GOVERNMENT ENERGY MANAGEMENT PROGRAM *(GEMP)*

Background

The Government Energy Management Program's (GEMP) aim is to reduce the monthly consumption of electricity and transport petroleum products by at least ten percent in all Government Departments, Government Owned and Controlled Corporations (GOCCs), State Colleges and Universities (SCUs), Hospitals and other instrumentalities of the Government except for constitutional bodies including the judiciary and legislative body.

GOVERNMENT ENERGY MANAGEMENT PROGRAM

In compliance with Administrative Orders 103, 110, 110-A, & 126

Air-conditioning Unit & Lighting System Retrofit of Government Buildings in Luzon

"Survey on 161 Government Agencies"

Energy Efficiency and Conservation Division
Energy Utilization Management Bureau

I. Brief Description

On October 2014, a survey was started by the entire team of the Energy Efficiency and Conservation Division (EECD) in order to acquire data about the existing ACUs and Lighting systems of various government buildings. The main objective is to know the technical and economic viability of retrofitting energy inefficient government buildings. Data on 161 buildings have been gathered, which was then used to estimate potential savings (kWh and PhP) and Return of Investments (ROI) in the scenario that all old / inefficient ACU and lighting loads are to be replaced with inverter-types and LED linear lamps, respectively.

The results of this survey served as the basis for the World Bank's study entitled "Options for Financing Energy Efficiency in Public Buildings in the Philippines".

Asec. Robert Uy, Dir. Jesus Tamang and Division Chief Art Habitan attended the presentation of World Bank's study.

II. Scope and Limitation of the Survey

- ***Government Buildings/Establishments/Institutions:***
  - National and Line Agencies
  - Government Owned and Controlled Corporations
  - Academe
  - Hospital

II.A. Airconditioning Units

NON-INVERTER AIRCONDITIONING UNITS	RATING (HP)						RATING (TR)						
✓ Window type ✓ Split Type (Wall Mounted) ✓ Package Type (Floor-Mounted)	0.5	1	1.5	2	2.5	3	0.5	1	1.5	2	2.5	3	3.5
	3.5	4	4.5	5	6		4	4.5	5	6	7	7.5	

II.B. Lighting System

CATEGORY	LIGHTING TYPE	RATING (W)
✓ Fluorescent Lamps	Linear Fluorescent Lamps	14-40W
	CFL/Halogen/IB/Mercury/HPS	8-500W

III. Cost Benefit Analysis of Airconditioning Units

TABLE 14.0: LUZON AREA

AIRCON REPLACEMENT
COST BENEFIT ANALYSIS

PARTICULAR	AIRCON
A. Estimated Consumption of 20,799 Non-Inverter AC, kWh/year	**111,302,893**
B. Estimated Consumption of 20,799 Inverter AC, kWh/year	**72,346,880**
C. Savings, kWh/year	**38,956,013**
D. Peso Savings, *Php/year*	**428,516,138**
*computed based on electricity price of PhP 11.00 / kWh	
E. Investment Cost, *Php for Inverter Type*	
6 HP: 5 units x P 180,748.00/unit	903,740
5 HP: 279 units x P 131,600.00/unit	36,716,400
4.5 HP: 5 units x P 118,152.00/unit	590,760
4 HP: 202 units x P 108,299.00/unit	21,876,398
3.5 HP: 2 units x P 89,300.00/unit	178,600
3 HP: 258 units x P 69,999.00/unit	18,059,742
2.5 HP: 1,706 units x P 40,499.00/unit	69,091,294
2 HP: 8,262 units x P 34,299.00/unit	283,378,338
1.5 HP: 2,826 units x P 24,089.00/unit	68,075,514
1 HP: 1419 units x P 23,099.00/unit	32,777,481
0.5 HP: 91 units x P 9,898.00/unit	900,809
7.5 TR: 322 units x P 248,572.00/unit	80,040,184
7 TR: 29 units x P 232,651.00/unit	6,746,879
6 TR: 2 units x P 200,808.00/unit	401,616
5 TR: 1,826 units x P 168,965.00/unit	308,530,090
4.5 TR: 21 units x P 153,044.00/unit	3,213,924
4 TR: 21 units x P 135,000.00/unit	2,835,000
3.5 TR: 3 units x P 121,201.00/unit	363,603
3 TR: 2,378 units x P 105,280.00/unit	250,355,840
2.5 TR: 73 units x P 89,358.00/unit	6,523,134
2 TR: 625 units x P 73,437.00/unit	45,898,125
1.5 TR: 207 units x P 57,515.00/unit	11,905,605
1 TR: 191 units x P 41,594.00/unit	7,944,454
0.5 TR: 46 units x P 25,672.00/unit	1,180,912
Total Investment Cost, Php for Inverter Type	**1,258,488,442**
Total Investment Cost (including Installation/Labor/Delivery, +25%)	**1,573,110,552.50**
With contingency (20%)	**1,887,732,663.00**
F. Simple Payback Period	**4.41**
=Total Investment Cost/ Peso Savings/year	

IV. Cost Benefit Analysis of Lighting System

TABLE 15.0:

LIGHTING REPLACEMENT
COST BENEFIT ANALYSIS

PARTICULAR	LIGHTING
A. Estimated Consumption of 307,355 (28-40W) Fluorescent Lamps	
65,752 (14-20W) Flourescent Lamps	
132 (500W) Halogen/Mercury/HPS Lamps	
180 (400W) Halogen/Mercury/HPS Lamps	
18 (300-350W) Halogen Lamps	
685 (250W) Halogen/Mercury/HPS Lamps	
965 (150-200W) Halogen/Mercury/HPS Lamps	
914 (80-120W) CFL/HPS/Halogen/PAR/IB Lamps	
1,330 (55-75W) Halogen/IB Lamps	
6,497 (32-50W) Halogen/IB/CFL/HPS Lamps	
7,778 (24-30W) Halogen/IB/CFL Lamps	
37, 433 (17-23W) Halogen/IB/CFL Lamps	
4,860 (14-15W) CFL Lamps	
4,069 (10-13W) IB/CFL/Halogen Lamps	
3,615 (8-9W) CFL Lamps kWh/year	**59,510,659.00**
B. Estimated Consumption of 307,355 (16W) LED Linear Lamp	
65,752 (8W) LED Linear Lamp	
132 (120W) LED Bulb	
180 (100W) LED Bulb	
18 (90W) LED Bulb	
685 (70W) LED Bulb	
965 (50W) LED Bulb	
914 (40W) LED Bulb	
1,330 (30W) LED Bulb	
6,497 (15W) LED Bulb	
7,778 (13W) LED Bulb	
37, 433 (9W) LED Bulb	
4,860 (7W) LED Bulb	
4,069 (5W) LED Bulb	
3,615 (4W) LED Bulb kWh/year	**23,804,264**
C. Savings, kWh/year	**35,706,395**
D. Peso Savings, Php/year	**392,770,349**
*computed based on electricity price of PhP 11.00 / kWh	
E. Investment Cost	
16W LED Linear: 307,355 units x P 1,500.00/unit	461,032,500
8W LED Linear: 65,752 units x P 280.00/unit	18,410,560
120W LED Bulb: 132 units x P 21,000.00/unit	2,772,000
100W LED Bulb: 180 units x P 21,000.00/unit	3,780,000
90W LED Bulb: 18 units x P 20,000.00/unit	360,000
70W LED Bulb: 685 units x P 20,000.00/unit	13,700,000
50W LED Bulb: 965 units x P 19,000.00/unit	18,335,000
40W LED Bulb: 914 units x P 19,000.00/unit	17,366,000
30W LED Bulb: 1,330 units x P 1,067.00/unit	1,419,110
15W LED Bulb: 6,497 units x P 870.00/unit	5,652,390
13W LED Bulb: 7,778 units x P 750.00/unit	5,833,500
9W LED Bulb: 37,433 units x P 620.00/unit	23,208,460
7W LED Bulb: 4,860 units x P 490.00/unit	2,381,400
5W LED Bulb: 4,069 units x P 370.00/unit	1,505,530
4W LED Bulb: 3,615 units x P 370.00/unit	1,337,550
Material Investment Cost, Php for LED	**577,094,000**
Total Investment Cost (including Installation/Labor/Delivery, +25%)	**721,367,500.00**
With contingency (20%)	**865,641,000.00**
F. Simple Payback Period	**2.20**
=Total Investment Cost/Peso Savings/year	

V. 2013-2014 Electricity Consumption Profile

2013 KWH DATA FOR GOVERNMENT AGENCIES		
GOVERNMENT AGENCIES	TOTAL KWH FOR 2013	PERCENTAGE SHARE
National & Line Agencies	60,516,515	12%
Government Owned and Controlled Corporations	329,678,131	64%
Academe	57,451,625	11%
Hospital	65,258,092	13%
Total	512,904,363	100%

2014 KWH DATA FOR GOVERNMENT AGENCIES		
GOVERNMENT AGENCIES	TOTAL KWH FOR 2014	PERCENTAGE SHARE
National & Line Agencies	63,471,961	12%
Government Owned and Controlled Corporations	337,388,054	64%
Academe	59,069,286	11%
Hospital	65,233,387	12%
Total	525,162,688	100%

**Note: 2014 kWh consumption data is composed of Jan-Sept data only. Oct.-Dec. 2014 data is projected. Estimated Potential Savings refer to Airconditioning and Lighting retrofit of 161 Buildings.*

	KWh	%Share	KWh Savings Per year (A)-(B)	Equivalent Savings Per Year in Peso	Investment in Peso	Payback (Years)
(A) 2014 Electricity Consumption	**525,562,688 (Php 5,781,189,568)**	**100%**				
BREAKDOWN						
A/C Non-Inverter (Estimate)	111,302,893	21.18%				
FL Lighting (Estimate)	59,510,659	11.32%				
Other Loads (Computers, appliances, pumps, Centralized ACU, etc.)	354,749,136	67.50%				
			74,662,407	821,286,481	2.752 B	3.35
(B) New Consumption (Estimate)	**450,900,280 (Php 4,959,903,086)**	**100%**				
BREAKDOWN						
A/C Inverter (Estimate)	72,346,881	16.04%				
LED Lighting (Estimate)	23,804,263	5.28%				
Other Loads (Computers, appliances, pumps, Centralized ACU, etc.)	354,749,136	78.68%				

VI. Summary of Results

- With the total inventory of conventional ACUs (20,799 units) and non-LED lights (307,355 units) gathered from the survey, the cost of retrofitting was estimated to be **2.752 B pesos**.

- The annual savings from the retrofitting activity was estimated to be **821,286,481 pesos** (*74,662,407 kWh*). Hence, the calculated payback period was **3.35 years**.

Possible Areas of Collaboration

1. Improvement of Public Procurement allowing Government Building's access to ESCO services.

2. A System that tags all programs / activities of Government Agencies that contribute to the Improvement of Energy Efficiency and Conservation in Government Buildings.

3. Facilitation of Funding Mechanisms for ESCO implementation of programs and projects in government.

4. Capacity Development for Enercon Officers in Government Buildings with respect to Energy Management and compliance to ISO 50001.

5. Models of Best Practices on Energy Efficiency and Conservation in other Governments.

END OF PRESENTATION