

# **KOSRAE UTILITIES AUTHORITY (KUA)**

## **PROPOSED UPGRADE OF THE PRE PAYMENT KWH METERING SYSTEM BEING UTILIZED AT KOSRAE UTILITIES AUTHORITY**

A PROJECT SUBMITTED TO THE  
SECRETARIAT OF THE PACIFIC COMMUNITY (SPC)

**JUNE 2012**



State of Kosrae  
Federated States of Micronesia

## **KOSRAE UTILITIES AUTHORITY**

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### **ENERGY EFFICIENCY PROGRAM WITH UPGRADE OF THE PREPAYMENT KWH METERS SYTEM AT KUA.**

#### **1. BACKGROUND**

**Kosrae Utilities Authority (KUA)** desires to avail of a financial assistance package to finance its upgrading of the Prepayment Metering system for electricity. This program aims to install prepayment KWH meters to the entire customer base of KUA in an effort to improve the efficiency of energy usage. This efficient use of energy will be a contributing factor in the reduction of power produced for domestic and industrial usage and will in turn reduce the harmful gases formed and discharged during power production process.

#### **2. HISTORY AND PRESENT SETTING**

When KUA commenced with the Pre Payment scheme, arrears from late and non paying customers have piled up. This has resulted in KUA having to face a problematic cash flow and much time and effort was used in legal proceedings against delinquent clients. There was also a strong resistance to its usage as it was an unknown system that the public has no previous experience.

Despite the initial resistance to the system of pre payment for electricity, KUA strongly stood for its implementation and with help from donor agencies (US DOI) has found redemption from the system. The Pre Payment metering schemes has relieved KUA with a significant amount of burden in Administrative process of billing and collection from its customers while increasing its collection. Furthermore, arrears have substantially been reduced causing better cash flow for KUA. There was also a meaningful reduction in energy usage as consumers have become aware of the need to save energy as a way of saving money.

Statistics have revealed a downward trend in energy utilization in Kosrae since the introduction of Pre Payment metering and thus improvement in greenhouse gas generation at the power plant has resulted as well.

Record shows that KUA had a total base of 1,903 customers for fiscal year 2011. Majority of the residential customers (approximately 1,550) are installed with prepayment KWH meters and KUA intends to utilize these Pre Payment meters to all residential customers, Government offices and commercial establishments within a practical time frame.

KUA envision to fully equipping its customers with pre payment KWH meters as a means to further save energy and improve its Administrative system. However, to do so, KUA must improve its system of pre payment metering. Problems have cropped up with the system that a full rehabilitation is deemed necessary to attain KUA’s goals. The existing system of vending and individual meters used by KUA customers employs old generation software and hardware which is already outmoded having been used in Kosrae for more than ten (10) years. Difficulties have been encountered on this system such as old tokens being reused and accepted (causing loss of revenues), faulty keypads, faulty meter readings, and other technical glitches. Plans to replace or upgrade the system have been planned but were put on hold due to high cost of software and individual meters to complete the full installation of Pre payment meters to all of KUA customers.

KUA has taken initiative in finding solution to the problems on the system and have found an alternative in a modern system in Pre Payment Metering Systems. The alternative system is internationally accepted and offers a cheaper alternative to the Pre Payment system utilized in KUA at present.

**Table 1. Figures showing growth of the number of KUA customers per year**

	2007	2008	2009	2010	2011
Regular Meter Customers	520	438	377	381	353
Cashpower Meter Customers	1,232	1,347	1,455	1,512	1,550
Total Customers	1,752	1,785	1,832	1,893	1,903
% of Customers On Cashpower Meter	70 %	75%	79 %	80%	81 %

The table shows the growth of KUA customers and likewise the increasing numbers of customers utilizing prepayment KWH meters. Although the usage of Cashpower prepayment meters started more than ten (10) years ago, the above table shows the latest five (5) year data on the number of KUA customers served.

