long lease agreements for a WtoE power plant	2012-2013	**3**
2.4/	Conduct a study to formulate and recommend legislation for Energy Efficient Building Code	2013	**4**
3.5/	After selecting the best suitable locations, secure land through long lease agreements for wind sites	2012-2013	**4**
3.10/	Select equipment and build the wave power plant with interconnection to the PV hybrid system.	2014-2016	**5**
3.6/	Secure funding for the wind farm (1MW to 2MW)	2013-14	**5**
3.13/	Select equipment and build the power plant with interconnection to the island grid system.	2014 - 2016	**5**
3.7/	Select equipment and build the wind farm with interconnection to the grid.	2014-2016	**6**

Objectives	Outcome Measures	Activities, programs, strategies	Governance/ Responsibilities	Time frame
Provision of stable and reliable power generation in Weno	New power plant that provides efficient and reliable electricity to all end-users in Weno	Procurement of 2 no. 1 MW generation capacity to secure short term power supply on Weno. Implementation of OMNIBUS project (procurement and installation of a 7 MW power-plant (2 no. 2.5 MW slow speed generators and 2 no. 1 MW generators	CPUC Governors Office, IPIC / FSM TC&I; CPUC	2011 2011-2013
Improve management, operation and maintenance of CPUC	More efficient utility management (generation & distribution) Sustainable O&M schedule for power plant;	Contract outside management and maintenance consultants to train and improve management of CPUC Increase Power output efficiency Rationalise transformers and upgrade distribution lines; Install water-meter to end-users on Weno to ensure recovery of the cost of power usage of waste-water and drinking water treatment plant; Reduce commercial losses to support cost and depreciation recovery;	State / IPIC; CPUC/OMM	2010-2012
Enhancement of power sector by Supply Side Energy Efficiency and proper revenue measurements	A more efficient-run power plant resulting in a sustainable power supply to the end-users Supplement conventional energy with Alternative Energy in line with National targets	Measure power loads on all main supply lines; Determine energy loss by supply line and focus mitigation activities Promulgate housing codes requiring all government facilities on Weno and the outer islands to operate or install alternative energy sources; Borrow from EU, ADB, or China Exim Bank Funding for Alternative Energy	CPUC Governors Office, IPIC	2011 – 2013
Efficient electricity demand management	More efficient power usage by customers;	Promulgate energy efficiency regulations for new buildings; Provide incentives for increasing energy efficiency to businesses and property owners; Undertake awareness campaigns for energy efficiency and management Engage with EDF-10 North-REP project on energy efficiency and capacity building support	CPUC; EPA; Governors office	2011-2013

Objectives	Outcome Measures	Activities, programs, strategies	Governance/ Responsibilities	Time frame
Electrify government Facilities in Chuuk State using Alternative Energy by having a renewable energy sources contributing to the total energy mix. -PV grid tied systems -Waste to energy -Wind energy	Supporting the energy requirements of Government Facilities with renewable energy	Study on suitable energy technologies including energy audits Prepare regulations allowing feed-in tariffs/ net-metering PEC; Italian Government; North-REP	CPUC, Public Works, IPIC	2011 – 2015
Electrification of lagoon islands and other un-electrified islands	Improved Access to electricity for all Chuuk residents and public facilities	Install hybrid PV installations on the lagoon islands with pre-paid meters Install PV stand-alone systems on public facilities in the outer islands as appropriate North-REP (EDF-10);	CPUC, IPIC	2011 – 2020

CHUUK - 5 YEAR ENERGY ACTION PLAN

OBJECTIVE 1: CONVENTIONAL ENERGY							
Activity Priority	**Activity**	**Organization(s) Responsible**		**Performance indicators**	**Budget (USD)**	**Potential Source**	**Time Frame**
		Lead Agency	**Supporting**				
HIGH (1)	**POWER GENERATION** **1.1/** Total power needed in Weno is 4.5 MW Two1MW generators, both in poor condition, are in operation, security of supply is threatened A. Procure 2 new 1MW medium speed generators B. Overhaul existing 1 MW generator as standby in advance of New Power Plant (see 1.2 below) **1.2/** New power plant (OMNIBUS project) Design of the new power plant with a 7 MW capacity (2 no. 2.5 MW slow speed generators & 2 no 1 MW medium speed generators purchased under A above). Next steps: i): Confirm funding availability ii): Select Preferred bidderiii): prepare the connection of the new generators to the grid	**CPUC** **CPUC**	**ADB; DTC&I; PMU, PPA, FSM Dept. R&D,** **FSM TC&I; ADB; OIA Compact PMU**	24 hour power supply for the whole Weno Island Long term reliable power for Weno Island; Ability to supply adjacent lagoon islands More efficient operation; Fuel savings	A. 2,000,000 B. 500,000 14,500,000	USDOI / ADB Compact / ADB	2011 2011-2013
	POWER DISTRIBUTION **1.3/** Reduction of line losses: ➢ Schedule continuous tree trimming program ➢ Replacement of old Pole and cross-arms ➢ Purchase of new and replacement of old transformers **1.4/** Reduction of Commercial Losses Survey and repair all cash power meters; Remove all illegal connections; Complete cash power meter installation	**CPUC** **CPUC**	**OIA; Compact PMU** **SPC/ PPA** **SPC/PPA**	More efficient operation; more reliable power supply Operating surplus to allow re-investment in infrastructure Improved cash flow;	35,000 15,000	EDF-10 PPA USDA	2010-2011

	GENERAL **1.5/** Recruitment of engineers and outsource of CPUC management	**State**	**OIA/PPA**	Return to 24 hour supply; effective management process in place;			2012
	CAPACITY BUIDING **1.6/** Capacity building program to enhance understanding of production and distribution losses and solutions/practices to minimize production and transmission losses.(DSM and SSM) **1.7/** Implementation of the DSM recommendation consumption and decrease trade deficit.	**CPUC** **CPUC**	**OIA; PPA; OIDP** **FSMPC; PPA; SPC**	CPUC Board and staff with enhanced capacity to deliver good quality service Fuel consumption reduction due to an efficient utility	1,000,000	PPA DSM / SSP program EU or US	2012

OBJECTIVE 2: ENERGY CONSERVATION AND ENERGY EFFICIENCY							
Activity Priority	**Activity**	**Organization(s) Responsible**		**Performance indicators**	**Budget (USD)**	**Potential Source**	**Time Frame for Initiation**
		Lead Agency	**Participating / Supporting**				
HIGH (2)	**2.1/** Formulate, recommend, and implement Public Awareness and Education on Energy Conservation and Energy Efficiency Measures, etc. by 2012. Minimize petroleum imports **2.2/** Formulate and recommend Directives or Regulations on energy conservation and energy efficiency on new infrastructure design and construction such as schools, Public Health Services, etc. by end of 2011 ➢ Technical Assistance in formulation of Regulation or Directive ➢ Implementation of Energy Conservation and Energy Efficiency Regulation ➢ Monitoring program effectiveness	**CPUC; IPIC** **IPIC**	**FSM Dept. R&D;** **North-REP (EDF-10)** **FSM Dept R&D, AG's office**	Knowledge Enhancement on Efficiency operation that will lead to a more efficient society. Energy savings for public will assist the utility in lowering the base and peak load.	115,000 15,000	EDF-10 EDF-10 / AUSAID	2012 2012
MEDIUM	**2.3/** A/ Perform Energy Audits on all Government Buildings and Facilities (Offices, Hospital, and residences), commercial buildings, and residences by 2011 ➢ Audit report recommendations for reference done by TA ➢ Evaluate report and recommendations B/ Provide recommendations on energy saving measure to reduce petroleum consumption ➢ Implementation of Energy Audit recommendations ➢ Start awareness campaign to government officials and other building users **2.4/** A/ Conduct a study to formulate and recommend legislation for Energy Efficient Building Code by 2013 B/ Provide recommendations and formulate legislation for Energy Efficient Building codes to improve living standards, health and education C/ Provide incentives for business and individuals to encourage use of energy efficient technologies	**State Gov. office /** **FSM R&D** **CPUC**	**SPC N-REP** **SPC Energy**	Energy savings that result in lower peak load and thus contribute to obtaining efficient energy usage. Additionally, this will streamline revenue savings for the government Implementing energy efficiency methods will contribute to the set goals	50,000 150,000 25,000 20,000	EDF-10 US/AUSAID	2012 2013

