

Energy Sector Development in the Federated States of Micronesia

Environmental Management Plan for Upgrades and Expansions to Existing Power Stations and Networks

**Energy Division
National Department of Resources and Development
Government of the Federated States of Micronesia**

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1 Introduction

One of the Components of the Energy Sector Development Project (ESDP) is to improve the efficiency and reliability of electricity supply in the four State Utility Companies across the Federated States of Micronesia (FSM). This component will support fuel savings through improved fuel efficiency of power generation and increasing penetration of renewable energy sources, loss reduction, reliability increases, and performance improvement activities and maintenance plans for the four utilities, including key investments in equipment needed to increase revenues and reduce energy losses. The investments are short term priorities identified in the State Action Plans under the National Energy Policy 2010 (adopted in 2012).

This EMP covers the proposed upgrades and extensions to the power stations and networks funded by the ESDP in each of the four states; Pohnpei, Yap, Chuck and Kosrae. The EMP meets the requirements of the World Bank Safeguard Policy 4.01 Environmental Assessment for Category B projects. The EMP may also be used as supporting information in the preparation of documentation as per the Environmental Impact Assessment Regulations of the FSM Environmental Protection Act.

These projects have very small footprints, mostly within the boundaries of existing power stations, and the severity of environmental and social impacts is low. Standard mitigation and management plans, and standard approaches to consultation, EMP monitoring, supervision, reporting and review are included in the main document. Project specific mitigation and monitoring plans are provided in the Annexes as follows:

- Annex 1 Pohnpei and Kosrae projects
- Annex 2 Yap projects
- Annex 3 Chuuk projects

State power utilities should refer to the standard mitigation and monitoring plans and their separate Annex to manage their specific work program.

An Environmental and Social Management Framework (incorporating a Resettlement Policy Framework) (ESMF) has been prepared to manage the environmental and social impacts from a second component of the ESDP – the preparation of Energy Master Plans to prioritise future investments and actions at the National and State levels. The ESMF provides guidance for capacity building within the Implementing Agency (IA) and the State Utilities for safeguards implementation and monitoring, and for long term improvements in the management of environmental and social impacts of the operation of utility assets.

1.1 Contact Details

The contact details of the person responsible for the EMP are:

Mr. Hubert Yamada

Assistant Secretary, Energy Division, National Department of Resources and Development

huberty08@yahoo.com

+691 320 5133

2 Project Description

The proposed investments are based on a recently completed assessment of the state utilities' technical performance conducted by KEMA¹ in 2010 and updated in 2013, and the priorities identified in the State Action Plans under the National Energy Policy. The ESDP will fund the following investments and provide technical assistance to the utilities for improving their technical performance and implementing maintenance plans. The key investments planned for each utility are:

2.1 Pohnpei Utilities Corporation (PUC)

Acquisition and installation of 2 new gensets of 2 MW total capacity to improve reliability and fuel efficiency.

Until recently, the situation at PUC's generation park, Nanpohnmal, Nett, was critical, with an available capacity of 4.7 MW, 1.2MW below the maximum load of 5.9 MW. The park has nine high speed diesel fuel power generators housed in four separate power plants in close proximity to one another. However, only 4 out of the 9 generating units are operational, all at de-rated capacity. Generation efficiency is very low at 12.1 kWh/gallon (August 2013).

The shortfall forced regular load shedding and caused frequent unplanned interruptions to supply. To solve the power shortfall Vital Energy Inc., a subsidiary of PetroCorp, purchased four containerized high speed 500kW diesel generators (total 2 MW) to provide power to PUC under a public-private agreement. The generators commenced operations in November 2013.

Even with this recent addition of generation capacity to the grid, PUC still requires an upgrade to their existing power plant in order to ensure that there is reserve available to cover maintenance, and to improve overall fuel efficiency.

PUC has opted for the acquisition and installation of new gensets rather than repairing old generators. Repairing old generators would not provide a long-term solution given the difficulties in procuring spare parts for generators with more than 20 years of use.

The works will involve the removal and disposal of 2 gensets, and lead to an increase in the total installed capacity of 2MW at the power plant.

2.2 Yap State Public Services Corporation (YSPSC)

(i) Acquisition and installation of capacitor banks and temperature compensated digital fuel meters.

(ii) Prepaid meters.

(iii) A major overhaul of two White Superior gensets and acquisition and installation of new radiators.

¹ KEMA: electrical equipment testing company Keuring van Elektrotechnische Materialen.

On Yap's main islands, Falalop, Ulithi and Woleai, and Mogmog, most of the electricity is produced from diesel. Ulithi also has 19.3kWp of solar power.

YSPSC has currently two Deutz generating units, each with a nameplate capacity of 3.2 MW, available for power production and two White Superior generating units, each with a nameplate capacity of 750 kW, but currently both of these units are de-rated to 450 kW. This way no optimal fuel efficiency can be reached when serving the load which varies from a minimum of 1.45 MW up to a maximum of 2.1 MW. YSPSC received a loan from the ADB for purchasing a new generating unit with a nameplate capacity of 1.5 MW.

The 2 White Superior engines will operate more efficiently after being overhauled and after new radiators have been installed. These engines could then be uprated again closer to their capacity of 750 kW to provide more generating capacity. The upgrades will allow the entire generation system to be operated more efficiently in response to the demand loads.

YSPSC has noticed that inaccuracies up to 10% exist with their existing fuel meters. In order to have accurate data for determining the different units' fuel efficiency there is the need for replacing the old fuel meters with new, accurate meters.

The power station's power factor is currently .89 to .90, but can be increased to .95 by installing capacitor banks near the power station where the feeders go out to their service areas. Their operation will be automated. This will increase the output of electricity and contribute to the efficiency of the grid.

YSPSC is suffering from an increasing bad debt. At the end of fiscal year 2012 42% of net receivables were over 30 days delinquent compared to 27% for fiscal year 2011. Prepaid meters have been identified as a solution to this. In other FSM islands prepaid metering has proven to be successful in reducing bad debt, although after introduction of prepaid meters the consumption of electricity tends to decrease. The target is to provide 95% of the 1800 customers with prepaid meters, while the remaining small number of large customers will keep (three-phase) electromechanical meters.

2.3 Chuuk Public Utility Corporation (CPUC)

(i) Acquisition and installation of 200kW of grid connected photovoltaic generation

(ii) Upgrade to more efficient street public lighting system by replacing light bulbs.

The Chuuk grid only services the main island of Weno. After years of unreliable service and power outages Weno now has a largely uninterrupted electricity supply due to investments in generation and changes to management. All of the electricity is currently produced from diesel. There are four power generators located in a single power plant in Nepukos, Weno. CPUC provides electricity to around 1,540 customers, representing an estimated 26 percent of the total population, and 85 percent of Weno Island.