The increasing trend of prepayment meters usage is the goal of KUA. However, on current year 2012, there has been a slackening in utilization of prepayment meters on new installations (average of five (5) new installations per month) as KUA's stock of prepayment meters has dwindled and no new pre payment meters have been procured due to tight financial conditions. The rising cost of fuel has eaten up a large portion of KUA's financial reserves earmarked for parts, materials and prepayment meters as well.

**Table 2. KWH Production for Five Years at Kosrae**

	<b>FY 2007 (Oct '06 to Sept '07)</b>	<b>FY 2008 (Oct '07 to Sept '08)</b>	<b>FY 2009 (Oct '08 to Sept '09)</b>	<b>FY 2010 (Oct '09 to Sept '10)</b>	<b>FY 2011 (Oct '10 to Sept '11)</b>
October	538,471	537,561	488,033	547,590	551,816
November	508,420	512,770	475,190	522,822	537,927
December	537,275	534,857	507,850	539,090	555,280
January	541,400	541,362	501,154	556,862	537,145
February	486,158	500,790	462,175	512,470	485,457
March	549,105	527,524	519,714	566,897	532,067
April	509,992	505,308	499,776	550,507	495,271
May	550,062	511,199	502,989	569,802	509,674
June	541,285	503,521	494,277	539,502	480,083
July	548,153	521,971	506,123	524,393	505,493
August	526,288	506,305	542,712	541,630	510,908
September	526,210	472,240	522,178	532,636	487,631
<b>Total</b>	<b>6,362,819</b>	<b>6,175,408</b>	<b>6,022,171</b>	<b>6,504,201</b>	<b>6,188,752</b>
<b>Percentage INC/(DEC)</b>		<b>(2.95 %)</b>	<b>(2.48 %)</b>	<b>8 %</b>	<b>(4.84 %)</b>

Table above represents the general trend in KWH production in Kosrae establishing Fiscal Year 2007 as the base for the latest five year data representation. Although the general trend in KWH production since the introduction of Pre payment KWH meters is downward, figures for FY 2010 was the exception as an increase was experienced.

**Table 3. Five Year Trend in Total KWH Sales (Cashpower and Regular Meters)**

	<b>FY 2007 (Oct '06 to Sept '07)</b>	<b>FY 2008 (Oct '07 to Sept '08)</b>	<b>FY 2009 (Oct '08 to Sept '09)</b>	<b>FY 2010 (Oct '09 to Sept '10)</b>	<b>FY 2011 (Oct '10 to Sept '11)</b>
October	455,542	467,628	403,403	454,649	453,056
November	441,538	442,414	373,740	451,240	458,027
December	464,199	436,562	410,901	486,973	479,974
January	446,238	424,669	455,250	419,628	454,229
February	424,048	399,245	387,420	412,993	418,965
March	456,900	401,564	445,647	482,947	462,368
April	431,985	403,622	407,915	443,510	415,585
May	490,947	422,658	424,292	482,259	412,538
June	466,776	388,673	451,159	451,247	400,268
July	457,253	424,262	468,306	441,820	405,453
August	461,437	451,414	462,490	493,806	451,387
September	444,456	412,335	478,834	491,654	436,512
<b>Total</b>	5,441,319	5,075,046	5,169,358	5,512,726	5,248,361
<b>Percentage INC/(DEC)</b>		<b>(6.73%)</b>	<b>1.85 %</b>	<b>6.63 %</b>	<b>(4.79%)</b>

**Table 4. Five Year Trend in KWH Sales on Cashpower Meters**

	<b>FY 2007 (Oct '06 to Sept '07)</b>	<b>FY 2008 (Oct '07 to Sept '08)</b>	<b>FY 2009 (Oct '08 to Sept '09)</b>	<b>FY 2010 (Oct '09 to Sept '10)</b>	<b>FY 2011 (Oct '10 to Sept '11)</b>
October	176,623	205,466	187,097	220,472	204,501
November	170,163	184,616	157,631	241,427	229,258
December	190,257	193,222	195,734	233,120	234,895
January	195,432	169,564	221,347	212,119	249,581
February	185,968	167,626	190,438	212,170	213,520
March	188,666	169,626	226,643	267,777	225,076
April	179,403	172,554	206,477	230,182	213,549
May	203,610	183,961	196,365	246,429	222,131
June	205,093	173,317	224,818	226,292	208,334
July	198,775	164,367	223,458	225,740	205,163
August	200,363	172,883	220,315	262,296	244,291
September	181,274	181,813	247,112	237,233	228,146
<b>Total</b>	<b>2,275,629</b>	<b>2,139,014</b>	<b>2,497,436</b>	<b>2,815,256</b>	<b>2,678,445</b>
<b>Percentage INC/(DEC)</b>		<b>(6%)</b>	<b>16 %</b>	<b>12.72 %</b>	<b>(4.86 %)</b>

