

ENERGY AUDIT REPORT 2022

I. ESTABLISHMENT DESCRIPTION SUMMARY

NAME OF ESTABLISHMENT	J3 Trainers and Consultants, Inc.
ADDRESS	MEPZ 2, Basak, Lapu-Lapu City
CONTACT PERSON	Engr. Jay Escorial, CEM
SECTORS	Industrial DE

The company is offering its services in the conduct of energy audits and engineering consultancy as a solutions provider to the industrial, commercial & the transport industries.

The 3-storey building houses 899 employees for its repair and manufacturing processes and its office space with a total gross floor area of 17,000 sqm and an annual energy consumption of **10,5918,913 kWh for CY2021**. The computed BEEI of the facility is **668.13 kWh/year/sqm** or a ratio on the energy use per output of **144 kWh/output**. It has a space temperature and %RH which ranges from 22 degC – 25 degC and 30% - 70% respectively for the maintenance and proper operations of test equipment which requires a stable temperature and humidity ranges. The lighting system utilizes at least 95% LED while maximizing the use of natural lights from windows and solar powered perimeter lightings.

II. PERFORMANCE ASSESMENT REPORT, ENERGY CONSERVATION MEASURES

A. Lighting System

- i. Accounting of the remaining CFL lamps and their corresponding wattage
- ii. Measured lighting levels (illumination) at different areas through sampling method
- iii. Computation of lighting power density index for each floor

Table 1. Summary of Estimated Lighting Energy Consumption

Lamp Type	Rating (watts)	Quantity (pcs)	Annual kWh
LED Tube (Office & Production Area)	16	3,856	540,456.96
LED Bulb (Office, Meeting Rooms)	8	96	6,867.84
LED UFO (Office, Lobbies)	14	26	3,188.64
CFL's (CR's, Exit Stairs & GF Canopy)	40	236	14,471.52
Total		4216	564,984.96

The estimated energy consumption for the lighting fixtures in the facility is 564,984.96 kWh/year as shown in table 1.

Table 2. Lighting Power Density (LPD) Index

Floor	No. of Lamps	Total Wattage	Area (Sq.M)	LPD (W/Sq.M)
GF Prod Area	1466	23,456	7,000	3.35
2F Prod Area	1686	26,976	7,000	3.85
3F Office Area	704	11,264	3,000	3.75

Based on the calculated lighting power density index of the building in table 2, the existing lighting systems is below the maximum LPD index recommended by the DOE, Guidelines on Energy Conserving Design of Buildings (table 39, pp 88). The low LPD index of the facility is due to the use of highly efficient LED lamps.

B. Cooling Units

- i. Accounting of ACCU and its type & capacity
- ii. Accounting of VRF's and its capacity
- iii. Accounting of AHU's, CHW Pumps and other mechanical equipment

Table 3. Cooling Systems

Cooling System Equipment	Rating	Quantity	Annual Consumption (kWh)
	(kW)	(Count per Unit)	
Chiller	464	3	3,462,883
AHU	30	11	635,364
VRF (ACCU)	16	12	384,006.00
VRF (FCU)	0.9	88	162,000.00
VRF (ACCU)	11	1	48,180.00
PACU	6	2	52,560.00
CHWP	45	4	353,400.00
Total			5,098,393.00

III. ENERGY AUDIT OBSERVATIONS AND RECOMMENDATIONS

A. Observation and Findings (Lighting System)

1. Good practice:
 - Majority of the facility lighting fixtures are LED lights
 - Natural daylights are utilized through windows
 - Low light power density index was due to the use of high efficient LED lightings
 - Utilization of solar powered lights in the perimeter lightings

2. Findings:

- Some lighting fixture (5%) serving CR, exits and lobby are not yet LED of which can be an opportunity to save energy when converted to LED bulbs.

B. Observation and Findings (Cooling Units)

1. Good practice:

- Facilities utilization of building management system (BMS) and VFD's
- Utilization of energy efficient VRF system units
- Conduct of regular preventive maintenance of the cooling units

2. Findings:

- Deteriorated and damaged insulation for ACCU and its water pipes
- Frequency of cleaning of cooling coils for ACCU is quarterly & heavy build-up of dirt on the coils were observed.



IV. CONCLUSIONS

A. Lighting System

- Consider retrofitting of the remaining (5%) CFL lamps to LED.
- Utilizing the use of existing motion/occupancy sensors in the office and meeting rooms.

B. Cooling System

- Consider a more frequent cooling coils cleaning to ensure efficient heat transfer
- Facilitate repair of damaged ACCU insulation to eliminate cooling loss

C. Summary of Recommendations EE&C Measures

There is an existing Energy Efficiency & Conservation (EE&C) initiative from the facility on further improving and reducing their energy consumption. The Facilities & Eng'g Team are aware of the benefits of utilizing an energy efficient equipment and prioritizes the use of efficient technologies such as LED tube & bulbs and inverter-type VRF air conditioners.

To further enhance the efforts to practicing energy efficiency & conservation, the auditor recommends the following EE&C measures, and these are;

- Formulate energy conservation guidelines in relation to RA 11285
- Formulate and internal policy for a sustainable implementation of EE&C
- Conduct an in-house capacity building seminars to all employees focusing on the energy efficiency and conservation.
- Maintain and keep record of essential documents such as energy bill, inventory of lighting and all other energy consuming equipment/device.

Prepared by:

Engr. Jay Escorial, REE, CEA
Energy Auditor

Accepted by:

Engr. Jay Escorial, REE, CEM
Facility EE Practitioner