The installation of solar photovoltaic generation is to reduce CPUC's diesel oil expenditures and advance the State Energy Action Plan target to install 450kW of solar power generation units by 2015. The solar systems will be installed in the site of CPUC's power plant and on buildings owned by the State

2.4 Kosrae Utility Authority (KUA)

(i) Acquisition and installation of a new genset of 1.2MW to improve fuel efficiency and reliability.

(ii) Fuel injection services in all gensets, energy audits and improvements to reduce consumption of power station internal services.

Most of the power in Kosrae is provided by six diesel generators located in a single power plant centrally located near the Government Office Complex in Tofol. The total diesel installed capacity is 5,400kW, and the grand total capacity including grid-connected solar PV systems is about 5,452kW. KUA provides electricity to 1,900 customers representing about 98 percent of the population (a very small village remains unconnected).

With the new genset, the overall fuel efficiency can go up to from 14.85 kWh/gallon to 15.8 kWh/gallon). The new generator allows KUA to operate with reserve generation, where the peak load can still be served even if the largest generator is out of service. The new genset may replace an old, inoperative unit.

Fuel injection system optimisation will increase fuel efficiency.

3 Potential Significant Environmental and Social Impacts

The following is a summary of the significant environmental and social impacts that may arise.

Table 1 Summary of Potential Significant Environmental and Social Impacts from Power Station and Network Upgrades or Extensions

Phase	Activity	Potential impact
Construction	Storage, handling, use and disposal of hazardous materials such as waste oil, waste diesel and light bulbs	Soil and water contamination Health and safety risks
	Inappropriate disposal of old generating equipment, radiators and other equipment	Soil and water contamination from solid waste, oils and potential for PCB contamination.
	Location of sites for solar panel arrays	Impacts on private assets and land, such as tree trimming.
	Installation of prepaid meters	Social unrest relating to a change in access to, and payment for, power.
Operation and maintenance	Storage, handling, use and disposal of hazardous materials such as waste oils, batteries.	Soil and water contamination
	Air discharges	Deterioration of local ambient air quality
	Noise	Deterioration of local ambient noise Impact on worker health and safety

4 Reporting

The type of reports, frequency and responsibilities for reporting are summarized in the reporting program below.

Table 2 Reporting Program

Type of report, and purpose	Frequency and timing of reporting	Who is responsible for preparing the report?	Who is responsible for receiving the report?	What are the actions / outcomes from reporting?
Construction Environmental Management Report Details of implementation of the EMP.	Once prior to construction starting, then monthly until the end of construction.	Contractor	Implementing Agency (IA) and State Utility	Improvements to mitigation measures if necessary.
Incident report Serious accidents, serious spills, public complaint.	Construction phase: Within 1 week of the incident occurring	Contractor	IA and State Utility	Contractor to remedy incident. PIA to notify authorities if relevant.
Environmental Performance Monitoring Report A record of all activities and outcomes from the implementation of all EMP including incidents, monitoring data, photos, contractor's monitoring records and records of IA site visits.	Six monthly, for the duration of the project.	IA	World Bank as part of project reporting.	Improvements to environmental mitigation and management if necessary.

5 Consultation and Disclosure

Public and stakeholder consultation and disclosure of the EMP was undertaken in each state, led by the IA and state utilities.

Key stakeholders were invited to each meeting. The meetings provided opportunity for questions to be asked and answered.

The draft EMP was disclosed in hard copy at State Utility offices and the office of the Energy Division on March 10, 2014 in Yap, Chuuk and Kosrae and on March 12, 2014 in Pohnpei. The draft EMP was disclosed in soft copy on the Chuuk utility website. The final EMP was disclosed on the World Bank website on March 20, 2014.

Methods, attendance and results are provided in Annex 5, 6,7 and 8.

6 Institutional Responsibilities and Capacity Building

The Energy Division is ultimately responsible for implementation of the EMP as the Implementing Agency. The Energy Division has only one staff member, the Assistant Secretary, who will be the project coordinator and focal point. There are no environmental or social specialists in the state utilities and only one, YSPSC, has any form of formalized standard operating procedures that could be further developed into a format for the management of impacts from plant and network operations. Managers and supervisors will need training in order to implement the EMP and ESMF.

The project will fund a part time safeguards specialist. This specialist will assist the IA to implement and monitor the safeguards requirements of the project. Key tasks will be to: conduct training on World Bank safeguards policies and the EMP with the IA and state utilities, integrate the EMP requirements into the Project Implementation Manual; integrate EMP into TOR and contracts for all suppliers and consultants, review and comment on bid responses.

All contractors and suppliers shall have the EMP as part of their contract, and they will be required to comply with the EMP and implement the relevant parts of the mitigation and monitoring plans.

The World Bank task team, including safeguards specialists, will make twice-yearly supervision missions. There will be opportunities for capacity building, training and other support and mentoring tasks during the missions to support the IA and utilities to implement and supervise the EMP.

Table 3 Summary of Responsibilities

Action	Responsible Institution		
	Pre Construction	Construction Phase	Operational Phase
Implementing EMP	State Utility, IA	Contractor / Supplier, State Utility, IA	State Utility
Obtaining State permits for air discharges, hazardous waste and lodging initial environmental assessment forms	IA		
Consultation	State Utility and IA		
Supervision of EMP	IA	IA	IA
Monitoring Data Collection and Analysis	IA	Contractor	State Utility
Reporting	IA, State Utility and Contractor As per Section 4		
Oversight of EMP implementation	World Bank		

7 Budget

The following is an approximate budget for implementing the EMP, based on the tables in Annexes 1, 2 and 3. These items are over and above those considered to be covered by normal operations.

Table 4 Approximate EMP Budget

Item	Cost estimate \$US
Consultation during project preparation	\$1,000
Workshops with IA and State Utility for EMP implementation and monitoring	\$6,000
Baseline monitoring of ambient noise – Pohnpei, Kosrae, Yap	\$6,000
Publicity campaign for prepaid meters, Yap	\$3,000
Total	\$16,000