**Table 5. Five Year Trend in Cash Sales for Power in US Dollars**

	<b>FY 2007 (Oct '06 to Sept '07)</b>	<b>FY 2008 (Oct '07 to Sept '08)</b>	<b>FY 2009 (Oct '08 to Sept '09)</b>	<b>FY 2010 (Oct '09 to Sept '10)</b>	<b>FY 2011 (Oct '10 to Sept '11)</b>
October	\$ 136,979.72	\$ 139,570.68	\$ 178,298.40	\$ 165,739.82	\$ 179,201.59
November	131,432.37	132,583.70	163,264.39	162,022.10	179,054.37
December	119,499.95	129,399.03	179,046.25	175,645.55	192,368.34
January	129,589.56	131,735.88	155,513.85	157,138.47	184,521.00
February	122,240.63	132,823.54	129,997.17	152,606.01	175,079.59
March	123,309.46	133,945.18	146,912.85	178,741.21	198,904.33
April	113,774.43	134,952.65	131,384.31	166,325.78	177,758.56
May	130,309.61	143,976.01	138,541.50	189,024.16	187,163.70
June	124,185.95	139,090.91	147,832.28	179,421.18	194,206.20
July	124,927.37	162,238.19	153,473.05	168,980.01	197,191.99
August	135,433.46	203,111.48	163,568.94	189,031.29	210,634.09
September	132,154.35	187,866.71	168,890.25	181,738.43	206,758.81
<b>Total</b>	<b>\$ 1,523,836.86</b>	<b>\$ 1,771,293.96</b>	<b>\$ 1,856,723.24</b>	<b>\$ 2,066,414.01</b>	<b>\$ 2,282,842.57</b>
<b>Percentage INC/(DEC)</b>		<b>16.23 %</b>	<b>4.82 %</b>	<b>11.29 %</b>	<b>10.47 %</b>

Cash sales figures shows an upward trend mainly to adjustments in the billing rate which is adjusted annually.

**Table 6. Five Year Trend for Fuel Consumption**

	<b>FY 2007 (Oct '06 to Sept '07)</b>	<b>FY 2008 (Oct '07 to Sept '08)</b>	<b>FY 2009 (Oct '08 to Sept '09)</b>	<b>FY 2010 (Oct '09 to Sept '10)</b>	<b>FY 2011 (Oct '10 to Sept '11)</b>
October	40,114	40,060	33,014	33,014	36,180
November	37,863	38,232	30,687	30,687	34,933
December	39,867	39,443	33,090	33,090	37,211
January	40,196	36,652	35,194	35,194	36,983
February	37,683	37,033	30,362	30,362	36,182
March	39,984	35,442	33,769	33,769	40,962
April	39,062	33,651	32,096	32,096	38,283
May	41,859	33,111	36,426	36,426	34,815
June	41,834	32,554	37,405	37,405	36,382
July	40,158	33,723	38,764	38,764	33,917
August	40,666	33,088	41,104	41,104	34,796
September	40,289	33,252	38,461	38,461	36,250
<b>Total</b>	<b>479,575</b>	<b>426,241</b>	<b>420,372</b>	<b>452,628</b>	<b>436,894</b>
<b>Percentage INC/(DEC)</b>		<b>(11.12%)</b>	<b>(1.37%)</b>	<b>7.67%</b>	<b>(3.47%)</b>

Fuel consumption on power production also shows downtrend except in FY 2010 wherein bigger sized generating unit were utilized as the smaller sized Generator developed problems and have to be shut down for repairs.