OBJECTIVE 3 A: ALTERNATIVE/ RENEWABLE ENERGY – SOLAR SECTION 10% RE by 2015 (in preparation of 50%) for Lagoon islands: Replace 10% of present diesel electricity consumption by electricity produced by renewable energy sources Such as wind energy (1-2 MW) photovoltaic solar energy (450kWp) by 2015 Solutions need to be economically sustainable in the long term i.e. O&M and long term replacement costs must be covered							
Activity Priority	**Activity**	**Organization(s) Responsible**		Performance indicators	Budget	Potential Source	Time Frame for Initiation
		Lead Agency	**Participating / Supporting**				
MEDIUM / HIGH	**3.1/** PV solar grid tied-systems to be installed on government and administration buildings up to 450 kWp: - Chuuk Hospital - Department of Education - Government Administration Building - Legislature Building - Public Works - CPUC - Airport buildings - Jail and Police Station Assess the cost benefit of stand-alone PV system for water and sewage pumps.	**Chuuk State IPIC / CPUC**	AMU , FSM Energy Division and EU N-REP PMU	The PV installation will reduce peak loads and will reduce the fuel consumption and thus lead to savings	4,500,000	with EU, Japan, Italian & US assistance and others Italian grant	2012 -2015 2011-12
MEDIUM / HIGH	**3.2/** Hybrid systems using PV and either diesel/ wave or wind energy for the un-electrified Truk Lagoon Islands: - Tonoas - Fefen - Uman - Udot - Faichuuk Currently the islands are not electrified and have a population of roughly 40,000 people. The hybrid solution will make the power affordable. To ensure sustainability the houses and public facilities will be getting pre-paid meters.	**Chuuk State CPUC**	AMU and Jica / EU N-REP PMU	A stable and affordable energy supply in the mentioned islands.	750,000 750,000 250,000 200,000 500,000	Japan cool earth and EU EDF10	2011 –2015
MEDIUM	**3.3/** Electrification of lagoon islands and other un-electrified islands. Install PV stand-alone systems on public facilities as appropirate in the outer islands and install hybrid PV installations on the lagoon islands with pre-paid meters	**CPUC**	FSM R&D, AMU SPC / EU N-REP PMU	Access to electricity for all Chuuk residents and public facilities		EU EDF-10 and EDF 11	2011 - 2020

OBJECTIVE 3 B: ALTERNATIVE/ RENEWABLE ENERGY – WIND SECTION 10% RE by 2015 (in preparation of 50%) for Weno island: Replace 10% of present diesel electricity consumption by electricity produced by renewable energy sources Such as wind energy (1.1 MW) photovoltaic solar energy (400kWp) by 2015							
Activity Priority	**Activity**	**Organization(s) Responsible**		**Performance indicators**	**Budget**	**Potential Source**	**Time Frame for Initiation**
		Lead Agency	**Participating / Supporting**				
HIGH	*WIND SECTION* **3.4/** - Start Chuuk wind energy measurements in Weno, Tonoas and other Truk Lagoon islands. - When the one year data is compiled by end 2012, undertake FS for wind study and assessment.	**CPUC**	N-REP PMU and AMU	Gather enough data to start a more in-depth study and a wind pilot project	50,000 75,000	EDF10	2012 2012/13
MEDIUM	**3.5/** After selecting the best suitable locations, secure land through long lease agreements for wind sites	**Chuuk State**		Land secured for the use of a wind farm	120,000		2012/13 dependant on wind assessment
LOW	**3.6/** Secure funding for the wind farm (1MW to 2MW)	**Chuuk State**			5,000,000	EIB or ADB	2013/14
LOW	**3.7/** Select equipment and build the wind farm with interconnection to the grid. Add the necessary short time energy storage to keep the grid stable.	**CPUC**	with private companies & contractors after bidding process	Prepare technical specs, bid out and install			2014-2016 Minimum three wind turbines installed by 2015

OBJECTIVE 3 C: ALTERNATIVE/ RENEWABLE ENERGY – WAVE SECTION 10% RE by 2015 (in preparation of 50%) for Lagoon islands: Replace 10% of present diesel electricity consumption by electricity produced by renewable energy sources Such as wind energy (1.1 MW) photovoltaic solar energy (400kWp) by 2015							
Activity Priority	**Activity**	**Organization(s) Responsible**		**Performance indicators**	**Budget**	**Potential Source**	**Time Frame for Initiation**
		Lead Agency	**Participating / Supporting**				
HIGH	*WAVE SECTION* **3.8/** - Select wave data for the Islands close to the reef and do energy measurements for the Lagoon islands and bigger outer islands. - Prepare a feasibility study for and technology selection.	**CPUC**	N-REP PMU and AMU	Gather enough data to start a more in-depth study and a wave pilot project	20,000	EDF10	2012 2012/13
MEDIUM	**3.9/** After selecting the best suitable locations, secure land through long lease agreements for wave sites	**Chuuk State**		Land secured for the use of a wave	40,000		2012/13 depending of wave and technology assessment
MEDIUM	**3.10/** Select equipment and build the wave power plant with interconnection to the PV hybrid system. Add the necessary short time energy storage to keep the grid stable.	**CPUC**	with private companies & contractors after bidding process	Prepare technical specs, bid out and install			2014-2016

OBJECTIVE 3 D: ALTERNATIVE/ RENEWABLE ENERGY – BIOMASS & WASTE SECTION 10% RE by 2015 (in preparation of 50%) for WENO islands: Replace 10% of present diesel electricity consumption by electricity produced by renewable energy sources Such as waste to energy and biomass energy (2 MW) by 2015							
Activity Priority	**Activity**	**Organization(s) Responsible**		**Performance indicators**	**Budget**	**Potential Source**	**Time Frame for Initiation**
		Lead Agency	**Participating / Supporting**				
HIGH	*Waste to Energy / biomass SECTION* **3.11/** - do a solid waste characterization study and collect sewage and biomass data in Weno and look into the possibility of solid waste contribution/transportation from the lagoon islands to Weno. - Prepare a feasibility study for technology selection.	**CPUC**	N-REP PMU and AMU	Gather enough data to start a more in-depth study feasibility study	50,000	EDF10	2012 2012/13
MEDIUM	**3.12/** After selecting the best suitable location, secure land through long lease agreements for a WtoE power plant site and look at the possibility of IPP (Independent Power Provider) set-up with a PPA (Power Purchase Agreement) in place.	**Chuuk State CPUC**		Land secured for the use of a WtoE power plant	40,000		2012/13 depending on technology assessment
MEDIUM	**3.13/** Select equipment and build the power plant with interconnection to the island grid system	**CPUC**	with private companies & contractors after bidding process	Prepare technical specs, bid out and install			2014-2016