Annex 1 Pohnpei PUC and Kosrae KUA Mitigation and Monitoring Plan

Pre-Construction Mitigation Plan PUC and KUA

Environmental or social impact	Pre-Construction Mitigation Actions	Costs	Responsible	Start	End
Soil and water contamination as a result of leaks and spills entering the environment.	For new and replacement gensets, include in the design and procurement: Ensure, through design of spill containment at the genset and / or within the building, that 100 percent of fuel and oil held within the generators can be contained and collected for removal within the footprint of the building. Include in tender documentation.	Moderate, included in Construction Cost	IA	Design phase	Award of construction tender.
Noise	Tender documents for equipment procurement will specify sound attenuation as part of the package.	Minor, Included in tendering costs	IA	Tender preparation	Selection of preferred supplier
General / all impacts	The EMP will be included in the Contractors / Suppliers specification and contract. Specific mitigation measures for the contractor / supplier shall be highlighted in the general conditions.	Minor, included in tendering costs	IA	Tender preparation	Award of tender.
General / all impacts	Apply for and secure permits to construct / install gensets, under the Air Pollution Control Standards and Regulations of Pohnpei State. Submit an Initial Environmental Assessment to the Secretary of Human Resources in accordance with the Environmental Impact Regulations of the FSM Environmental Protection Act.	Minor	IA	Design phase	Prior to construction starting.
Reduction in air quality due to emissions from gensets	Apply for and secure permits to construct / install gensets, under the Air Pollution Control Standards and Regulations of Pohnpei State.	Minor	IA	Design phase	Prior to construction starting.
Reduction in air quality due to emissions from gensets	Provide a specification for the gensets that are consistent with the Air Pollution Control Standards and Regulations of Pohnpei State (for PUC projects) and the IFC / World Bank Environment, health and Safety Guidelines for Air Emissions and Ambient Air Quality (for PUC and KUA projects).	Minor	IA	Design phase	Award of tender.
Health and Safety	The tender shall be prepared in accordance with the health and safety guidelines in the IFC / World Bank Environment, Health and Safety Guidelines for Occupational Health and Safety	Minor, included in tendering costs	IA	Tender preparation	Award of tender.

Environmental or social impact	Pre-Construction Mitigation Actions	Costs	Responsible	Start	End
Hazardous wastes (not including oil)	For PUC projects, comply with the Pohnpei EPA Solid Waste Regulations, by preparing or updating the existing Hazardous Waste Management Plan.	Minor	State Utility / IA	Design	Prior to operation

Construction Mitigation Plan PUC and KUA

Environmental or social impact	Construction Mitigation Actions	Costs	Responsible	Start	End
Noise	On arrival at site, and prior to installation, the contractor will confirm that the equipment meets the standard for noise emissions as stated in the tender documents.	Minor, Included in Operation Cost	Contractor / Supplier	Prior to equipment installation	Prior to equipment installation
Non-toxic solid wastes (metal, packing, etc.)	Metal, cardboard and plastic will be recycled, where local facilities exist. Waste that cannot be recycled will be transported by licensed contractor to landfills permitted by State EPA.	Minor, Included in construction contract	Contractor / Supplier	In the beginning of construction	At completion of construction
Waste oil and other hazardous wastes	Waste oil will be reused / recycled using local service providers. If necessary, waste oil from Kosrae shall be transported by a licensed operator to Pohnpei for reuse / recycling. Other hazardous wastes shall be separated for reuse, recycling, treatment and / or disposal by permitted contractors.	Minor, included in construction contract.	Contractor / Supplier	In the beginning of construction	At completion of construction
Old gensets and other equipment	Old gensets and other waste equipment will have oils removed and other parts dismantled, and be removed from site and recycled. Where recycling is not possible, the remains may be stored on site until such time as the option becomes available, or disposed at landfill permitted by the State EPA. Oils shall be sampled for PCB prior to disposal. Any PCB contaminated oils shall be stored separately and removed for treatment and disposal by permitted contractors.	Minor	IA	During construction	At completion of construction
Oil spill or leaks during construction / installation	Oil sorbents will be kept on-site to contain any spills, and staff shall be trained in spill procedures.	Minor, included in construction contract	Contractor / Supplier	In the beginning of construction	At completion of construction

Environmental or social impact	Construction Mitigation Actions	Costs	Responsible	Start	End
	Any contaminated soils as a result of construction activities will be removed by licensed contractor and disposed to landfill sites approved by local authorities. Records to be kept of the amount of material, contaminants, and destination of the waste material.	Moderate (if required), included in construction contract	Contractor / Supplier	In the beginning of construction	At completion of construction
Soil and water contamination	Oil / diesel containment devices such as bunds and separators will be constructed as per the tender documents.	Moderate, included in construction contract	Contractor / Supplier	Prior to the beginning of construction	At completion of construction
Construction worker health and safety	All construction workers will have site inductions by the State Utility on health and safety. All work shall be in accordance with the World Bank / IFC Environment, Health and Safety Guidelines for Occupational Health and Safety.	Included in operational procedures	State Utility	In the beginning of construction	At completion of construction
	All workers will be provided with hard hats, hearing protection, high visibility jackets and covered boots. All work shall be in accordance with the World Bank / IFC Environment, Health and Safety Guidelines for Occupational Health and Safety.	Included in construction contract	Contractor / Supplier	In the beginning of construction	At completion of construction
Air Discharges	Apply for and obtain a permit to operate gensets in accordance with the Air Quality Regulations of Pohnpei.	Minor	IA / PUC	During construction	Prior to operation

Operation Mitigation Plan PUC and KUA

Environmental or social impact	Operation Mitigation Actions	Costs	Responsible	Start	End
Soil and water contamination from oil and diesel	Oil collectors and separators (such as bunds), and any storm water treatment devices, will be regularly checked and maintained. Equipment will be regularly checked and maintained to prevent leaks.	Minor, included in Operation Cost	State Utility	During operation	Continuous

Environmental or social impact	Operation Mitigation Actions	Costs	Responsible	Start	End												
Waste oil	All waste oil will be stored in leak proof containers under cover / inside a building, and be collected for reuse or recycling by permitted operators.	Minor, included in Operation Cost	State Utility	During operation	Continuous												
Hazardous wastes (not including oil)	<p>All hazardous wastes will be stored in leak proof containers under cover / inside a building and be transported for reuse, recycling, treatment and / or disposal at special disposal places permitted by State EPA.</p> <p>For PUC projects, comply with the Pohnpei EPA Solid Waste Regulations, by implementing the hazardous waste management plan.</p>	Minor, included in Operation Cost	State Utility	During operation	Continuous												
Complaints from the neighbors and local community	Complaints shall be recorded and followed up through a complaints process.	Minor, Included in Operation Cost	State Utility	During operation	Continuous												
Air discharges	Operate and maintain to achieve air emissions consistent with IFC / World Bank Environment, health and Safety Guidelines for Air Emissions and Ambient Air Quality (for PUC and KUA projects) and air permit (PUC).	Minor, included in operation cost	State Utility	During operation	Continuous												
Noise	<p>Noise impacts should not exceed the following Noise Level Guidelines or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.</p> <table border="1" data-bbox="450 866 1308 1241"> <thead> <tr> <th data-bbox="450 866 734 995"></th> <th colspan="2" data-bbox="734 866 1308 995">One Hour LAeq (dBA) (World Bank / IFC Environment, Health and Safety Guidelines for Noise Management)</th> </tr> <tr> <th data-bbox="450 995 734 1094">Receptor</th> <th data-bbox="734 995 1021 1094">Daytime 07:00 - 22:00</th> <th data-bbox="1021 995 1308 1094">Night time 22:00 - 07:00</th> </tr> </thead> <tbody> <tr> <td data-bbox="450 1094 734 1193">Residential; institutional; educational</td> <td data-bbox="734 1094 1021 1193">55</td> <td data-bbox="1021 1094 1308 1193">45</td> </tr> <tr> <td data-bbox="450 1193 734 1241">Industrial; commercial</td> <td data-bbox="734 1193 1021 1241">70</td> <td data-bbox="1021 1193 1308 1241">70</td> </tr> </tbody> </table> <p>National or State regulations replace these where they are more stringent</p>		One Hour LAeq (dBA) (World Bank / IFC Environment, Health and Safety Guidelines for Noise Management)		Receptor	Daytime 07:00 - 22:00	Night time 22:00 - 07:00	Residential; institutional; educational	55	45	Industrial; commercial	70	70	Refer to monitoring plan	State Utility	During Operation	Continuous
	One Hour LAeq (dBA) (World Bank / IFC Environment, Health and Safety Guidelines for Noise Management)																
Receptor	Daytime 07:00 - 22:00	Night time 22:00 - 07:00															
Residential; institutional; educational	55	45															
Industrial; commercial	70	70															