From the study conducted by KEMA on KUA's system losses and Cost Recovery Study on KUA's operation, increasing the customer base utilizing Prepayment KWH meters will have an estimated effect of increasing KUA efficiency in power production due to reduction in the production of power and thus generating an estimated savings of \$5,000.00 per month.

This is the assumption if 90% of the customer base will be utilizing Pre Payment KWH meters. Assuming a 5% savings on reduction of power production due to use on Prepayment meters, the yield on estimated savings are as follows:



**Estimated Savings in Diesel Fuel for production: \$5,000 /month @ \$4.6 per gallon  
(With usage of Prepayment meters)**

**= 1,136 Gallons / mo.**

**Estimated Yearly savings in Fuel**

**= 1,086 Gallons x 12 Months**

**= 13,032 say 13,000 Gallons**

**Equivalent Savings in CO2 Emissions**

**@ 10.22 Kg /gal.**

**= 13,000 Gals. x 10.22**

**(Greenhouse Gases)**

**= 132,860 Kg.**

**REDUCTION IN ARREARS**

One of the biggest benefits that were earned from the use of prepayment meters was the reduction of arrears from delinquent customers.

**Table 7. Present Customer Accounts with Arrears**

	<b>Account</b>	<b>Initial</b>	<b>Paid</b>	<b>Paid Total</b>	<b>Outstanding</b>
1	328000	9,390.83	1,736.16	1,998.34	7,392.49
2	3247000	6,896.34	339.27	1,863.51	5,032.83
3	10120600	3,598.81	0.00	179.90	3,418.91
4	10052400	5,070.24	522.84	2,990.86	2,079.38
5	2729000	2,947.61	1,121.74	1,303.73	1,643.88
6	100470001	1,632.51	55.69	127.46	1,505.05
7	10116000	1,405.27	7.00	7.00	1,398.27
8	2992000	1,853.00	240.62	467.70	1,385.30
9	6600	1,035.81	60.06	115.17	920.64
10	1432000	2,965.44	1,181.98	2,104.01	861.43
11	1384100	543.78	0.00	29.75	514.03
12	4624000	759.76	250.00	255.00	504.76
13	3729000	960.09	115.07	535.30	424.79
14	2152000	1,087.15	380.87	666.13	421.02
15	5112000	581.40	93.34	196.51	384.89

16	4200600	455.89	102.03	102.03	353.86
17	10002700	398.00	38.24	101.13	296.87
18	10089900	341.31	22.12	74.33	266.98
19	1984000	1,169.52	600.36	935.36	234.16
20	10073000	521.40	252.57	338.30	183.10
21	5210000	454.96	187.63	283.62	171.34
22	10033000	324.46	146.81	189.02	135.44
23	10099600	244.27	84.68	109.55	134.72
24	5000500	150.74	5.73	27.23	123.51
25	10041400	177.46	8.25	58.01	119.45
26	10037600	292.38	182.39	183.51	108.87
27	2338000	121.62	12.95	14.25	107.37
28	10102200	206.68	89.40	104.39	102.29
29	10015000	299.29	147.99	200.92	98.37
30	3968100	135.71	0.00	42.00	93.71
31	15440001	149.00	0.00	58.33	90.67
32	9999900	196.41	47.86	106.96	89.45
33	4024000	685.00	194.57	599.30	85.70
34	10005300	224.59	109.65	144.02	80.57
35	10054500	139.63	62.59	62.59	77.04
36	P10063200	1,010.33	777.95	933.44	76.89
37	656000	163.51	66.50	91.00	72.51
38	648000	232.98	123.03	170.76	62.22
39	712000	190.42	119.52	134.02	56.40
40	100403001	278.30	225.23	230.74	47.56
41	1006001	71.48	30.65	30.65	40.83
42	10073300	182.43	126.43	143.56	38.87
43	10085100	35.06	0.00	0.00	35.06
44	10038200	116.43	54.23	83.48	32.95
45	2464000	89.81	23.62	57.29	32.52
46	10044300	1,617.52	1,112.14	1,588.63	28.89
47	3240001	30.00	1.12	1.12	28.88
48	1064001	505.41	442.35	477.86	27.55
49	209000	44.43	19.04	19.04	25.39
50	10001300	29.21	4.50	4.50	24.71
51	10060200	93.31	1.93	69.31	24.00
52	824000	133.16	22.12	110.83	22.33