POHNPEI STATE ACTION PLANS

Reference	ACTIVITIES/PROGRAMS – PRIORITY LIST	Time frame	Priority
1.1/	Overhauling of Generators and procurement of a 2 MW diesel generator to replace the old existing one.	**2010**	**1**
1.2/	Reduction of line losses and other distribution losses	2010	**1**
1.3/	Secure funding for quick acquisition of replacement parts	2010	**1**
1.4/	Capacity building program for utility personal to enhance understanding of production and distribution losses; and solutions/practices to minimize production and transmission losses.	2010	**1**
1.5/	Conduct a study to formulate and recommend conventional power generation needs to match DS requirements	2010-2011	**1**
1.6/	Implementation of the DSM recommendation	2011-2012	**1**
3.1/	Rehabilitation measures to refurbish existing hydro power turbines to put back on line In depth reassessment for the expansion of the Nanpil River Hydropower Plant to increase the capacity	2010 2011	**1**
3.2/	In depth reassessment of feasibility of hydro power potential development of all Mini and Micro Hydropower Plant schemes including Lehnmesi and Senpehn rivers for power generation	2013	**2**
1.7/	A/ Perform a technical investigation for viability to modify existing Caterpillar B/ Perform a comprehensive technical study for sustainable utilization of bio-fuel blend of diesel	2011	**2**
1.8/	Perform generator modifications and Implementation of waste oil-diesel blend Pilot Project	2012	**2**
2.1/	Public Awareness and Education on Energy Conservation and Energy Efficiency Measures.	2011	**2**
2.2/	Formulate and recommend legislation banning importation of less energy appliances		**2**
2.3/	Formulate and recommend Directives or Regulations on energy conservation and energy efficiency		**2**
2.8/	Perform Energy Audits on all Government Buildings and implement recommendations	2010	**2**
1.9/	Perform a comprehensive technical study for a sequential replacement of the existing diesel generators with efficient, reliable , and low speed gen-sets by end of 2018		**3**
1.10/	Purchase of new efficient, low speed generators; decommission old units and install new units by 2018 with a total capacity of 50MW.	2018	**3**
1.11/	Replace all street lights with more efficient (LED) or solar street lights		**3**
2.4/	Replacement program for electrical water heating with solar water	2013	**3**
2.5/	Technical study to recommend sustainable utilization of bio-fuel blend of diesel for sea transportation	2015	**3**
2.6/	Conduct an in depth study to set standards for public transport to minimize petroleum consumption and pollution;	2013	**3**
2.7/	Conduct study to formulate and recommend Energy Efficiency Code Regulation appliances	2011	**3**
2.9/	Conduct a study to recommend legislation for higher duties for bigger luxury vehicles and heavier trucks	2015	**3**
2.10/	Conduct a study to formulate and recommend legislation for Energy Efficient Building Code	2013	**3**
3.2B/	Complete design of viable hydropower plant schemes to lead to implementation, and commissioning	2013	**3**
3.3/	Rehabilitation of the existing Stand Alone Solar Home Systems (SHS)	2011	3
3.4/	Conduct a technical study to provide appropriate alternate energy sources to all un-electrified households	2011	3
3.5/	Electrification of the public facilities in not yet electrified outer islands and remote area's	2011	3
3.6/	Study to determine the viability of renewable energy technologies as an energy	2011- 2012	3
3.7/	Conduct study, develop and implement viable integrated grid systems with appropriate renewable energy	2012	3
3.8/	Conduct a comprehensive study to determine the potential of all appropriate renewable energy technologies	2012	3
3.9/	Conduct study and develop plans to remove, replant and rehabilitate senile coconut plants	2011	3
3.10/	Assess and develop uniform method of data collection, monitor, and develop priorities for implementation of appropriate renewable energy technologies	2012	3

POHNPEI - 5 YEAR ENERGY ACTION PLAN

OBJECTIVE 1: CONVENTIONAL ENERGY

Goal: Efficient, safe, reliable, and affordable supply of conventional energy

Objective: Improve Conventional Power Generation supply efficiency

Activity Priority	Activity	Organization(s) Responsible		Performance indicators	Budget (USD)	Potential Source	Time Frame
		Lead Agency	Participating / Supporting				
HIGH (1)	**GENERATION** **1.1/** The generators are in disarray and need an urgent overhaul A. Overhauling of Generators No. 5 and No.8 B. Overhauling of Generators No. 4, 6, 7, 9 and 10 C. Procurement of a 2 MW diesel generator to replace the old and inefficient existing one.	**PUC**	**AMU, PPA, FSM Dept. R&D**	Higher efficiency and reliable power supply Fuel savings	A. 440,000 B. 2,000,000 C. 2,000,000	USDOI / Japan Generator no. 9 and 10 - JICA	2010
	DISTRIBUTION **1.2/** Reduction of line losses: ➢ Schedule continuous tree trimming program ➢ Fuse coordination program / additional cash-power meters ➢ A computerized program that will monitor installation, maintenance and part replacement ➢ Replacement of old Pole and cross-arms ➢ Purchase of new and replacement of old transformers ➢ Purchase of bucket truck ➢ Purchase of drop-line	**PUC** **AMU, PPA**			150,000 370,000 315,000 2,900,000 500,000 220,000 250,000		
	GENERAL **1.3/** ➢ Secure funding for quick acquisition of replacement parts ➢ Establish reliable supplier agreements with vendors ➢ Create reliable procurement procedures	**PUC**	**FSM Dept. R&D / ODA**		35,000 15,000		
	CAPACITY BUIDING **1.4/** Capacity building program to enhance understanding of production and distribution losses and solutions/practices to minimize production and transmission losses. **1.5/** Conduct a study to formulate and recommend conventional power generation needs to match demand requirements	**PUC**	**FSMPC, AMU, SPC (SOPAC)**	Knowledge Enhancement and Efficiency operation that will lead to an efficient operating utility.		EDF-10 PPA USDA PPA DSM program	2010-2011 2011-2012

HIGH (2)	1.6/ Implementation of the DSM recommendation consumption and decrease trade deficit. 1.7/ A/ Perform a technical investigation for viability to modify existing Caterpillar Generators to utilize blend of 5% waste oil and 95% diesel oil by June 2011 to reduce petroleum B/ Perform a comprehensive technical study for sustainable utilization of bio-fuel blend of diesel and coco-oil for power generation to reduce petroleum consumption and decrease cash out flow 1.8/ Based on study mentioned in 1.4 perform generator modifications and Implementation of appropriate waste oil-diesel blend Pilot Project	**PUC** **PUC** **PUC**	**FSMPC, PPA, SPC (SOPAC)** **SPC, AMU**	Fuel consumption reduction due to an efficient utility Based on the report recommendations will be available for reference and implementation 20% fuel saving Waste oil and diesel blend report recommendations availability for reference and future implementation	1,000,000 50,000 150,000	EU or US EDF-10 EU, Japan, US	2011 2012 2012
MEDIUM	1.9/ Perform a comprehensive technical study for a sequential replacement of the existing diesel generators with efficient, reliable , and low speed gen-sets by end of 2018 1.10/ Looking for funding and start preparing for the purchase of new efficient, reliable and low speed engines and generators; decommissioning and installation of new units by 2018 with a total capacity of 50MW. Total budget needed in 2018 could be roughly $ 50,000,000 1.11/ Replace all street lights with more efficient (LED) or solar street lights to reduce consumption of petroleum fuel Phase I: Kolonia Pilot Project, 200 Solar street lights Phase II: All other municipalities, 1,000 Solar street lights or with LED streetlights.	**PUC** **PUC** **PUC**	**SPC, AMU**	Cost savings on fuel purchase reduce petroleum consumption and reduce cash out flow Fuels and cost saving Cost saving for the utility as the current streetlights are using inefficient light bulbs	50,000 600,000 3,000,000	USDOI China/ Japan	2011 2015 2012

Total budget needed for improvements in the conventional energy sector: $ 14,045,000

High priority: $10,395,000

OBJECTIVE 2: ENERGY CONSERVATION AND ENERGY EFFICIENCY

Goal: Establish collective and collaborative initiatives to optimize energy conservation in all socio-economic sectors through realistic and attainable objectives

Objective: Improve awareness in energy efficiency and regulate energy efficiency by implementing conservation measurements that lead to a energy saving of 30%

Activity Priority	Activity	Organization(s) Responsible		Performance indicators	Budget (USD)	Potential Source	Time Frame for Initiation
		Lead Agency	Participating / Supporting				
HIGH	**2.1/** Formulate, recommend, and implement Public Awareness and Education on Energy Conservation and Energy Efficiency Measures, etc. by 201. Minimize petroleum imports and decrease capital flight	**State energy office**	**FSM Dept. R&D**	Knowledge Enhancement on Efficiency operation that will lead to a more efficient society.	115,000	EDF-10	2011
	2.2/ Formulate and recommend legislation banning importation of less energy efficient lights, appliances, air conditioners, and conventional water heating equipment, etc. by 2011 ➢ technical assistance in formulating legislation, and draft review ➢ Public education and awareness ➢ Monitoring program effectiveness	**State energy office**	**FSM Dept R&D, AG's office**	Energy savings for public will assist the utility in lowering the base and peak load.	15,000 25,000 30,000	EDF-10 / AUSAID	2010
	2.3/ Formulate and recommend Directives or Regulations on energy conservation and energy efficiency on new infrastructure design and construction such as schools, Public Health Services, etc. by end of 2011 ➢ Technical Assistance in formulation of Regulation or Directive ➢ Implementation of Energy Conservation and Energy Efficiency Regulation ➢ Monitoring program effectiveness	**State energy office**	**State energy office** **, AG's office**		15,000 50,000 15,000	EDF-10 / AUSAID / US	2011