Construction Monitoring Plan PUC and KUA

Environment or social impact	Monitoring parameter	Place of monitoring	Monitoring method	Monitoring schedule	Cost	Responsible	Start	End
Solid and hazardous waste	Check service provider's permit is valid	Prior to access to site to collect waste	Visual inspection	Prior to granting access to construction site	Included in contract	Contractor / Supplier	The beginning of construction	The end of construction
Noise	One Hour LAeq (dBA)	At the location of the nearest receptor off site.	Measurements to be made by specialized company holding an appropriate licence, consistent with international standards for noise monitoring.	Three recording events to establish a baseline prior to operation.	\$4,000	State Utility / IA	The beginning of construction	The end of construction

Operation Monitoring Plan PUC and KUA

Environment impact	Monitoring parameter	Place of monitoring	Monitoring method	Monitoring schedule	Cost	Responsible	Start	End
Noise	One Hour LAeq (dBA)	At the location of the nearest receptor off site.	Measurements to be made by specialized company holding an appropriate licence, consistent with international standards for noise monitoring.	Within 2 weeks following a complaint	Minor, included in Operation Cost	State Utility	Start of operation	Continuous
Air discharges	As per permit	As per permit	As per permit	As per permit	Minor to moderate	PUC	Start of operation	Continuous
Solid and hazardous waste	Check service provider's permit is valid	Prior to access to site to collect waste	Visual inspection	At the time of pick up	Minor, included in Operation Cost	State Utility	Start of operation	Continuous

Annex 2 Yap YSPSC Mitigation and Monitoring Plan

Pre-Construction Mitigation Plan YSPSC

Environmental or social impact	YSPCS Pre-Construction Mitigation Actions	Costs	Responsible	Start	End
General / all impacts	The EMP will be included in the Contractors / Suppliers specification and contract. Specific mitigation measures for the contractor / supplier shall be highlighted in the general conditions.	Minor, included in tendering costs	IA	Tender preparation	Award of tender.
General / all impacts	Submit an Initial Environmental Assessment to the Secretary of Human Resources in accordance with the Environmental Impact Regulations of the FSM Environmental Protection Act.	Minor	IA	Design phase	Prior to construction starting.
Noise	Design overhauls with sound attenuation where practicable given constraints of existing equipment / buildings.	Minor	IA	Design phase	Selection of preferred supplier or preferred overhaul methods
Reduction in air quality due to emissions from gensets	Provide a specification for the genset upgrades that are consistent with the IFC / World Bank Environment, health and Safety Guidelines for Air Emissions and Ambient Air Quality, or as close to possible given existing equipment constraints.	Minor	IA	Design phase	Award of tender.
Health and Safety	Tenders for contractors / suppliers shall be prepared in accordance with the health and safety guidelines in the IFC / World Bank Environment, Health and Safety Guidelines for Occupational Health and Safety	Minor, included in tendering costs	IA	Tender preparation	Award of tender.

Construction Mitigation Plan YSPSC

Environmental or social impact	Construction Mitigation Actions	Costs	Responsible	Start	End
Noise	On arrival at site, and prior to installation, the contractor will confirm that the equipment meets the standard for noise emissions as per the supply agreement.	Minor	Contractor / Supplier	Prior to equipment installation	Prior to equipment installation

Environmental or social impact	Construction Mitigation Actions	Costs	Responsible	Start	End
Non-toxic solid wastes (metal, packing, etc.)	Metal, cardboard and plastic will be recycled, where local facilities exist. Waste that cannot be recycled will be transported by licensed contractor to landfills permitted by State EPA.	Minor, Included in construction contract	Contractor / Supplier	In the beginning of construction	After completion of construction
Waste oil and other hazardous wastes	Waste oil will be reused / recycled using local service providers. If necessary, waste oil from Yap shall be transported by a licensed operator to Pohnpei for reuse / recycling. Other hazardous wastes shall be separated for reuse, recycling, treatment and / or disposal by permitted providers.	Minor, included in construction contract.	Contractor / Supplier	In the beginning of construction	After completion of construction
Old waste equipment	Old radiators and other waste equipment will be stored on site / removed from site and recycled. Where recycling is not possible, refer to waste options above. Oils shall be sampled for PCB prior to disposal. Any PCB contaminated oils shall be stored separately and removed for treatment and disposal by permitted contractors.	Minor	IA	During construction	
Construction worker health and safety	All construction workers will have site inductions by YSPSC on health and safety.	Minor	YSPSC	In the beginning of construction	After completion of construction
	All workers will be provided with hard hats, hearing protection, high visibility jackets and covered boots. All work shall be in accordance with the World Bank / IFC Environment, Health and Safety Guidelines for Occupational Health and Safety.	Included in construction contract	Contractor / Supplier	In the beginning of construction	After completion of construction
Social unrest due to installation of prepaid meters	Public communication program to inform customers. YSPSC or its contractor to make contact with householders at least 48 hours' prior and agree with the householder the date and time (allowing a half-day window) within which works will be done. Confirm prior permission for entry.	Refer budget	YSPSC / Contractor / Supplier	During installation period	Completion of installation program.