53	10046600	267.87	0.00	245.83	22.04
54	10054400	153.77	12.98	132.91	20.86
55	444001	75.87	40.60	55.48	20.39
56	3300100	189.92	168.76	170.01	19.91
57	21294001	20.04	1.88	1.88	18.16
58	10032100	20.95	1.25	3.75	17.20
59	10039100	20.40	5.00	7.50	12.90
60	10017800	105.37	93.70	93.70	11.67
61	10039800	46.95	16.73	35.68	11.27
62	100030001	11.25	0.00	1.25	10.00
63	4560000	82.73	66.82	74.42	8.31
64	3767000	391.42	320.33	384.08	7.34
65	3688000	405.23	0.00	401.93	3.30
66	4088100	52.08	0.00	49.26	2.82
67	10070400	21.19	19.13	19.13	2.06
68	5624000	1,823.87	209.11	1,821.92	1.95
69	10074300	4.34	3.12	3.12	1.22
	<b>TOTAL</b>	<b>\$56,000.60</b>	<b>\$ 12,513.35</b>	<b>\$24,226.42</b>	<b>\$ 31,774.18</b>

The table represents the present status of arrears in KUA's account of customers. Since the inception of prepayment meters the accumulated arrears has been reduced to the present level. With the continuity of the program, it is perceived that the arrears will be eventually erased within a reasonable amount of time.

### **3. PROGRAM OF ACTIVITIES**

**KUA** intends to activities to improve its overall efficiency resulting in reduced operational expenses and savings in fuel. The full utilization of Prepayment KWH meters on its customer base will bring about the desired results sought for at KUA.

With a limited number of options for funding, projects with proven impacts on the preservation of the environment and increasing system efficiency has to be prioritized. One such undertaking is the **Upgrading of the Prepayment Metering System employed at KUA.**

This project as well as the others being considered is projected to strengthen KUA's efficiency and reliability with a long term view on KUA's relevance to Kosrae's economic growth and environment.

**(Please see attached ANNEX A for Other Projects that KUA is considering to undertake)**

#### **3.1 Upgrading of Prepayment Metering System for Full Utilization to KUA's Customer Base.**

KUA set its sights to replace the existing Prepayment metering system with a new and modern internationally accepted system. The proposed system follows the Standard Transfer Specification (STS) and the International Standard for Prepayment system IEC62055.

##### **3.1.1 Schedule of Plan of Activities**

Submittal and Approval of Proposal

Approval of Proposal

Procurement of System and Hardware

Phase One, (Set up of new Operating System)

Phase Two, (Replacement of Prepayment Meters (200 units Residential)

Phase Three, (Replacement of Prepayment Meters (300 units, Residential)

Phase Four, (Replacement of Prepayment Meters (350 Meters, Residential)

Phase Five, (Replacement of Prepayment Meters (400 Meters, Residential)

Phase Six, (Replacement of Prepayment Meters (400 Meters, Residential)

Phase Seven, (Replacement of Prepayment Meters (200 Meters, Commercial & Others)

**(Please Refer to Annex B for the Proposed Schedule of Activities).**

**3.1.2 SPECIFICATIONS OF THE SYSTEM AND EQUIPMENT PROPOSED TO REPLACE AND UPGRADE EXISTING PREPAYMENT METERING SYSTEM AT KUA**

3.1.2.1 Prepayment KWH Meter, DDZ1513, single Phase, 3 wire, ANSI split type Prepayment meter, “INHEMETER” Brand, Manufactured by: Shenzhen Inhemeter Co, Ltd. Shenzhen, China, with Indoor CIU unit, cable interface.