MEDIUM	2.4/ Study and formulate a replacement program for conventional water heating with solar water heating to reduce petroleum consumption by 2013 and to minimize energy losses. ➢ Seek and secure funding for technical assistance for replacement of conventional water heaters ➢ Technical Assistance for development of a replacement plan ➢ Implementation (Pilot Project of Solar Water Heaters) 2.5/ Conduct an in depth technical study to recommend viable, efficient, reliable, and sustainable utilization of bio-fuel blend of diesel and coconut-oil for sea transportation by end of 2015. Implement the findings and start pilot project. Implementation of program. 2.6/ A/ Conduct an in depth study to formulate and implement a mechanism and set standards for public transport to minimize petroleum consumption, minimize traffic congestion and pollution; B/ To create and enact legislation to provide mandatory incentives/awards or rebates for usage of mass transit and carpooling by 2013. 2.7/ A/ Conduct study to formulate and recommend Energy Efficiency Code Regulation by 2011 to minimize petroleum consumption and increase the use of energy efficiency appliances B/ Formulation of Draft Energy Efficiency Code C/ Awareness and implementation	**State energy office** **FSM Dept. R&D** **FSM TC&I** **State energy office**	**State energy office/ODA** **State energy office** **T&I state** **SPC (SOPAC)**	Energy savings that result in lower peak load and thus contribute to obtaining efficient energy usage Replacement of imported fuels for locally available oil Development of a Mass Transit System Plan will use less petroleum, minimize traffic congestion and pollution; guidelines and regulations for broader public	15,000 50,000 125,000 25,000 500,000 25,000 25,000 100,000	EDF-10 Regional funding AusAid/ USAID USDOI EDF-10	2011 2015 2012 2013 2011 2012

HIGH	2.8/ A/ Perform Energy Audits on all Government Buildings and Facilities (Offices, Hospital, and residences), commercial buildings, and residences by 2011 ➢ Audit report recommendations for reference done by TA ➢ Evaluate report and recommendations B/ Provide recommendations on energy saving measure to reduce petroleum consumption and decrease cash out flow by 2012 ➢ Implementation of Energy Audit recommendations ➢ Start awareness campaign to government officials and other building users	**State energy office**	**SPC Energy**	Energy savings that result in lower peak load and thus contribute to obtaining efficient energy usage. Additionally, this will streamline revenue savings for the government	50,000 150,000	EDF-10	2011
MEDIUM	2.9/ A/Conduct a study to formulate and recommend legislation for higher duties for bigger luxury vehicles and heavier trucks to reduce petroleum in efficiency use and waste by 2015 B/Provide recommendations and create legislation for curtailing importation of bigger luxury and heavy vehicles for reduction of fuel consumption and cash out flow 2.10/ A/ Conduct a study to formulate and recommend legislation for Energy Efficient Building Code by 2013 B/ Provide recommendations and formulate legislation for Energy Efficient Building codes to improve living standards, health and education while reducing energy waste and improve energy efficiency	**State energy office** **State energy office**	**SPC Energy**	Energy savings that result in lower peak load and thus contribute to obtaining efficient energy usage. Additionally, this will streamline revenue savings for the government Implementing energy efficiency methods will contribute to the set goals	50,000 150,000 25,000 20,000	EDF-10 US/AUSAID	2011 2013

Total budget needed for improvements in energy efficiency and conservation: $1,575,000

High priority: $ 465,000

OBJECTIVE 3A: RENEWABLE ENERGY – HYDRO SECTION

Goal: An increased share of appropriate renewable energy deliverables in Pohnpei State's energy supply
Objective: To access a mix of various energy resources that leads to less dependency on imported fuels and ensure availability of technical knowhow and financial means to maintain the systems

Activity Priority	Activity	Organization(s) Responsible		Performance indicators	Budget (USD)	Potential Source	Time Frame for Initiation
		Lead Agency	Participating / Supporting				
HIGH	3.1/ A/ In depth reassessment for the expansion of the Nanpil River Hydropower Plant to increase the generating capacity by diverting the Kiepw and Nankawad Rivers into the existing Nanpil River Dam for continuous operation to reduce petroleum consumption and lower capital flight by 2011	**PUC**	**FSM Dept. R&D & State energy office**	Earlier studies were done more than 15 years ago. A current needs assessment is required due to changes in the weather pattern. The study should determine what upgrades are needed for the current kWh production Earlier assessments indicate a 5-6MW hydro capacity	100,000	EIB with EDF-10 Or other donors like China / Exim bank	2011
	B/ Perform rehabilitation measures to refurbish existing hydro power turbines and to re-engage operation by 2010 (phase 1)				1,600,000		2010
	C/ Implementation of Nanpil hydro upgrade (phase 2)	**PUC**	**FSM Dept. R&D & State energy office**		13,800,000		2012
	3.2/ A/ In depth reassessment of feasibility of hydro power potential development of all Mini and Micro Hydropower Plant schemes including Lehnmesi and Senpehn rivers for power generation to reduce petroleum consumption and reduce trade deficit by 2013 ➢ Technical Assistance (Technical, Environmental, Social Studies, and, Financial Analysis, Design Plans) (Lehnmesi, Lupwor, Kirietleng, Lehdau, Senpehn, Enpein Power, Mand, Sekere, etc)				300,000	EIB with EDF-10 Or other donors like China / Exim bank	2013

MEDIUM	B/ Complete design of viable hydropower plant schemes to lead to implementation, construction, and commissioning by 2013. Public/Private Partnership or Private build, operate, and transfer, etc	**PUC**	**FSM Dept. R&D & State energy office**	Pohnpei will have enough hydro power to reduce 75% of its fossil fuel needs.	100,000,000	EIB with EDF-10 Or other donors like China / Exim bank	2013-2015

Total budget needed for improvements in renewable energy – HYDRO section: $ 115,800,000

High priority – phase 1: $ 2,000,000 High priority – phase 2: $ 13,800,000

OBJECTIVE 3B: RENEWABLE ENERGY – SOLAR SECTION

Goal: An increased share of appropriate renewable energy deliverables in Pohnpei State's energy supply
Objective: To access a mix of various energy resources that leads to less dependency on imported fuels and ensure availability of technical knowhow and financial means to maintain the systems

Activity Priority	Activity	Organization(s) Responsible		Performance indicators	Budget (USD)	Potential Source	Time Frame for Initiation
		Lead Agency	Participating / Supporting				
MEDIUM	3.3/ Complete rehabilitation to increase the capacity, reliability, and efficiency of the existing Stand Alone Solar Home Systems (SHS) to provide sufficient energy for lighting, entertainment, refrigeration, and fans, etc. ➢ Seek and secure funding for Technical Study for rehabilitation and upgrade of the existing PV SHS ➢ Technical Assistance (Technical, Environmental, Social, Financial Analysis, and Design Plans) ➢ Study Report recommendations review prioritizing implementation ➢ Implementation of rehabilitation and upgrade of existing SHS	**State energy office** **FSM R&D**	**FSM Dept. R&D/ SPC N-REP**	Availability of Study Report Recommendations. All existing Stand alone PV systems working with a clear maintenance and part replacement program. At least 75% of outer island households electrified with solar energy	1,500,000	EDF-10, Or other donors	2011
	3.4/ Conduct a technical study to provide appropriate alternate energy sources to all un-electrified households ➢ Technical Assistance	**State energy office**	**SPC N-REP / FSM Dept. R&D and PUC**	A study report that includes: Technical, Environmental, Social, Financial Analysis, and, Design Plans	50,000	EDF-10	2011

MEDIUM	3.5/ Electrification of the public facilities in Pakin, Salapuk and others that are not yet.	**PUC / State energy office**	**State Health and Education departments / SPC N-REP**	100% of the schools and dispensaries electrified	500,000	EDF-10	2011
	3.6/ Perform a study to determine the viability of renewable energy technologies as an energy source for big users of diesel based power such as COM Compound, FSM Capitol Complex, Pohnpei State Hospital, etc. to meet the basic electrical requirements by 2018	**PUC / State energy office**	**FSM Dept. R&D /AMU**	Report with technical design that can lead to the development of a proposal to start solar electrification	50,000	EDF-10 together with JICA	2011-2012
	3.7/ Conduct study, develop and implement viable integrated grid systems with appropriate renewable energy technologies to reduce dependency on imported petroleum products by 15% by 2013.	**PUC / State energy office**	**FSM Dept. R&D /AMU**	Study Report Availability for Consultation	50,000	EDF-10 together with JICA	2013