Operation Mitigation Plan YSPSC

Environmental or social impact	Operation Mitigation Actions	Costs	Responsible	Start	End
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Environmental or social impact	Operation Mitigation Actions	Costs	Responsible	Start	End
Waste oil	All waste oil will be stored in leak proof containers under cover / inside a building, and be collected for reuse or recycling by permitted operators.	Minor, included in Operation Cost	YSPSC	During operation	Continuous
Hazardous wastes (not including oil)	All hazardous wastes will be stored in leak proof containers under cover / inside a building and be transported for reuse, recycling, treatment and / or disposal at special disposal places permitted by State EPA.	Minor, included in Operation Cost	YSPSC	During operation	Continuous
Complaints from the neighbors and local community	Complaints shall be recorded and followed up through a complaints process.	Minor, Included in Operation Cost	YSPSC	During operation	Continuous
Air discharges	Operate and maintain to achieve air emissions consistent with IFC / World Bank Environment, health and Safety Guidelines for Air Emissions and Ambient Air Quality.	Minor, including in operation cost	YSPSC	During operation	Continuous
Noise	Noise impacts following upgrades should not result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site. National or State regulations replace these where they are more stringent	Refer monitoring plan	YSPSC	During Operation	Continuous

Construction Monitoring Plan YSPSC

Environment or social impact	Monitoring parameter	Place of monitoring	Monitoring method	Monitoring schedule	Cost	Responsible	Start	End
Solid and hazardous waste	Check service provider's permit is valid	Prior to access to site to collect waste	Visual inspection	Prior to granting access to construction site	Included in contract	Contractor / Supplier	The beginning of construction	The end of construction
Noise	One Hour LAeq (dBA)	At the location of the nearest receptor off site.	Measurements to be made by specialized company holding an appropriate licence, consistent with international standards for noise monitoring.	Three recording events to establish a baseline for operation phase.	\$1,000	YSPSC	The beginning of construction	The end of construction

Operation Monitoring Plan YSPSC

Environment impact	Monitoring parameter	Place of monitoring	Monitoring method	Monitoring schedule	Cost	YSPSC	Start	End
Noise	One Hour LAeq (dBA)	At the location of the nearest receptor off site.	Measurements to be made by specialized company holding an appropriate licence, consistent with international standards for noise monitoring.	Within 2 weeks following a complaint	Minor, included in Operation Cost	YSPSC	Start of operation	Continuous
Solid and hazardous waste	Check service provider's permit is valid	Prior to access to site to collect waste	Visual inspection	Prior to granting access to site	Minor, included in Operation Cost	YSPSC	Start of operation	Continuous

Annex 3 Chuuk CPUC Mitigation and Monitoring Plan

Pre-Construction Mitigation Plan Chuuk

Environmental or social impact	Chuuk Pre-Construction Mitigation Actions	Costs	Responsible	Start	End
General / all impacts	The EMP will be included in the Contractors / Suppliers specification and contract. Specific mitigation measures for the contractor / supplier shall be highlighted in the general conditions.	Minor, included in tendering costs	IA	Tender preparation	Award of tender.
General / all impacts	Submit an Initial Environmental Assessment to the Secretary of Human Resources in accordance with the Environmental Impact Regulations of the FSM Environmental Protection Act.	Minor	IA	Design phase	Prior to construction starting.
Land acquisition or involuntary resettlement issues from siting of solar PV arrays.	Avoid impacts on private land and assets by locating solar PV arrays on government leased land. Review and confirm leases prior to construction. Prepare a resettlement action plan or abbreviated resettlement action plan where any private land or assets will be impacted – such as tree trimming or alteration of structures to install and operate solar PV arrays, in accordance with the project Resettlement Policy Framework. Refer to the Solar Array Code of Practice	Moderate costs if private land or assets will be impacted. Otherwise, minor costs.	IA	Design phase	Prior to construction starting
Health and Safety	The tender shall be prepared in accordance with the health and safety guidelines in the IFC / World Bank Environment, Health and Safety Guidelines for Occupational Health and Safety	Minor, included in tendering costs	IA	Tender preparation	Award of tender.

Construction Mitigation Plan Chuuk

Environmental or social impact	Construction Mitigation Actions	Costs	Responsible	Start	End
Non-toxic solid wastes (metal, packing, etc.)	Metal, cardboard and plastic will be recycled, where local facilities exist. Waste that cannot be recycled will be transported by licensed contractor to places specially allocated for landfills, approved by local authorities.	Minor, Included in construction contract	Contractor / supplier	In the beginning of construction	After completion of construction

Environmental or social impact	Construction Mitigation Actions	Costs	Responsible	Start	End
Waste light bulbs and other hazardous wastes	Hazardous wastes such as light bulbs that contain heavy metals shall be separated for reuse, recycling, treatment and / or disposal by permitted providers.	Minor, included in construction contract.	Contractor / Supplier	In the beginning of construction	After completion of construction
Construction worker health and safety	All construction workers working at the power station will have site inductions by CPUC on health and safety. All work shall be in accordance with the World Bank / IFC Environment, Health and Safety Guidelines for Occupational Health and Safety.	Included in CPUC operational procedures	CPUC	In the beginning of construction	After completion of construction
	All workers will be provided with hard hats, hearing protection, high visibility jackets and covered boots.	Included in construction contract	Contractor / Supplier	In the beginning of construction	After completion of construction

Operation Mitigation Plan Chuuk

Environmental or social impact	Operation Mitigation Actions	Costs	Responsible	Start	End
Hazardous wastes including batteries and light bulbs	All hazardous wastes will be stored in leak proof containers under cover / inside a building and be transported for reuse, recycling or disposal at landfills operated by service providers with valid permits.	Minor, included in Operation Cost	CPUC	During operation	Continuous
Complaints from the neighbors and local community	Complaints shall be recorded and followed up through a complaints process.	Minor, Included in Operation Cost	CPUC	During operation	Continuous

Construction Monitoring Plan Chuuk

Environment or social impact	Monitoring parameter	Place of monitoring	Monitoring method	Monitoring schedule	Cost	Responsible	Start	End
Solid and hazardous waste	Check service provider's permit is valid	Prior to access to site to collect waste	Visual inspection	Prior to granting access to construction site	Included in contract	Contractor / Supplier	The beginning of construction	The end of construction

Operation Monitoring Plan Chuuk

Environment impact	Monitoring parameter	Place of monitoring	Monitoring method	Monitoring schedule	Cost	Responsible	Start	End
Solid and hazardous waste	Check service provider's permit is valid	Prior to access to site to collect waste	Visual inspection	Prior to granting access to site	Minor, included in Operation Cost	CPUC	Start of operation	Continuous

Annex 4 Code of Practice for Solar PV Arrays (Stand-alone and Roof Mounted)

The purpose of this Code of Practice is to provide practical methods to avoid, minimise or mitigate environmental and social impacts from the design, installation, use, maintenance and decommissioning of PV panels in Chuuk, FSM.

Design

Hardware must be recycled or disposed of at an approved landfill. To ensure this happens, provide funding and resources for decommissioning. Use the contract conditions with the manufacturer and / or supplier to ensure this will happen at the end of the useful lifetime of the panels, or seek additional funding at the time of decommissioning.