3.1.2.2 Smart Vend STS, Vending System Software.  
Version 1.0 Support Scratch card, online charge, credit card.

3.1.2.3 Technical Training and support for the system.

**3.1.2.3 ESTIMATED COST OF PROJECT**

Item	Description	Quantity	Unit Cost	Total Cost	Remarks
1.	Single Phase Prepayment KWH Meter	1,500 units	\$ 85.00	\$127,500.00	
2.	Smart Vend STS Software, Ver. 1	1 Lot	\$ 60,000.00	\$ 60,000.00	
3.	Technical Training And Support	1 Lot	\$ 15,000.00	\$ 15,000.00	Estimated cost for a one (1) month stay in Kosrae. For one person.
4.	Sub Total Cost			\$ 202,500.00	Funding by PACC
5.	KUA Share in Meter Acquisition	350 units	\$ 85.00	\$ 29,750.00	KUA's Funding Share
	<b>TOTAL PROJECT COST</b>			<b>\$ 232,250.00</b>	

#### **3.1.2.4 BENEFITS OF THE PROJECT**

- 3.1.2.4.1 KUA will be able to maintain just one (1) billing system for its Electricity Division. Presently, two (2) individual systems is being operated and maintained to serve the billing and collection system of KUA.
- 3.1.2.4.2 A singular metering system could be configured for a Smart Grid Metering System that can be set up in the future.
- 3.1.2.4.3 Will continue the success rate achieved in conservation of energy with its wise usage due to a proactive system of visual monitoring with Prepayment KWH Meters.
- 3.1.2.4.4 The system being considered (**Shenzhen Inhemeter**) to replace the one in use at KUA at present is one of the cheapest costs if not the cheapest available in the market. It is almost three (3) times cheaper per unit than the brand utilized at KUA presently.
- 3.1.2.4.5 KUA having had experience in the operation and Maintenance of Prepayment metering system need not undergo prolonged training on the new system.
- 3.1.2.4.6 KUA can dispose of the replaced Prepaid KWH meters through other Pacific Island Utilities utilizing the same Brand and model of meters. The meters can be procured at discounted costs as service to other utilities. Proceeds from the sale could be used to fund KUA's share for the project.
- 3.1.2.4.7 Savings in Energy through the project will produce a positive impact in the reduction of greenhouse gases produced at the power plant.
- 3.1.2.4.8 The project will provide a good training vehicle for KUA's staff and technicians Capacity Building in keeping abreast with the fast changing world of Science and Technology.
- 3.1.2.4.9 Operational costs savings is possible with a unitary metering system in place at the utility.
- 3.1.2.4.10 Full operational service and system support is guaranteed from the supplier as an incentive for being an exclusive customer.

**3.1.2.5 COST RECOVERY PLAN**

**3.1.2.5.1 Estimated cost of Project: \$ 232, 250.00**

**3.1.2.5.2 Estimated Savings per month: \$ 5,000.00 / month**

**3.1.2.5.3 Estimated Cost recovery Period: \$ 232,500.00 / \$ 5,000.00 per month**

**3.1.2.5.4 Recovery Period of Cost: = 46.5 months**

**ANNEX A. PROPOSED PROJECTS PLANNED FOR KUA**

<b>ACTIVITY</b>	<b>CAPITAL COST</b>	<b>ESTIMATED NET SAVINGS PER MONTH</b>	<b>PAY BACK PERIOD</b>
1. Installation of a 1250 KW GenSet as a Prime Unit.	\$1,000,000.00	\$15,000.00	10 TO 12 YEARS with a lifespan estimated at 20 years.
2. Increase capacity of grid connected solar PV system by 50 KW	\$400,000.00	\$4,000.00	9 to 10 years
3. Upgrade of Power Sub Station	\$450,000.00	Mitigate an estimated loss of \$180,000/mo. with breakdown of Sub Station Savings from Efficiency at \$10,000 per Mo.	5 years
4. Installation of fuel saving device at the Generator Engine.	\$50,000.00	\$1,250.00	3 Years
<b>Total Capital Cost</b>	<b>\$1,900,000.00</b>		



