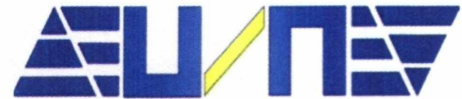




Republic of the Philippines  
DEPARTMENT OF ENERGY  
Energy Utilization Management Bureau



15 February 2021

**MS. SONIA B. SAN DIEGO**  
Deputy Administrator, EECO  
National Electrification Administration  
57 NIA Rd., Diliman, Quezon City

**ATTENTION:** Mr. Estanislao Laxa, Jr.

**Dear Ms. San Diego:**


We are pleased to transmit the report on the virtual energy audit spot check conducted at your building facilities on 11 February 2021 by our staff from the Energy Efficiency and Conservation Public Sector Management Division.

The report highlights the analyses we made on the energy consuming systems in your facilities. Our findings and recommendations focus on ways to save energy in your lighting system, office equipment and air-conditioning system.

We take this opportunity to thank you and your staff for the cooperation and hospitality accorded to our team during the conduct of the audit.

Should you have any inquiry or if you need further assistance, please feel free to contact Ms. R. Joan R. Sotelo ([sotelorjoan@gmail.com](mailto:sotelorjoan@gmail.com)), and/or Mr. Marc Venson D. Chua ([mackoychua@gmail.com](mailto:mackoychua@gmail.com)) at Telephone Nos. (02) 8840-2243 and 8479-29-00 local 214.

Very truly yours,

  
**PATRICK T. AQUINO, CESO III**  
Director

  
rrs/mvdc








**National Electrification  
Administration**  
*57 NIA Rd., Diliman, Quezon City*

**Energy Efficiency & Conservation Performance  
Assessment Report**

Prepared by:

**DEPARTMENT OF ENERGY**  
Energy Efficiency and Conservation Public Sector  
Management Division

Energy Auditors:

Rosalie Joan DR. Sotelo   
Simon S. Leonor  
Crizaldo G. Santos  
Victorino G. Getalado, Jr.   
Marc Venson D. Chua   
Louise Andrea B. Melquiades   
Jairus Drei E. Geronimo   
Ingrid Faye P. Calayag

Noted by:

  
**PATRICK T. AQUINO, CESO III**  
Director, EUMB

## Facility Description Summary

1. Name of Agency : National Electrification Administration (NEA)
2. Address : 57 NIA Rd., Diliman, Quezon City
3. Contact Person : Ms. Sonia B. San Diego  
Deputy Administrator  
Energy Efficiency and Conservation Officer  
  
Hernando N. Gabotero  
Building and Ground Maintenance Head B  
  
Mr. Estanislao Laxa, Jr.
4. Operating Hours : Mondays – Fridays (8:00 AM – 5:00 PM)

NEA is occupying a 10 story building which is composed of two levels basement parking, seven levels of office areas and a penthouse. The office building is located at 57 NIA Rd., Diliman, Quezon City. The gross floor area of the buildings were provided with its lighting and air conditioning system. NEA operates Mondays – Fridays (8:00 AM – 5:00 PM). Electricity is supplied by Manila Electric Company, Inc. (MERALCO).

**PERFORMANCE ASSESSMENT INITIAL REPORT**  
**Energy Conservation Measures**

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**I. Executive Summary**

In connection with the Department of Energy's (DOE) direction for institutionalization of a Government Energy Management Program (GEMP), a virtual energy audit at the NEA was conducted to identify the opportunities for energy efficiency and conservation on its electrical facilities specifically to achieve more efficient measures for its existing air cooling units and lighting systems. The DOE Energy Audit Team (DOE EAT) was composed of personnel from the Energy Efficiency and Conservation Public Sector Management Division (EPSMD).

The virtual energy audit inspection was assisted by the group of Ms. Estrellita Volante, Mr. Hernando Gabotero and Mr. Estanislao Laxa of NEA. NEA's group were interviewed regarding their programs and practices related to energy efficiency and conservation.