Ensure that the solar panels are resistant to corrosion and will enable the collection of rain water for drinking.

Protect health and safety of the public by ensuring the following:

- Inhibit unauthorized access to the PV modules using fences, gates, locks;
- Cover inverters with a locked metal cage firmly attached to the wall in order to avoid unauthorized manipulation (especially by playing children with the risk of accidents) or theft;
- Mark sites with comprehensive and visible signs (pictograms) indicating danger and no-go-areas; and
- Put the wiring underground in order to avoid accidents and damage (accidentally or intentioned by vandalism).

Site selection and preparation

- Consider using participatory approaches so that the community helps to decide where the arrays will be located.
- Prioritise roof-mounted systems over stand-alone arrays wherever possible, to minimise the need for land and minimise the need for aggregates and earthworks.
- Prioritise government buildings over private buildings.
- Consider secondary uses for stand-alone array structures, to maximise the benefit of the land use – such as:
 - Bike / car shelters
 - Outdoor class rooms / meeting spaces / shelters from the rain and sun
 - Sheds or other storage facilities
- Avoid the need to remove or trim productive trees if possible. Where this is unavoidable, mitigate or compensate for impacts in accordance with resettlement processes in the RPF.

Installation

Confirm access to land or buildings, in accordance with the resettlement processes in the ESMF, to ensure there is voluntary land donation, and / or that there is a compensation agreement in place prior to works beginning.

Ensure the correct building permits have been obtained.

Have an agreement in place between CPUC and the land owner regarding responsibilities for maintenance, the security of the panels and personal safety.

Prior to installation, CPUC (or their contractors) are to speak with land owners and occupiers on the function and features of the panels, to try to reduce the potential for vandalism, and to allay any health and safety concerns. Key messages are:

- No tampering with the equipment – the dangers associated with electrical equipment, and any hazardous substances (if any) if the panels are broken. Fences, locks and other mechanisms may be required to prohibit tampering.
- Drinking water can be collected from the arrays – there is no harm to human health.
- How this will (or won't) affect their power bill.
- Maintenance – what is required, who will do this, how, and how often.
- Who to contact if there is a problem or they need to know more information. Noting it is necessary that they should report immediately to CPUC any case of damage of any component, or any health or safety incident.

Operations and Maintenance

A maintenance protocol should be established by CPUC prior to commissioning.

Maintenance to be undertaken by trained CPUC staff or contractors, who have received health and safety training and equipment necessary to work at height and with electrical equipment. Regular checks should be carried out for safety and security and in particular after storms or heavy rainfall events.

The land owner, building owner and / or occupier should report any damage to CPUC as soon as possible.

Clean panels with fresh water when required (prolonged dry periods), using a soft cloth if necessary, but no detergents.

Ensure any parts that are replaced are removed from the island and recycled or disposed of at an approved landfill facility.

Inform land owners and occupiers at least 1 week prior to the visit. Seek prior permission for entry.

Seek land owners' permission prior to trimming trees.

Complaints should be logged and actioned, consistent with the EMP complaints procedure.

Records should be kept on maintenance activities and complaints.

Emergency Procedures for Broken Panels

CPUC should adopt a procedure for managing contamination of ground or drinking water or marine environment from heavy metals leaking from damaged panels. The procedure should involve:

- Medical assistance for any persons affected;
- Clean up procedures (including health and safety protocols and equipment);
- Disposal of broken panels and contaminated sands / soils in a designated landfill. .
- Disposal of contaminated drinking water into a sewer or septic tank.

Decommissioning

All equipment and infrastructure must be removed from the island and recycled or disposed of at an approved landfill facility.

Annex 5 Consultation and Disclosure – Pohnpei

Draft Record of Consultation Meeting –Pohnpei State

Re: World Bank/ FSM Energy Sector Development Project

Venue of Meeting: Governor’s Conference Room

Date: March 12, 2014

Time: 9:000

Participants:

Mr. Kadalino Lorens, Administrator, Pohnpei State Economic Affairs Office

Mr. Hubert Yamada, Assistant Secretary for Energy Division, Department of R&D, National Government

Mr. Joe Saimon, Office of Fisheries and Aquaculture

Mr. Marcelino K. Actouka, General Manager/CEO, PUC

Mr. Joses R. Gallen, General Counsel, PUC

Mr. Peterson Sam, General Manager, FSM Coconut Development Authority and Board of Director, PUC

Mr. Trevayne Esiel, FSM Petroleum Corporation and Board of Director, PUC

Mr. Henry Susaia, Pohnpei State EPA

Mr. Michael Liemen, Chief Magistrate, Sokehs Municipality

Nanita Mirelles, T&I

Record of Meeting:

Mr. Kadalino Lorens, opened the meeting as the Chairman by welcoming everyone in attendance and further expressed his appreciation for everyone for coming to the meeting. He then turn the floor to Mr. Yamada to do his presentation.

Mr. Yamada, presented the overview of the consultation meeting with Pohnpei as a stake holder in the proposed Energy Sector Development Project three components. First Component is to help improve efficiency and reliability of electricity supply in the four states of the FSM which is funded through IDA in the amount of \$9 Million USD. Second Component is the development and preparation of a National and State Energy Master Plan to be funded by IDA with the sum of US\$3.4. Third Component the ESDP is for Technical Assistance and Project Management budgeted for US\$ 1.5. This component will help build the capacity of the Implementing Agency. This is intended for the Energy Division of the National Government and Association of Micronesia Utilities for a centralized data collection.

Mr. Yamada also presented and led the discussion on the draft Environment and Social Management Frame Work (ESMF) and the draft Environmental Management Plan. After his presentation, the floor was open for any question or comments. A question was put on the floor asking if other source becomes available to help Pohnpei Utilities Corporation with the 2MW replacement generators, can Pohnpei divert the use of this grant to other energy project. While this could be considered, depending on the specifics of the project (activity), this could delay the implementation process taking into account environmental and social assessments that would be required.

With respect to the draft EMP and ESMF, there was no expression of great concern from anyone. EPA representative expressed his support for the project in general. It was acknowledged that component 1 was basically to replace existing power generations, while component 2 would

accompany the need to conduct thorough environmental and social reviews during the planning as well as the implementing stages to address potential impact and disturbances, and how to manage or mitigate potential issues. Component 3 of the project hardly has any environmental impact.

It was also noted in the meeting, that Pohnpei will be using the grant to procure generators to replace with the already decapitating generator #7 and #8. The meeting agreed that there will be less environmental issues. Pohnpei will require that any generator that will be procured from the proceed of this project will come with the following prescription: Environmentally Friendly generators with 110% spill containment on board engine fluids and sound attenuated container.

At the conclusion of the meeting, it was the general consensus of the Consultation Meeting to support the project and the draft EMP and ESMF.