Total budget needed for improvements in renewable energy – SOLAR section: $ 2,150,000

OBJECTIVE 3C: RENEWABLE ENERGY – OTHERS

Goal: An increased share of appropriate renewable energy deliverables in Pohnpei State's energy supply
Objective: To access a mix of various energy resources that leads to less dependency on imported fuels and ensure availability of technical knowhow and financial means to maintain the systems

Priority	Activity	Organization(s) Responsible		Performance indicators	Budget (USD)	Potential Source	Time Frame for Initiation
		Lead Agency	Participating / Supporting				
MEDIUM	3.8/ A/ Conduct a comprehensive study to determine the potential of all appropriate renewable energy technologies as an energy source by 2013 such as wind, biomass, solid waste utilization, methane digesters, etc. to reduce petroleum consumption ➢ Technical Assistance (Technical, Environmental, Social, Financial Analysis, and Design Plans) ➢ Study Report recommendations for prioritizing and implementation ➢ Start develop designs and plans for implementation by 2018 to decrease petroleum consumption	**State energy office** **FSM R&D**	**FSM Dept. R&D**	Comprehensive report on all appropriate alternative energy technology sources for energy in Pohnpei	200,000	EDF-10, Or other donors	2013 - 2015
	3.9/ Conduct study and develop plans to remove, replant and rehabilitate senile coconut plants with improved coconut plant hybrids by 2013.	**State energy office**	**FSM Dept. R&D / COM**	A study report with clear recommendations and rehabilitation plans	25,000	EDF-10 or AUSAID	2011-2013
	3.10/ Assess, and develop uniform methods of data collection and monitoring. Develop priorities for implementation of appropriate renewable energy technologies such as wind, biomass, solid waste utilization, methane digesters, coconut oil, gasifiers, etc by 2013	**State energy office**	**FSM Dept. R&D / AMU**	Easy access to information that will assist with implementation of RE programs	50,000	EDF-10, Or other donors	2011-2013

Total budget needed for improvements in renewable energy – "OTHER" section: $ 275,000

CONVENTIONAL ENERGY:

Goal: Efficient, safe, reliable, and affordable supply of conventional energy

Objectives	Outcome Measures	Activities, programs, strategies	Governance/ Responsibilities	Time frame	Budget
1. Improve Conventional Power Generation supply side efficiency	1. Petroleum consumption reduction	1. Scheduled and continuous tree trimming program (bucket trucks, etc.)	PUC	On-going	US $100,000
		2. Fuse coordination program	PUC	On-going	
		3. Perform scheduled preventive maintenance	PUC	On-going	
		4. Adhere to manufacturer's recommended scheduled engine overhauls	PUC	On-going	
	2.Reliability and operation efficiency practices	1.Secure funding for quick acquisition of replacement parts	FSM R&D	0.00-10.00	$1.0 M
		2. Establish reliable supplier agreements with vendors	PUC		
		3. Create reliable procurement procedures	PUC		
2. Training for PUC on production and distribution to enhance understanding of losses, solutions/practices to minimize production and transmission losses	1. Knowledge Enhancement and Efficiency operation	1. Request financing to contract trainer	1. FSM R&D	0.00-1.0	$25,000
		2. Terms of Reference	FSM R&D		
		3. Training for PUC generation and distribution personnel	PUC		
3. Conduct a study to formulate and recommend conventional power generation needs to match demand side requirements	Report recommendations availability for reference	1. Request financing for the study on conventional l power generation to requirement to adequately address demand side needs	FSM R&D	0.00-3.0	$15,000
		2. Terms of Reference	FSM R&D		
		3. Consultation	PUC		
		4. Implementation of report recommendation priorities	PUC		$1.00 M
4.Replace all street lights with more efficient or solar street lights to reduce consumption of petroleum fuel	Replacement of conventional street lights with solar or LED street lights	1. Seek and secure financing for purchase of solar/LED street lights	FSM R&D	0.00-4.0	$15,000
		2. Plans and RFP	FSM R&D		$3.60 M
		3.Implementation of conventional streets replacement with solar or LED street lights 3a. Phase I: Kolonia Pilot Project, 200 pcs 3b. Phase II: All other municipalities, 1,000 pcs	PUC		$600,000 $3.00 M
		4. Monitoring	State Energy Office		$10,000

5. Perform a technical investigation for viability to modify existing Caterpillar Generators to utilize blend of 5% waste oil and 95% diesel oil by June 2011 to reduce petroleum consumption and decrease trade deficit.	Waste oil and diesel blend report recommendations availability for reference	1. Seek and secure financing for technical study for waste oil-diesel blend to fuel Caterpillar generator engines Pilot Project	FSM R&D	0.00-1.0	$15,000
		2. Report recommendations review	PUC		
		3. Secure Financing for Generators modifications	FSM R&D		$150,000
		4. Implementation of appropriate waste oil-diesel blend Pilot Project	PUC		
		5. Monitoring and data collection	PUC		
6.Perform a comprehensive technical study for sustainable utilization of bio-fuel blend of diesel and coconut-oil for power generation to reduce petroleum consumption and decrease cost	Technical study report recommendations availability for reference	1. Seek and secure financing for technical study of bio-fuel (blend of diesel and coconut-oil) for its reliability and sustainability	FSM R&D	0.00-2.0	$25,000
		2. Report recommendations review	PUC		
		3. Funding source identification for Implementation (Pilot Project 50 KW run on diesel 80% and coconut-oil 20%)	FSM R&D		$150,000
		4. Implementation	PUC		
		5. Monitoring	PUC		
7.Perform a comprehensive technical study for a sequential replacement of the existing diesel generators that are efficient, reliable, and low speed by end of 2018 to reduce petroleum and reduce cost 7a. Purchase of new efficient, reliable and low speed engines and generators; decommission and install new units by 2018 to reduce petroleum consumption and minimize cost	1. Report recommendations availability for reference	1. Seek and secure financing for comprehensive technical study for replacement of conventional diesel generators with efficient, slow speed units	FSM R&D	0.00-10.0	$250,000
		2. Report recommendations review	PUC		
		3. Designs and Specifications	PUC		
	1. Construction and Installation	1.Implementation	FSM R&D		$50.0 M
		2. RFP	PUC		
		3. Construction, Installation, and Commissioning	PUC		

ENERGY CONSERVATION AND ENERGY EFFICIENCY

Goal: Establish collective and collaborative initiatives in optimizing energy conservation in all sectors of the economy and society through realistic and attainable objective

Objectives	Outcome Measures	Activities, programs, strategies	Governance/ Responsibilities	Time frame	Budget
1. Formulate, recommend, and implement Public Awareness and Education on Energy Conservation and Energy Efficiency Measures, etc. by 2011 to minimize petroleum imports	Availability of report recommendations and Public Education materials for reference	1. Seek and secure funding for technical assistance for Public Education on Energy Conservation and Energy Efficiency	State Energy Office	0.00-3.0	$15,000
		2 Report recommendation review	State Energy Office		
		3. Implementation (Public Awareness on Energy Conservation and Energy Efficiency	State Energy Office		$100,000
		4 Monitoring for the effectiveness of the Public Education Program	State Energy Office		
2. Formulate and recommend legislation banning importation of less energy efficient lights, appliances, air conditioners, and conventional water heating equipment, etc. by 2010	1. Legislation recommendation	1. Seek and secure funding for technical assistance in formulating legislation	State Energy Office	0.00-2.0	$15,000
		2. Technical assistance on draft legislation review	State Energy Office		
		3. Draft legislation review	Legislature		
	2. Legislation	1. Legislation introduction	Legislature		
		2. Public Hearings (Public Education)	Legislature		$25,000
		3. Bill adoption and approval	Legislature		
		4. Implementation	Legislature		
		5. Monitoring for program effectiveness	State Energy Office		$50,000
3.Formulate and recommend Directives or Regulations on energy conservation and energy efficiency on the new infrastructure design and construction of schools, Public Health Services, etc. by end of 2010	Formulation of Directives or Regulations	1. Seek and secure funding for expert technical assistance	FSM R&D	0.00-2.0	$15,000
		2. Technical Assistance in formulation of Regulation or Directive	State Energy Office		
		3. Regulation review	State Energy Office		
		4. Implementation of Energy Conservation and Energy Efficiency Regulation	State Energy Office		$50,000
		5. Monitoring of program effectiveness	State Energy Office		
4.Study and formulate a replacement program for electrical water heating with solar water heating by 2013	Report recommendations availability for reference	1. Seek and secure funding for technical assistance for replacement of conventional water heaters	FSM R&D	0.00-5.0	$15,000
		2. Technical Assistance for development of replacement plan	FSM R&D		
		3. Report recommendations and plan review	State Energy Office		
		4. Implementation (Pilot Project of Solar Water Heaters)	State Energy Office		$50,000