**Summary of Recommended Energy Conservation Measures**

Recommended Measures	Potential Savings/Benefits		Estimated Investment Cost, Peso	Payback Period, yrs
	kWh/yr	Peso/yr		
1. Replace the existing conventional ACUs with Inverter Type ACUs	278,593.56	2,785,935.60	2,785,935.60	4.42
2. Replace the existing fluorescent lamps/bulbs with LEDs	46,785.70	467,857.00	350,768.00	0.75

**II. Office Special Orders and other Issuance/s on Energy Conservation Measures**

NEA implements energy conservation initiatives and measures in their facilities although currently there is with EE&C issuances. The facility have an Energy Efficiency and Conservation Officer (EECO) by assignment with office order, Ms. Sonia B. San Diego. Pursuant to R.A. 11285, EECO shall lead the overall supervision of EE&C activities and measures for the facility.

### III. Building Energy Efficiency Index (BEEI)

The office building have a total conditioned area of about 7,803.90 m<sup>2</sup> with an annual consumption of 528,000 kWh for the year 2020.

Based on the ASEAN Energy Efficiency and Conservation Best Practices for Office Building standards, the considered efficient BEEI value is equal or less than 160 kWh/year/m<sup>2</sup>.

### IV. Energy Audit Observation:

#### A. Air-conditioning System

##### Observations:

- The air-conditioning units installed in the facility were composed of 3 units - 1 HP conventional type ACU (window type), 3 units – 1.5 HP conventional type ACU (window type), 37 units – 2 HP conventional type ACU (window type), 7 units – 2.5 HP conventional type ACU (window type), 3 units – 5 HP conventional type (floor mounted) ACU, 2 units – 3 TR conventional split type ACU, 1 unit – 5 TR conventional split type ACU, and 26 units – 7.5 TR conventional split type ACU. The rest were already inverter types.
- Air-conditioning units are switched off when not in use.
- Air-conditioning units have label indicating its scheduled hours of operation

##### Recommendations:

- Keep the doors and windows closed to prevent hot air from coming inside the air-conditioned area.
- Maintain the ACU thermostat setting not lower than 24°C.
- Provide thermometers (analog or digital) for each air-conditioned areas to monitor the room temperature.
- Clean the filters and condensers regularly. It helps operate the motor efficiently.
- Install shading or glass tints on window panels exposed to direct sunlight. It will reduce heat load in the room.
- Consider to replace conventional air-conditioning units with inverter type air-conditioning units. Please see attached cost analysis for air-con replacement.

##### Note:

- Since actual measurement cannot be done with the use of temperature data logger equipment due to the nature of virtual energy audit, the team made use of BEEI as its equivalent gauge of evaluation, for the purpose of quality measurement.

## **B. Lighting System**

### Observations:

- The existing installed conventional lightings were 90 units – 1x18W Linear Fluorescent Lamps, 96 units – 2x18W Linear Fluorescent Lamps, 437 units – 1x30W Linear Fluorescent Lamps, and 271 units – 2x30W Linear Fluorescent Lamps,. The rest were already LEDs.
- Hazy reflectors, louvers and diffusers contribute to the uneven illuminance level.
- The Lighting Power Density (LPD) is considered efficient if it is below 10 W/m<sup>2</sup>.

### Recommendation:

- Should there be lighting replacements in the future, ensure that LEDs will be procured.
- Assess the existing lighting system of the office areas. Make sure that each work area/desk has enough illumination between 300 to 700 lux.
- To increase or maintain the illumination level, clean the lamp fixtures regularly.
- Use illuminance meters to monitor the level of degradation monthly.
- Make use of natural lighting whenever possible.
- Use Task Lighting in work areas to improve overall room illuminance level.

### Note:

- Since actual measurement cannot be done with the use of Lux Meter equipment due to the nature of virtual energy audit, the team made use of LPD as its equivalent gauge of evaluation, for the purpose of quality measurement.

## **C. Other Office Equipment**

### Observation:

- All computer monitors are using LCD/LED technology
- Computers were turned off during lunch break.
- Electrical appliances were unplugged when not in use.

### Recommendations:

- Gradually shift from using Desktop units to Laptop units on some minor clerical work stations.
- Turn-off computer monitors when leaving the workplace for a longer period of time.
- Educate and encourage employees to be energy-conscious and to offer ideas about how energy can be saved. Employee buy-in and involvement can make or break the agency's efforts to conserve energy.