Thank you.

Prepared by: PUC

Concurred by: Chairman Kadalino Lorens

Attachment A

Affidavits

<u>Name</u>	<u>Office</u>
1. Herbert K. Foyt	Fish & D, Ecology
2. Adolfo, MARCELINO	PUC, CEO/ADM
3. Jose R. Gallen	PUC, General Counsel
4. Peterson Sam	PUC, Director / COA
5. Trayne Towel	PUC, Director / Fish & D
6. Michael Leman	State Mun. Govt / Chief Neg
7. Henry Susaia	Partner EPA
8. Nanita Miralles	T & I
9. Joseph Saimon	Fisheries and Aquaculture
10. Karolimo Lotens	Energy Commission Finance

Annex 6 Consultation and Disclosure – Kosrae

FSMEnergy Sector Development ProjectStakeholder Meetings Notes

March 10, 2014, held at the Governor’s conference room from 10am to 12pm.

Meeting objectives:

1. Energy project overview
2. Discussion of environmental / social risks & mitigation
3. Get feedback

Overview

Who is involved:

Division of Energy - Project Implementing Agency

Contact Person: Hubert Yamada, Assistant Secretary, Division of Energy,
huberty08@hotmail.com

State Utilities

Association of Micronesian Utilities / AMU (Technical Steering Committee)

Funded by the World Bank

The World Bank is prepared to fund one of two proposed projects.

Plan A is the proposed ICT fiber project. The bill is still with Congress and they may not act.

Plan B is this proposed FSM energy project, which will run from 2014 – 2018, following World Bank Board approval in June, 2014. The entire grant is \$13.9m, with Kosrae’s share being \$1.58m.

The project components include:

- Addressing most urgent investment needs in each state power utility
- Developing four State Energy Master Plans and a National Energy Master Plan
- Providing technical assistance to build capacity in the Division of Energy and the Association of Micronesian Utilities

Kosrae’s request includes

- Installation of a new diesel generator, 1.2MW capacity.
- Fuel injection services in all generators
- Energy audits at the plant

Risks &Mitigation

Risks	Mitigations
Waste (oil, equipment, etc.)	Hazardous waste separated for recycling, treatment and disposal. Waste recycled where possible, otherwise must be disposed at municipal landfill.
Air emissions from generators	Air quality guidelines from World Bank, Pohnpei EPA, and World Health Organisation to be met.
Health and safety of workers	World Bank health and safety guidelines and

	local laws to be followed for noise in the workplace, working around electricity, personal protective equipment etc.
Health, safety and wellbeing of neighboring community	Consultation prior to work. Complaints mechanism. Equipment standards for air and noise emissions.

Master Plans

- Build on the National Energy Policy and Energy Action Plans
- Confirm the power sector investments for the next 5 years
- Environmental and social aspects will be integrated into the planning process
- For priority projects: feasibility studies, environmental and social impact assessment and other specific studies will be done to make them ‘investment ready’

Potential Impacts and Benefits

- More reliable energy supply
- Lower costs than without the project
- Energy efficiency and awareness of energy wastage will increase
- Reduced use of fossil fuels
- Future investments may:
 - Require land
 - Create waste or emissions to land, water and air
 - Disturb natural habitats (forests, marine, coastal, river)
 - Affect communities (noise, odor, physical cultural resources)

Mitigation:

- Consult with stakeholders to seek least impact design solutions and monitor implementation
- Avoid impacts on private land or resources as far possible – and compensate if impacts are unavoidable
- Avoid or mitigate significant environmental impacts, in particular on natural habitats, forests and physical cultural resources
- Ensure that any complaints are fairly handled
- Build capacity and provide training for energy and environmental sectors

Following the presentation there was an active discussion session.

Fred Skilling explained that if the project goes through the KUA energy production will be more efficient. Currently the plan produces 12.7 kw per gallon of fuel, the new generator and fuel injection system will increase that to about 15.8kw per gallon, this will result in a savings of about \$100,000 per year.

Questions included:

Will we need the power produced by the new engine? Yes, future demands include the new hospital.

What about the new solar array. The solar array funded by the Japanese is expected to cover about 30% of current usage. Construction will start in June and will take 1-2 years to build. What about wave power? This project depends on funding. Right now there are no funds to move ahead.

A private sector request: to include training of local staff (KUA) under the capacity building / TA section of the grant request, so that they will be qualified to evaluate and advise businesses on possible renewable energy sources for their location.

Conclusion:

All stakeholders attending the consultation meeting endorsed the FSM Energy Sectors Development Projects for WB Financing.



NAME	Title	Office / Dept.	Email address
Chito Isaac		DOA	chitoisaac@mail.tulsa
Hans Skilling		KYDA / Red Cross	hskilling_08@yahoo.com
Shiro Sigrah		DOHS	shsigrah@sonhealth.com
KATRINA ADAMS		KCC	KATRINA.KADAMS@KCC.COM
Nena G. Nena		KUA	kuacsm@mail.com
Gerry F. Protacio		KUA	kuapengr@mail.com
Sian Nivison		ODA / KSG	snivisonkosraeoda@gmail.com
Josiah F. Waguk		KSL	strawaguk@gmail.com
ALIKIA J. SIGRAH		KSL	ajbsigrah08@comcast.net
PALIKUN SHREW		KSL	palikunshrew@yahoo.com
MURSON TOLENA		MMG	
KILAPWA JOE		KCC	
Alister Toleno		DOE	alistertoleno@gmail.com
SWEETYA TULENSRU		Gov's Office	swtymarta@yahoo.com
MARY N. LUPPE		KUA	mluppea@kua.com
TIMOTHY TIMOTHY		Board member - KUA	mer.tenc.tim@gmail.com
Lorrie Asher		OAG	lorrie.asher.esy@gmail.com
Reem Abrah		legislature	reem.abrah@yahoo.com
Robert I. Taulung		KSL	ritaulung@yahoo.com
Tulensa W. Palik		KSL	tulensapal@yahoo.com
HARDY ANDREW		DREA	dreaandj@gmail.com
Gina Sabu		KSL	GinaSabu@gmail.com
FRANK W. TAMM		TIME	
JESSE, BEN		LITG	bsesse210@gmail.com
WITSON PHILIP		KCC	witson.philipe



Annex 7 Consultation and Disclosure – Yap

MINUTES

STAKEHOLDERS MEETING FOR CONSULTANCY
ON THE
ENVIRONMENTAL MANAGEMENT PLAN FOR UPGRADES AND EXPANSIONS TO EXISTING
POWER STATIONS AND NETWORKS
IN YAP STATE, FSM

Date and Venue: Meeting was held on 11 March 2014 at the Small Business Development Center conference room in Colonia, Yap, Federated States of Micronesia.