5.Conduct an in depth technical study to recommend viable, efficient, reliable, and sustainable utilization of a bio-fuel blend of diesel and coconut-oil for sea transportation by end of 2015 to reduce petroleum imports and cost	Report recommendations availability for reference	1. Seek and secure financing for technical study to determine the sustainability of a diesel and coconut-oil blend for conventional power generation	FSM R&D	0.00-5.00	$25,000
		2. Submission of report and recommendations review	State Energy Office		
		3. Implementation (Pilot Project)	PUC		$150,000
		4.Monitoring and data collection	PUC		
6.Conduct an in depth study to formulate and implement a mechanism of set standards for public transport to minimize petroleum consumption, minimize traffic congestion and pollution;	1. Development of a Mass Transit System Plan	1. Seek and secure funding for study of a viable mass transit system	FSM R&D	0.00-5.0	$25,000
		2. Technical Assistance and development of an appropriate public transportation system plan	FSM R&D		
		3. Report recommendations and plans review	State Energy Office		
		4. Implementation (Purchase Pilot Project Mass Transit Buses, etc.)	State Energy Office		$500,000
		5. Monitoring of the program			
6a. To create and enact legislation to provide mandatory incentives/awards or rebates for usage of mass transit and carpooling by 2013.	1a. Legislation for public transportation incentives	1. Introduction of legislation	Legislature		
		2.Hearings and Public Awareness	Legislature		$25,000
		3. Approval	Legislature		
7.Conduct study to formulate and recommend Energy Efficiency Code Regulation by 2010 to minimize petroleum consumption and increase energy use	1.Report submission	1. Seek and secure funding for Energy Efficiency Code development study	FSM R&D	0.00-5.0	$25,000
		2. Technical Assistance in formulation of Energy Efficiency Code	State Energy Office		
		3. Energy Efficiency Code review	State Energy Office		
		4.Implementation	State Energy Office		$100,000
		5. Monitoring			
7a. Formulation of Draft Energy Efficiency Code	7a.Formulation of appropriate legislation	1. Introduction of legislation	legislature		
		2.Public Hearings	legislature		
		3. Implementation of legislation	State Energy Office		
8.Perform Energy Audits on all Government Buildings and Facilities and commercial buildings by 2013	1.Submission of Audit report, recommendations for reference	1. Seek and secure funding for Energy Auditor	FSM R&D	0.00-5.0	$25,000
		2. Energy Audit review	State Energy Office		
8a. Provide recommendations on energy	1a. Implementation of Energy Audit	1. Seek and secure funding for energy saving measures implementation and program	FSM R&D		$150,000

saving measure(s)	recommendations	commencement			
		2.Technical assistance on implementation	FSM R&D		
		3. Public Awareness and Education	State Energy Office		
9. Conduct a study to formulate and recommend legislation for higher duties for bigger luxury vehicles and heavier trucks by 2015 9a. Provide recommendations and legislation for curtailing importation of bigger luxury and heavy vehicles	1.Report submission	1. Seek and secure funding for Technical Study for development of legislation	FSM R&D	0.00-7.0	$25,000
		1.Technical Assistance to formulate legislation and Public Education Financing	FSM R&D		$25,000
		3. Reports review	State Energy Office		
		4. Implementation of report recommendation(s)	State Energy Office		
	1a.Formulation of legislation	1. Introduction of legislation	Legislature		
		2.Public Hearings	Legislature		
		3. Public Awareness and Education	State Energy Office		
		4.Monitoring	State Energy Office		
10. Conduct a study to formulate and recommend legislation for price control for consumers at the pump stations to maximize energy use 10a. Formulate legislation for Price Control in order to curtail the high price gaps between Wholesale and Retail petroleum prices by 2011; improve living standards, and health and education	1.Study Result submission	1. Seek and secure funding for Technical Study for formulation of legislation	FSM R&D	0.00-5.0	$15,000
		1.Technical Assistance in development of legislation and implementation plan	State Energy Office		$25,000
		3. Report recommendation review	State Energy Office		
	1a.Legislation formulation	1. Legislation introduction	Legislature		
		2.Public Hearings	Legislature		
		3. Implementation of legislation	Legislature		
		4. Monitoring prices	State Energy Office		
11. Conduct a study to formulate and recommend legislation for Energy Efficient Building Codes by 2013 11a. Provide recommendations and formulate legislation of Energy Efficient Building standards to instill healthier living; to provide education while reducing energy waste and improve energy efficiency	1. Submit report and recommendations	1. Seek and secure funding for Technical Study for development of Energy Efficiency Building Code	FSM R&D	0.00-5.0	$25,000
		2.Technical Assistance in formulation of Energy Efficient Building Code and financing implementation	State Energy Office		$20,000
		3. Report and Building Code review	State Energy Office		
	1a.Legislation formulation	1. Legislation introduction	Energy Office		
		2.Technical assistance on legislation interpretation			
		3. Public Hearing, Public Awareness and Education			
		4.Implementation			
		5.Monitoring and data collection			

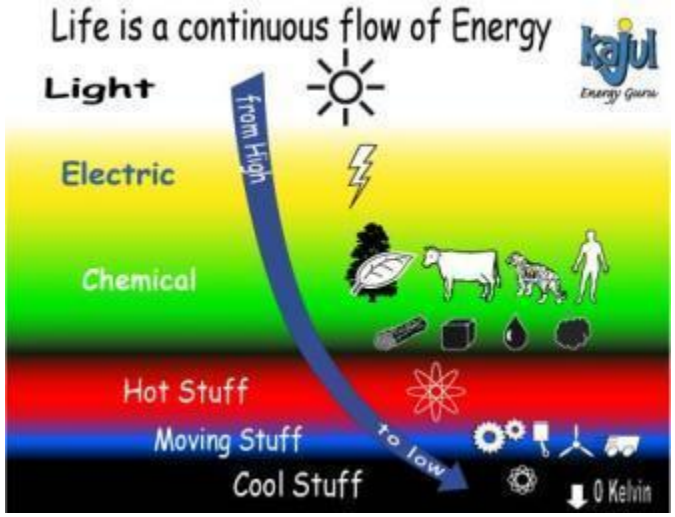
GOAL: An increased share of appropriate renewable energy technology sources in Pohnpei State's energy supply