## D. Fuels

### Observations:

- Inventory list and assignments of government service vehicles to a particular official were recorded including the fuel monitoring of each vehicle, the dispatching system and compliance on trip tickets.
- Preventive maintenance schedule of service vehicles were also recorded.
- No idling rule is being implemented in parking and waiting areas.

### Recommendations:

- Keep records of vehicle odometer reading and fuel consumption monthly to determine vehicle mileage.
- Use of vehicles shall be planned and scheduled to avoid unnecessary trips.
- Keep speed down and drive at a steady speed. The most efficient driving speed is 80 kph.
- Include in the fuel conservation program the reduction of fuel allocation for each vehicle by 10%.
- For future reference, request for replacement of vehicles more than 7 years if it has already traveled 175,000 km (Section 9.1.1 of National Budget Circular no. 446 series of 1995).

## V. Conclusion

There is an existing Energy Efficiency and Conservation (EE&C) initiative from NEA's end on further reducing their energy consumption as virtually inspected using energy efficient technologies installed on their facilities (Inverter type A/Cs and LED lightings).

Likewise, there was an office order on the designation of Energy Efficiency and Conservation Officer.


To further enhance the effort that has been started, the DOE team recommends the following general energy efficiency and conservation measures, and these are:

- For sustainability of the EEC Officer's assignments, ensure that the convened EEC committee of NEA shall periodically set EE&C targets, activities, and programs which shall be regularly monitored and evaluated.
- Formulate energy conservation guidelines for electricity and fuel, in relation to the attached IAEECC Resolution No. 1 series of 2020 entitled "Directing all government agencies, including Local Government units (LGUs) and foreign service posts, to comply with the GEMP, ordering the DOE to conduct energy audits and spot checks, and submit the proposed improvements to the GEMP."

- Pursuant to the implementing rules and regulations of the R.A. 11285 otherwise known as Energy Efficiency and Conservation Act, each government entity shall formulate an energy efficiency and conservation program to include energy conservation measures, target savings, motor vehicle inventory and other strategies consistent with the GEMP as well as compliance to Section 44 and 45 of the EEC-IRR.
- EEC Committee of NEA to classify additional energy consuming equipment on a per year basis, otherwise keep records of data on the retrofit activities (i.e. retrofit of centralized ACU into unitary inverter type A/Cs) which may result in gradual increase/decrease of annual energy consumption.
- Continuously update and formulate an internal office policy for sustaining the implementation of EE&C
- Posting of energy conservation signage such as "Turn off lights/office equipment when not in use"
- Conduct in-house capacity building seminars to all employees focusing on energy saving tips and proper energy management in the building.
- Maintain and record essential documents such as electric bill, inventory of lighting, A/C and other energy equipment constantly.
- Maintain energy consumption monitoring database for electricity and fuel for all service vehicles in accordance with Administrative Order 110.

Prepared by:

  
**Rosalie Joan D. Sotelo**  
Senior Science Research Specialist

  
**Marc Venson D. Chua**  
Science Research Specialist II



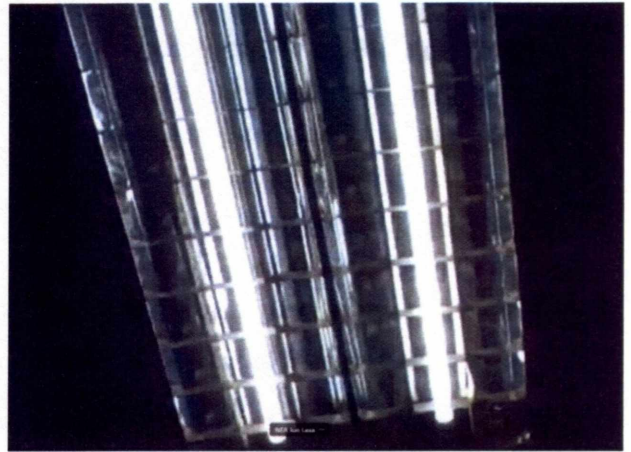
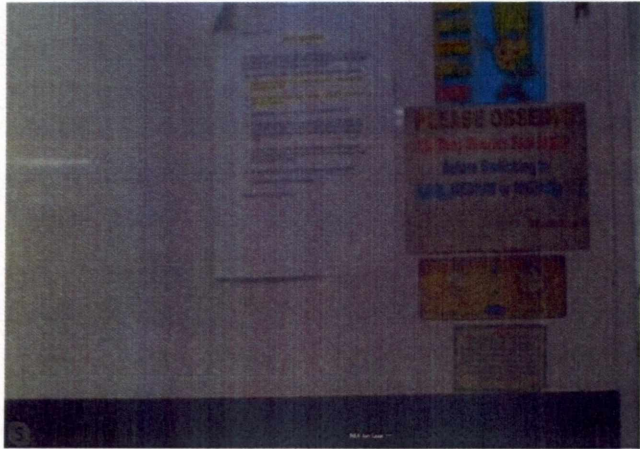
## ANNEX