Presenter: Meeting was conducted by Victor Nabeyan, the Assistant General Manager of the Yap State Public Service Corporation (YSPSC).

Attendance: In attendance were the following:

From the Public Sector –

- 1). Frank Haregaichig, Director, Department of Resources & Development, Yap State Government;
- 2). Christina Fillmed, Executive Director, Environmental Protection Agency, Yap State Government;
- 3). Camelia Sulog, Chief, Division of Agriculture, Department of R&D, Yap State Government;
- 4). John Waayan, WFB, Department of Youth & Civics Affair, Yap State Government;
- 5). John Libyan, ourYap, Department of Youth & Civics Affair, Yap State Government;

From the Private Sector

- 6). Tom Fetan, Member, Yap Chamber of Commerce;
- 7). George R. Lorwan, CEO/President, Waah Transportation Company;
- 8). Jeffrey Adalbai, Secretary, Yap Chamber of Commerce;
- 9). Sebastian Taman, Waah Transportation Company;
- 10). Paul Ayin, Sole Proprietor, Quality Catch;
- 11). Sara Fillmed, United Airlines;
- 12). Marie Laamar, Member, Yap Chamber of Commerce;

From the NGO Sector –

- 13). Leona LF Tamag, Women's Interest Officer, Yap Women's Association;

From YSPSC –

- 14). Francis Palan, Power Plant Manager;

March 11, 2014 Stakeholder's Meeting

NAME	Office/TITLE	Email	Phone
1. John Waagan F.	DYCA/WEB	waaagan@gmail.com	350-2163
2. Jhuat Libyan	DYCA/our/MS	jlibyan@yapstake.gov.org	350-2168
3. Sara Filmed	United Airlines	sara.filmed@united.com	350-2788
4. Christina Filmed	yap EPA	epayap@mail.fm	350-2113
5. Frank Haregaiding	R&D	yaprd@yapstake.gov.org	350 2182
6. Leona LF Tamag	WIO/YWA	ltamag@hotmail.com	
7. CHARLES FALMAYOG	YSPSC	charlesfalmayog@yspsc.com	350-7515
8. Jeffrey Adalbai	Chamber/Sec	jeff@adalbai.com	350-2118
9. GEORGE TORUWAN	WTC		350-2301
10. TAMMAD SULEG	DAF	agricultareyap@mail.fm	350-2183
11. TOM FERRAT	YCC		
12. Sebastian Taman	WTC	Wantsdes@gmail.com	350-4984
13. Virginia Hernandez	YSPSC	virginia0403@yahoo.com	
14. Steven L. Ken	YSPSC	stevlibanada@yspsc.fm	
15. Francis B. Falan	YSPSC	pwr.gen@yapspsc.org	
16. Gordon Moffat	YSPSC	Gdmoffat@gmail.com	350-4412
17. GARRETT JOHNSON	YSPSC	gjohnson@mail.fm	
18. PAUL ATIN	Quality Catch	paul@ayinglobal.com	350-7160
19. Marie A. Laemar	YCC	ycc-director@mail.fm	
20. Victor Nabayan	YSPSC	vnabayan@gmail.com	
21.			
22.			

Annex 8 Consultation and Disclosure – Chuuk

FSM/ World Bank Energy Sector Development Project Chuuk State Stakeholder Consultation Meeting 20th March 2014. Meeting Report.

The full report can be read at <http://www.cpuc.fm/development-partners/world-bank/energy-sector-development-project/>)

Introduction

A stakeholder consultation meeting was held on Monday 10th March 2014 to present the Proposed FSM Energy Sector Development Project funded through IDA grant. Formal Invitations were issued to stakeholders during the week of 3rd March 2014. CPUC staff also issued invitations to landowners and other stakeholders in the vicinity of the power house and within the general community. A total of 32 people attended the meeting.

A powerpoint presentation provided the overview of the Energy Sector Development Project. Many questions came from the floor, including questions about waste management (particularly hazardous waste), how to ensure the project would be a success (and not reinvent the wheel, and be delivered in a timely manner), how local businesses could / would be involved, and ensuring that any equipment purchased and installed is of good quality to ensure sustainability.

List of Invited Agencies/Organisations

Chuuk State Senate;

Chuuk State House of Representatives;

Chuuk State Governor & Department Heads;

Chuuk State Mayors;

Chuuk State Energy Workgroup;

Chuuk Women’s Council;

Chuuk Conservation Society;

Chuuk State Chamber of Commerce Members;

Development Bank of FSM;

Bank of FSM;

Bank of Guam;

Faichuk Development Authority;

FSM Telecom;

CPUC Power Plant Landowners;
College of Micronesia – Chuuk;
Chuuk State Small Business Development Centre;
CPUC;

Chuuk State Stakeholders Consultation Meeting

March 10, 2014

List of Participants - Name Organization Email/Phone

Wisney Nakayama Chuuk Conservation Society 931-3832
Rocky Inek CPUC Board of Director 330-4116
Kayo Noket Deputy Mayor (Weno) 932-9672
Peter Aten Division of Commerce & Industry 330-8782
Kelly Keller CPUC 330-2400
Kachutosy Paulus Faichuk Development Authority 932-7043
Mino R. Mori CPUC/FSMTC 330-2740
Tesime Kofot CPUC/Dept. of Marine Resources 330-6729
Daniel Ham Bank of FSM
Mark Mailo Chuuk State Legislature (Senate) 932-6797
Mark Waite CPUC 931-8598
Benjamin Akkin CPUC Board of Director 330-3282
Berly Killion Chuuk State Legislature (Rep.)
Ketsen Haregaichy Chuuk SBDC ketsen@pacificsbdc.co
Johnson S.Elimo Governor's Office (Governor) jelimo1216@yahoo.com
Kind Kanto COM –FSM Chuuk kank@comfsm.fm
Redley Killion Chuuk State Chamber of Commerce redleykillion@yahoo.com
Josie Estepa MCM 330-5212

Bill Stinnett Truk Stop Hotel kbstinnett@yahoo.com

Mathias Kuor Chuuk State Legislature (Senate) 931-4216

Atan Hetiback Chuuk State Legislature (Senate) 931-8735

Joakim Kaminaga Kaminaga Enterprise 330-6967

Cindy Mori Chamber of Commerce cindymori@gmail.com

Pintas Kenneth Weno Municipal (Mayor) 932-5262

Frank Cholymay DCO 931-6435

Kiki Stinnett Chuuk Women Council 932-8555

Sinory Meitou Weno Municipal 931-2247

Wilfred Robert Governor's Office (Chief of Staff) 930-3387

Harris Rain Chuuk State Legislature (Senate) 330-4284

Peter Amaraich Chamber of Commerce psamaraich@gmail.com

Larry Gouland CPUC larrygouland@yahoo.com

Fernie Esa CPUC 330-2400