Objectives	Outcome Measures	Activities, programs, strategies	Governance/ Responsibilities	Time frame	Budget
1. In depth reassessment for the expansion of the Nanpil River Hydropower Plant in order to increase the power generating capacity by diverting the Kiepw and Nankawad Rivers into the existing Nanpil River Dam for continuous operation by 2013 1a. Perform rehabilitation measures to refurbish existing hydro power turbines to put back on line by 2010	1.Technical study report submission	1. Seek and secure funding for Technical Study for in depth reassessment of the Nanpil Hydropower expansion	FSM R&D	0.00-5.0	$350,000
		1.Technical Assistance (Technical, Environmental, Social Studies, and, Financial Analysis, Design Plans) Financing for implementation			$13.80 M
		3. Study Report recommendations and plan review	PUC		
		4. Implementation 1. Phase I: Access road and bridges 2. Phase II: Construction	PUC		$13.8 M $5.7 M $8.1 M
	2. Installation	1. Seek and secure funding for technical assistance, rehabilitation & installation	FSM R&D		$100,000
		2.Technical assistance on acquisition of needed equipment to complete installation	FSM R&D		
		3.Installation and commissioning	PUC		
		4. Test run and operation	PUC		
2.In depth reassessment of feasibility of hydro power potential development of all Mini and Micro Hydropower Plant schemes including Lehnmesi and Senpehn Rivers for power generation by 2013 2a. Complete design of viable hydropower plant schemes to lead to implementation, construction, and commissioning by 2020. Public/Private Partnership or Private build, operate, and transfer, etc	1.In Depth Reassessment Study Report Submission	1. Seek and secure funding for Technical Assessment Study of the perennial streams in Pohnpei	FSM R&D	0.00-5.0	$300,000
		1.Technical Assistance (Technical, Environmental, Social Studies, and, Financial Analysis, Design Plans) (Lehnmesi, Lupwor, Kirietleng, Lehdau, Senpehn, Enpein Powe, Mand, Sekere, etc)	State Energy Office		
		3. Study Report recommendations review prioritizing implementation plan	State Energy office		
	2. Implementation	1. Seek and secure funding for technical assistance for implementation	FSM R&D	0.00-5.0	$100 M
		2.Technical assistance on RFP	FSM R&D		
		3. Implementation and construction of determined viable hydroelectric power sites	PUC		
		4. Commissioning	PUC		
3. Complete rehabilitation to increase the capacity, reliability, and efficiency of the existing Stand Alone Solar	Availability of Study Report with Recommendations	1. Seek and secure funding for Technical Study for rehabilitation and upgrade of the existing PV SHS	FSM R&D	0.00-5.0	$1.50 M
		1.Technical Assistance (Technical, Environmental, Social, Financial Analysis, and Design Plans)	State Energy Office		

Systems (SHS) to provide sufficient energy for lighting, entertainment, refrigeration, fans, etc.		3. Study Report recommendations review prioritizing implementation	State Energy Office		
		4. Implementation of rehabilitation and upgrade of existing SHS	State Energy Office		
4.Provide efficient, reliable, and affordable energy utilizing alternative energy sources to improve standards of living, health and education, while alleviating poverty without adverse ramifications to the environment and climate by 2018 to 100% of households	1.Study Report Recommendations Availability for Reference	1. Seek and secure funding for Technical Study to provide appropriate alternate energy sources to all households	FSM R&D	0.00-10.0	$50,000
		1.Technical Assistance (Technical, Environmental, Social, Financial Analysis, and, Design Plans)	FSM R&D		
		3. Study Report recommendations and prioritize for implementation	State Energy Office		
	2. Implementations	1. Technical assistance on implementation	FSM R&D		$3.00 M
		2. Technical assistance on RFP	FSM R&D		
		3. Implementation, Construction, and Commissioning	State Energy Office		
5.Perform a study to determine the viability of renewable energy technologies as an energy source for big users of diesel based power such as COM Compound, FSM Capitol Complex, Pohnpei State Hospital, etc. to meet the basic electrical requirements by 2018	1.Study Report Recommendations Availability for Reference	1. Seek and secure funding for Technical Study of big users of fuel oil based energy to integrate renewable energy sources for basic energy needs	FSM R&D	0.00-10.0	$50,000
		2.Technical Assistance (Technical, Environmental, Social Studies, and, Financial Analysis, Design Plans)	FSM R&D		
		3. Study Report recommendation and review for prioritization and implementation	State Energy Office		
	2. Implementation	1. Seek and secure funding for projects implementation schemes	FSM R&D		$5.00 M
		2. Technical Assistance on RFP	FSM R&D		
		3. Implementation, Construction, and Commissioning	State Energy Office		
6. Conduct study, develop and implement viable integrated grid systems with renewable energy technologies to reduce dependency on imported petroleum products by 15% by 2013. 6a. Develop designs and plans to implement and commission grid connected renewable energy technology sources to reduce petroleum consumption by 2018	1.Study Report Availability for Consultation	1. Seek and secure funding for Technical Study of appropriate integration of alternative energy sources into the state grid	FSM R&D	0.00-5.0	$50,000
		2. Technical Assistance (Technical, Environmental, Social Studies, Financial Analysis, and Design Plans)	FSM R&D		
		3. Study Report recommendations review and prioritization for implementation	State Energy Office		
	2. Implementation	1. Seek and secure funding for project designs implementations	FSM R&D	0.00-10.0	$5.00 M
		2. Technical Assistance on RFP	FSM R&D		
		3 Implementation, Construction, and Commissioning	State Energy Office		

7. Conduct a study to determine the potential of all appropriate RE technologies as an energy source by 2013 such as wind, biomass, solid waste utilization, methane digesters, etc. 7a. Develop designs and plans for implementation by 2018 to decrease petroleum consumption	1.Study Report Submission	1. Seek and secure funding for Technical Study on all appropriate alternative energy technology sources for Pohnpei	FSM R&D	0.00-5.0	$100,000
		2.Technical Assistance (Technical, Environmental, Social, Financial Analysis, and Design Plans)	FSM R&D		
		3. Study Report recommendations for prioritizing and implementation	State Energy Office		
	2.Implentation of Appropriate Technology Design Plans	1. Seek and secure funding for project implementation	FSM R&D	0.00-10.0	$50.00 M
		2. Technical Assistance and RFP	FSM R&D		
		3. Implementation, and Commissioning	State Energy Office		
8.Conduct study and develop plans to remove, replant and rehabilitate senile coconut plants with improved coconut plant hybrids by 2013	1.Study Report Recommendations Submission	1. Seek and secure funding for Technical Study on the rehabilitation and replanting of hybrid coconut trees	FSM R&D	0.00-5.0	$25,000
		2.Technical Assistance (Technical, Environmental, Social impacts, Financial Analysis, and Rehabilitation and replanting schemes)	FSM R&D		
		3. Study Report recommendations Review and prioritization of program implementation	Pohnpei Agriculture		
		4. Financing Implementation	FSM R&D	00.0-5.0	$5.00 M
	2. Rehabilitation Plans	5. Program Implementation	Pohnpei Agriculture		
		6 Financing for Monitoring	FSM R&D		$25,000
		7. Monitoring	State Energy Office		
9. Assess & develop a uniform method of data collection, monitoring, and implementation of renewable energy technologies such as wind, biomass, solid waste utilization, coconut oil, gasifiers, etc by 2013.	Study Report Submission	1. Seek and secure funding for Technical Study to set up a standard method of data collection and monitoring	FSM R&D	0.00-5.0	$25,000
		1.Technical Assistance in providing training and methodologies of data collection and monitoring	FSM R&D		
		3. Training on use of data collection equipment	FSM R&D		$50,000
		4. Implementation of data collection methodologies	State Energy Office		