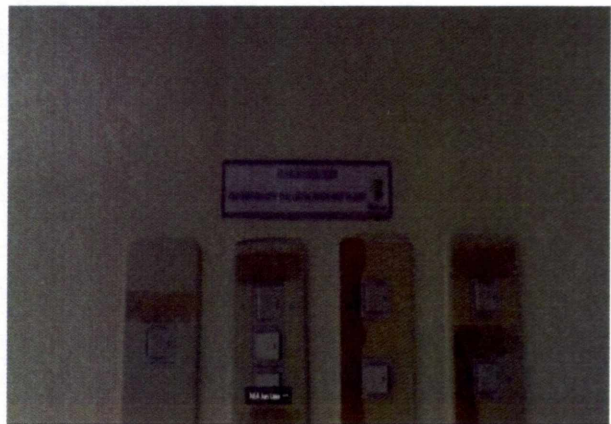
Typical door office entrance during the room sampling at NEA



Office windows with blinds



Air-conditioning unit (with thermostat setting) and lighting in the facility



Office work area and energy conservation posting

## COST BENEFIT ANALYSIS

### AIR-CONDITIONING UNITS REPLACEMENT

PARTICULAR	AIRCON
A. Estimated Consumption of 125 Non-Inverter AC, kWh/year	795,981.60
B. Estimated Consumption of 125 Inverter AC, kWh/year	517,388.04
C. Savings, kWh/year	278,593.56
D. Peso Savings, Php/year =Savings, kWh/year x Electricity Rate (10.00)	2,785,935.60
E. Investment Cost, Php for Inverter Type	
7.5 TR: 26 units x P 200,000.00/unit	5,200,000.00
5 TR: 1 unit x P 182,000.00/unit	182,000.00
3 TR: 2 units x P 114,000.00/unit	248,600.00
5 HP: 3 units x P 78,100.00/unit	453,000.00
2.5 HP: 44 units x P 78,100.00/unit	3,436,400.00
2.0 HP: 29 units x P 64,900.00/unit	1,882,100.00
1.5 HP: 14 units x P 47,300.00/unit	662,200.00
1.0 HP: 6 units x P 42,900.00/unit	257,400.00
Total Investment Cost, Php for Inverter Type	12,321,700.00
F. Simple Payback Period =Total Investment Cost/ Peso Savings/year	<b>4.42</b>

### A. Consumption of Non Inverter ACUs

Particular	Unit Cost with Installation Cost	Qty	kW	Hour	Days	Total kWh
7.5 TR Air-Conditioning Unit	200,000.00	26	7.31	8	21.5	32,701.50
5 TR Air-Conditioning Unit	182,000.00	1	4.88	8	21.5	838.50
3 TR Air-Conditioning Unit	124,300.00	2	2.925	8	21.5	1,006.20
5 HP Air-Conditioning Unit	151,000.00	3	4.4	8	21.5	2,270.40
2.5 HP Air-Conditioning Unit	78,100.00	44	2.2	8	21.5	16,649.60
2.0 HP Air-Conditioning Unit	64,900.00	29	1.76	8	21.5	8,778.88
1.5 HP Air-Conditioning Unit	47,300.00	14	1.32	8	21.5	3,178.56
1.0 HP Air-Conditioning Unit	42,900.00	6	0.88	8	21.5	908.16
		125		Total kWh/month		<b>66,331.80</b>
				Total kWh/year		<b>795,981.60</b>