## NOTES ON ANNEX A. (PROJECTS PLANNED FOR KUA)

1. Generator is projected to last a lifespan of twenty (20) years in operation as have been experienced at the power plant in KUA. Although a decline in efficiency in time will be experienced as the unit ages, it is projected that maximum efficiency can be achieved in the first ten to twelve years of operation. This time period of ten to twelve years was the basis of computing the recovery for the payback period.
2. KUA's various Grid Connected Solar PV Systems at different sites have a combined capacity of **50 KW**. KUA is pursuing with the assistance of EDF 10 program a project of adding more solar power capacity to the existing grid connected PV system. KUA's overall goal is to reach 20% of the peak load of the system.

With the funds to be requested from the EDF 10 program, KUA aims to reach 10% of the peak load with additional sites to be fitted with solar panel arrays. It means that 70 KW of grid connected PV system will be added within two (2) to Three (3) years. This will result in an installed system capacity of 120 KW of solar power. The system will generate an estimated energy of 900 KWH per day contributing to a fuel savings of approximately 70 Gals per day.

3. The upgrade of the power substation has long been overdue. The facility is deteriorating at a pace that an immediate retrofit is necessary to avert a catastrophic situation. Being the only structure to regulate and transmit power to different localities in Kosrae, its failure will plunge the island into a tragic condition of total power blackout. With a total failure of the substation KUA will sustain a loss equal to its average collection of **\$180,000.00** per month assuming a total failure lasting only one month. Not factored in is the devastating effect on loss of electricity on the business, educational, health and administrative services.

It was estimated that rebuilding of the substation will cost **\$ 450,000.00**. The project will ensure the steady distribution of power all around Kosrae. The project is primarily a damage cost mitigation project but will also increase efficiency of the system with new power transformers for station power and auxiliaries. A 50% cost reduction from core and iron losses due to resizing of power transformers will be realized. Target savings will be at \$ 15,000.00 per month and with an estimated payback period of around 5 years.

4. KUA has come to an agreement with a firm to install fuel economizer for the Generators at power plant. The intent is to reduce the consumption of fuel in power production to increase the fuel efficiency in power production. An annual savings of 1% is being projected to be attained which will save KUA \$15,000.00 annually.

## ANNEX B. PROPOSED SCHEDULE OF ACTIVITIES

Task No	PROGRAM OF ACTIVITIES IN UPGRADING OF PRE PAYMENT KWH METERS			
	Description of Activity	ACTION BY	TARGET DATE	TARGET MILESTONE
1	Submittal of Proposal	KUA	June 2012	SUBMISSION OF PAPERS
2	Approval of Proposal	SPC	August 2012	AGREEMENT REACHED
3	Procurement of System and Hardware	KUA/SPC	Sep to Dec 2012	PROCUREMENT OF SYSTEM
4	Phase One, (Set up of new Operating System/ Training)	KUA/SUPPLIER	Jan 2013	COMPONENTS DELIVERED / TRAINING
5	Phase Two, (Replacement of Prepayment Meters (200 units Residential)	KUA	Feb to Apr 2013	INSTALLATION OF FIRST BATCH
6	Phase Three, (Replacement of Prepayment Meters (300 units, Residential)	KUA	May to Aug 2013	INSTALLATION OF SECOND BATCH
7	Phase Four, (Replacement of Prepayment Meters (350 Meters, Residential)	KUA	Sep to Dec 2013	INSTALLATION OF THIRD BATCH
8	Phase Five, (Replacement of Prepayment Meters (400 Meters, Residential)	KUA	Jan to Apr 2014	INSTALLATION OF FOURTH BATCH
9	Phase Six, (Replacement of Prepayment Meters (400 Meters, Residential)	KUA	May to Aug 2014	INSTALLATION OF FIFTH BATCH
10	Phase Seven, (Replacement of Prepayment Meters (200 Meters,	KUA	Sep to Dec 2014	INSTALLATION OF SIXTH BATCH/COMPLETION