KOSRAE STATE ACTION PLANS



Reference	ACTIVITIES/PROGRAMS – PRIORITY LIST	Time frame	Priority
3.1	Expand the use of solar energy by doubling the capacity of the grid connected PV system.	2011 - 2012	**1**
2.0	Conduct Energy Awareness Programs	2010 - 2014	**1**
3.4	Conduct a feasibility study for ocean technology/wave energy with the foreign partner. Establish a funding and repayment agreement with the foreign entity for the project. (PPA)	2010	**1**
4.1	Capacity Building in Solar Power production, maintenance and operations.	2010 - 2014	**1**
1.5	Replace one inoperative Back Up unit with new Generator of higher Efficiency.	2010 - 2011	**1**
1.7	Complete monitoring of operation, Preventive Maintenance and Collection of data	2011- 2012	**1**
2.2	Utilization of Pre Paid KWH meters for 90% of all KUA customers.	2011	**1**
2.4	Installation of KW Demand meter to large consumers of power.	2011-2013	**1**
3.2	Securing the necessary State requirements for wave power. (KIRMA, Legal, Municipalities, etc.)	2011	**1**
3.3	Construction of the Power Plant Facility. Retrofit current Distribution System in order to work with new facility. Trial Run, Commissioning and start Up of Operation.	2011 - 2012	**2**
2.3	Information programs on higher rated insulation materials for both commercial and residential use	2011	**2**
2.6	Utilization of compact Fluorescent lamps for residential and commercial establishments	2011	**2**
2.8	Feasibility Study for using waste heat recovery system to provide chilled water-cooling for government offices.	2012	**2**
3.12	Conduct wind mapping and wind assessment studies	2011	**2**
4.2	Training Program for Solar PV system, operation, maintenance	2010	**2**
4.3	Training on Conventional Energy Systems and Efficiency.	2011	**2**
4.4	Training on monitoring and developing Renewable Energy sources.	2011	**2**
3.4	To build an operational Sea Wave Power Plant with a capacity of 4 MW	2014	**2**
3.8	Study for Waste to Energy technologies	2011	**3**
2.1	Incentives to residential and Business establishments operating with appliances of high EER.	2011 -2012	**3**
2.5	Utilization of LPG for food preparation and cooking for domestic and Business establishments.	2011-2013	**3**
2.7	Create legislation for Building Codes on Energy Efficiency and Appliances.	2011	**3**
4.5	Training on Building Codes, Construction Methods and HVAC.	2011	**3**
4.6	Training on Alternative source of energy for domestic and commercial establishment (LPG, etc.)	2012	**3**
3.10	Conduct feasibility study on building a hydro plant in Kosrae.	2011	**3**
3.11	Construction of hydro plant facility – based on findings and recommendations of study.	2013	**3**
3.13	Install wind turbines with a total capacity of 200 – 500 kW (based on findings)	2014	3
1.1	Legislation of policies on the operation, maintenance, safety and financial aspects of Public Transportation	2012	4
1.2	Maintenance and upkeep of major roads & Designation of Agencies to manage Public Transportation.	2011	4
1.3	Designation of Agencies to manage Public Transportation.	2011	4
1.4	Parking management for Public Transportation vehicles	2011	4

PLAN OF ACTION STATE OF KOSREA – 5 YEAR

Priority	Objectives	Outcome Measures	Activities, programs, strategies	Governance/ Responsibilities	Time frame
LOW	***1. Conventional Energy*** **A. TRANSPORTATION** Develop and implement a comprehensive Fuel Sourcing, Distribution, and Utilization Program. Develop and Implement policy on Public Transportation.		1.1 Implement legislative policies on the operation, maintenance, safety and financial aspects of Public Transportation (Public Bus, Taxicab and carpools, School bus, etc.) 1.2 Maintenance and upkeep of major roads. 1.3 Designation of Agencies to manage Public Transportation. 1.4 Parking management for Public Transportation vehicles.	KSG KSG KSG	2012 2010 2011 2011
HIGH	**B. NEW GENERATOR** Increase Power Plant Efficiency by installing new main engine with higher efficiency rating.	Increase plant efficiency to 16 kWh/Gal. Existing Gen Set @ 100% Operation	1.5 Replace one inoperative Back Up unit with new Generator of higher Efficiency. Work with supplier for the most suitable unit for Kosrae. 1.6 Secure Funding for the project. 1.7 Complete monitoring of operation, Preventive Maintenance and Collection of data and recording.	KUA/ Kosrae State KSG/KUA KUA/ Kosrae State	2010 - 2011 2011-2012
MEDIUM	***2. Energy Efficiency & Conservation*** **A. ENERGY EFFICIENCY (DSM)**	General Awareness for the citizen of Kosrae to reduce energy usage by 3%.	2.1 Incentives to residential and Business establishments operating with appliances of high EER.	KUA/KSG/ENERGY WORKGROUP KUA KSG/KUA	2011 - 2012

HIGH (2)	Implement a comprehensive Energy efficiency Program for Kosrae.		2.2 Utilization of Pre Paid KWH meters for 90% of all KUA customers. 2.3 Devise information programs on the use of quality insulation materials for both commercial and residential construction. 2.4 Installation of KW Demand meter to large consumers of power. 2.5 Utilization of LPG for food preparation and cooking for domestic and Business establishments. 2.6 Utilization of compact Fluorescent lamps for residential and commercial establishments 2.7 Formulate Building Codes on Energy Efficiency and Appliances. 2.8 Feasibility Study for using waste heat recovery system to provide chilled water-cooling for government offices.	KUA KUA KUA KSG KUA/KSG	2011 2011-2013 2011 – 2012 2011 2011
HIGH	***3. Renewable Energy*** **A. SOLAR PV SYSTEMS** Reduction of fuel usage in production of power thru increased usage of Solar PV system.	Gradual increase in usage of Solar PV system @ 5,000 kWh annually.	Expand the use of solar energy by doubling the capacity of the grid connected PV system. 3.1 From 5,000 kWh/Year to 10,000 KWH/year in one (1) year. Request funding from donors (EU, France, US DOI, USDA, Japan, China, Energy Security, etc.) 3.2 Conduct Energy Awareness Programs to Business Establishments, Government Agencies, Residential, Schools, and Municipalities. 3.3 Capacity Building in Solar Power production, maintenance and operations. Monitor, collect and record data on the existing Solar PV Grid connected system.	KUA/KSG/FSM GOV KSG KSG/KUA KUA	2010 - 2014 2011 - 2012 2010 - 2014 2010 - 2014

HIGH	**B. OCEAN (TECHNOLOGY) ENERGY** To build an operational Sea Wave Power Plant with a capacity of 4 MW. First phase pilot plant of 200 kW capacity.	75% of Kosrae Power needs to be supplied from Sea Wave Power Plant at initial stage of operation. (1-2 years) 85% of Kosrae Power needs to be supplied from Sea Wave Power Plant, years 3 to 5.	3.4 Conduct a feasibility study with the foreign partner in the project. Establish a funding and repayment agreement with the foreign entity for the project. (PPA) 3.5 Securing the necessary State requirements. (KIRMA, Legal, Municipalities, etc.) 3.6 Construct phase one and monitor performance. 3.7 After feasibility of phase 1 move to phase 2 The construction of the 4 MW Power Plant Facility. Retrofit current Distribution System in order to work with new facility. Trial Run, Commissioning and start Up of Operation. Operation of sea wave power plant to supply 85% of power demand in Kosrae.	KUA/ Kosrae State/ Foreign Entity/ Energy Workgroup KSG/KUA KUA/ Kosrae State/ Foreign Entity/ Energy Workgroup	2010 2011 2011 2014
MEDIUM	**C. WASTE TO ENERGY / biomass** Do a solid waste characterization study and collect sewage and biomass data Prepare a feasibility study for technology selection.	Reduction of solid waste and production of energy	3.8 Gather enough data to start a more in-depth study feasibility study 3.9 look for funding and construct facility	KUA/ Kosrae State/ Foreign Entity/	2010 2011
MEDIUM	**D. HYDRO** Develop the possibility of building a Hydro Power Plant of 250 kW capacity	Reduction of 1.1 MWh or 15% of total load supplied by Diesel Generating sets.	3.10 Conduct feasibility study on building a hydro plant Secure funding and technical assistance from donors (EU, US DOE, Japan, China, ADB, World Bank, etc.) Secure necessary State and environmental clearances. 3.11 Construction of physical facility. Start up and commissioning.	KUA KSG KSG/KIRMA KSG KUA	2011 2012 2012 2013 2013
	4. WIND Develop the possibility of building a wind park Power Plant. 200 - 500 kW capacity		3.12 Conduct various wind studies Secure funding and technical assistance from donors (EU, US DOE, Japan, China, ADB, World Bank, etc.) Secure necessary State and environmental clearances. 3.13 Construction of physical facility. Start up and commissioning.	KUA KSG KSG/KIRMA KSG KUA	2011 2012 2012 2014 2014

HIGH (2)	***4. Capacity Building*** **A. TRAINING & CAPACITY BUILDING** Enhancement of Existing Capacity Building	Sustain the existing operating system on Energy and Efficiency.	4.1 Training Program for Solar PV system, operation, maintenance 4.2 Training on Conventional Energy Systems and Efficiency. 4.3 Training on Building Codes, Construction Methods and HVAC. 4.4 Training on monitoring and developing Renewable Energy sources. 4.5 Training on Alternative source of energy for domestic and commercial establishment (LPG, etc.)	KUA KUA/KSG KSG KUA/KSG KSG/KUA	2010 2011 2011 2010 2011