## LIGHTING REPLACEMENT

PARTICULAR	LIGHTING
<b>A. Estimated Consumption of 90 (1x18W) Linear Fluorescent Lamps</b>	93,378
96 (2x18W) Linear Fluorescent Lamps	
437 (1x30W) Fluorescent Lamps	
271 (2x30W) Fluorescent Lamps	
kWh/year	
<b>B. Estimated Consumption of 979 (1x16W) LED Linear Lamp</b>	46,592
282 (1x8W) LED Linear Lamp	
kWh/year	
<b>C. Savings, kWh/year</b>	<b>46,785.700</b>
<b>D. Peso Savings, Php/year</b>	
*computed based on electricity price of PhP 10.00 / kWh	<b>467,857.00</b>
<b>E. Investment Cost</b>	
16W LED Linear lamp: 979 units x P 218.00/unit	213,422.00
8W LED Linear lamp: 282 units x P 200.00/unit	56,400.00
<b>Total Investment Cost, Php for LED</b>	<b>350,768.60</b>
<b>F. Simple Payback Period</b>	<b>0.75</b>
=Total Investment Cost/Peso Savings/year	

9 /



**DEPARTMENT OF ENERGY  
GOVERNMENT ENERGY MANAGEMENT PROGRAM  
ENERGY AUDIT INITIAL RATING**

Name of Government Office: National Electrification Administration  
 Address: 57 NIA Road Government Center, Diliman, Quezon City  
 Date & Time of Spot-check: 11 February 2021; 9:00 AM

**Result**

**95.0%**  
SCORE

RATING

**A**  
GRADE

**Office Policy**

Perfect Score %	Agency's Score %	
5	5.0	1.) Designation of Enercon Officer
5	5.0	2.) Office issuances on energy conservation

**Best Practices for Electricity Conservation**

5	5.0	1.) Use of efficient lighting lamps such as LED, CFL, Slim type Fluorescent and others
5	3.0	2.) Use of efficient equipment such as appliances with Inverter Technology, LED displays and others
2	2.0	3.) Utilizing daylight whenever possible
5	5.0	4.) Room temperature not lower than 25 °C
5	3.0	5.) Aircon operation are scheduled from 9:00 AM to 4:00 PM
5	5.0	6.) Keeping the air conditioned room sealed from air infiltration
5	5.0	7.) Setting the ACU at "Fan Mode" during lunch break between 12:00 NN to 1:00 PM
5	4.0	8.) Turning off lights, computers, appliances, and other equipment when not in use
3	3.0	9.) Using stairs instead of elevator when going up or down one (1) floor

*Document Records for Electricity Conservation*

5	5.0	10.) Inventory list of Lightings, ACUs and other office equipment
5	5.0	11.) Monthly Electricity Consumption Report five (5) years from the present year with the latest copy of electricity bill

**Best Practices for Fuel Conservation**

10	10.0	1.) Implementation of Fuel Conservation Program
5	5.0	2.) Performing Preventive Maintenance Schedule (PMS) of official service vehicles
5	5.0	3.) Avoiding idling of engines while waiting and/or parking

*Document Records for Fuel Conservation*

5	5.0	4.) Inventory list and assignment of government service vehicles to a particular official
5	5.0	5.) Monthly Fuel Monitoring Report five (5) years from the present year
5	5.0	6.) Records of daily entry and dispatch of service vehicles from motorpool
5	5.0	7.) Records of Trip Tickets for each service vehicle

Energy Audit Team: RRS / MVDC / CGS / SSL / VGGJ / Received by: Sonia B. San Diego  
 Deputy Administrator, EECO  
 Date: 11 February 2021; 9:00 AM

**Important Notes:**

1. Since actual measurement cannot be done with the use of temperature data logger equipment due to the nature of virtual energy audit, the team made use of BEEI as its equivalent gauge of evaluation, for the purpose of quality measurement.
2. Since actual measurement cannot be done with the use of Lux Meter equipment due to the nature of virtual energy audit, the team made use of LPD as its equivalent gauge of evaluation, for the purpose of quality measurement.
3. This course shall be taken for the duration of COVID-19 pandemic, or until actual site inspection can take place.

9/