



MARIANO MARCOS STATE UNIVERSITY

Energy Wastage Identification

Another provision in the Energy Power Generation and Utilization Policy of the University is the auditing of energy centers, colleges and units in the university. Auditors from the Energy Management Committee are conducting on-the-spot and detailed audit to monitor energy wastage, non-functional equipment, KWH used and type of devices installed in a building. The data gathered will be useful in determining malfunctioned equipment and devices, as well as it can help detect energy wastage.

Here is a sample data that energy auditors gather:

Appliance \ Building	CBEA	S&T Park	NBERIC	CRL	ADMIN	FEM HALL	MANSION
Lights (CFL, T8, LED)	179	98	1013	462	634	122	55
Lights (Conventional)	0	0	0	0	0	0	0
ACU (Inverter)	38	2	18	5	30	0	3
ACU (Non-inverter)	6	0	0	17	31	1	3
Laptops (Branded)	40	0	5	20	25	0	0
Laptops (Generic)	0	0	0	0	0	0	0
Desktops (Branded)	61	1	7	22	127	0	0
Desktops (Generic)	0	0	0	0	0	0	0

Appliance \ Building	COM	CAFSD	COE	LIB1	LIB2	STUDENT CENTER	CETC	CAS
Lights (CFL, T8, LED)	673	327	541	207	314	253	68	249
Lights (Conventional)	0	0	0	0	0	0	0	0
ACU (Inverter)	12	25	22	45	42	3	11	15
ACU (Non-inverter)	6	16	21	29	5	0	0	5
Laptops (Branded)	0	3	0	0	7	0	0	0
Laptops (Generic)	0	0	0	0	0	0	0	0
Desktops (Branded)	13	13	25	44	15	1	1	5
Desktops (Generic)	0	0	0	0	0	0	0	0

COLLEGE: CAS							
DEPARTMENT:							
ROOM/ ROOM NO.		LIGHTING					
		TYPE	P.R.	VOLTAGE	PHASE	TIME OF USE (PER DAY)	
LOBBY		9 FLOURESCENT	252	230	1	8	
HALLWAY		30 FLOURESCENT	840	230	1	8	
CR - MALE		3 FLOURESCENT	84	230	1	8	
CR FOR HOLDING AREA		1 FLOURESCENT	28	230	1	8	
CR - MALE		2 BULB	30	230	1	8	
CR - FEMALE		2 BULB	30	230	1	8	
RM 108		12 SETS FLOURESCENT	336	230	1	8	
RM 110		6 SETS FLOURESCENT	168	230	1	8	
CLERICAL OFFICE		8 FLOURESCENT	288	230	1	8	
OFFICE OF THE DEAN		12 FLOURESCENT	336	230	1	8	
RM 106		12 FLOURESCENT	336	230	1	8	
METEOROLOGY LAB		12 PAIRS FLOURESCENT	336	230	1	8	
GUIDANCE OFFICE		6 PAIRS FLOURESCENT	168	230	1	8	
RM 206		8 FLOURESCENT	224	230	1	8	

RM 207	11 FLOURESCENT	308	230	1		8	
RM 208	9 FLOURESCENT	252	230	1		8	
RM 209	11 FLOURESCENT	308	230	1		8	
RM 210	10 FLOURESCENT	280	230	1		8	
RM 215	12 FLOURESCENT	336	230	1		8	
HALLWAY 2ND FLOOR	29 FLOURESCENT	812	230	1		8	
LOBBY	7 FLOURESCENT	196	230	1		8	
CR - MEN	3 FLOURESCENT	84	230	1		8	
CR - FEMALE	3 FLOURESCENT	84	230	1		8	
HALLWAY 1ST FLOOR	31 FLOURESCENT	868	230	1		8	

ROOM/ ROOM NO.	OTHER ELECTRICAL LOADS						
	TYPE	P.R.	VOLTAGE	PHASE	TIME OF USE (PER DAY)	CONDITION	KW/HR
RM 108	2 CEILING FAN	110	230	1	8	F	0.88
CLERICAL OFFICE	1 STAND FAN	65	230	1	8	F	0.52
OFFICE OF THE DEAN	4 PRINTER	160	230	1	2	F	0.32
	1 STAND FAN	65	230	1	8	F	0.52
	2 PC	400	230	1	8	F	3.2
	2 PC	400	230	1	8	F	3.2
	2 WALL FAN	120	230	1	8	F	0.96
	2 CEILING FAN	110	230	1	8	F	0.88
	1 WATER DISPENSER	500	230	1	8	F	4
	1 PRINTER	40	230	1	2	F	0.08
METEOROLOGY LAB							
	3 CEILING FAN	165	230	1	8	F	1.32
	2 WALL FAN	120	230	1	8	F	0.96
PHYSICS LAB							
	3 CEILING FAN	165	230	1	8	F	1.32
	3 WALL FAN	180	230	1	8	F	1.44
	3 STAND FAN	195	230	1	8	F	1.56
GUIDANCE OFFICE							
	1 PRINTER	40	230	1	2	F	0.08
	1 WATER DISPENSER	500	230	1	8	F	4
RM 206							
	1 PROJECTOR	500	230	1	2	F	1
	1 STAND FAN	65	230	1	8	F	0.52
	2 CEILING FAN	110	230	1	8	F	0.88
RM 207							
	4 CEILING FAN	110	230	1	8	2F, 2NF	0.88
	1 PROJECTOR	500	230	1	2	F	1
	1 STAND FAN	65	230	1	8	F	0.52

DEPARTMENT: CAFSD

ROOM/ ROOM NO.	LIGHTING						
	TYPE	P.R.	VOLTAGE	PHASE	USE (PI	ONDITIO	KW/HR
HALLWAY	30 FLOURESCENT	840	230	1	5	22F, 4NF	3.08
LOBBY	20 FLOURESCENT	560	230	1	3	17F, 3NF	1.428
CR - WOMEN	2 FLOURESCENT	56	230	1	5	F	0.28
CR - MEN	2 FLOURESCENT	56	230	1	5	F	0.28
ORESTER & ENVIRONMEN	18 FLOURESCENT	504	230	1	8	F	4.032
MICROBIAL ROOM	6 FLOURESCENT	168	230	1	8	F	1.344
	BULB/INCANDESCEN	200	230	1	8	F	1.6
MEAT PROCESSING	11 FLOURESCENT	308	230	1	8	F	2.464
112	12 FLOURESCENT	336	230	1	8	F	2.688
113	14 FLOURESCENT	392	230	1	8	F	3.136
	2 BULB	14	230	1	8	F	0.112
CR - WOMEN	5 SFLOURESCENT	140	230	1	5	F	0.7
CR - MEN	5 FLOURESCENT	140	230	1	5	4F, 1NF	0.56
ROOM 114	7 FLOURESCENT	196	230	1	8	F	1.568
ROOM 115	12 FLOURESCENT	336	230	1	8	F	2.688
ROOM 116	11 FLOURESCENT	308	230	1	8	F	2.464

ROOM 117	12 FLOURESCENT	336	230	1	8	F	2,688
ROOM 118	12 FLOURESCENT	336	230	1	8	F	2,688
ROOM 119	12 FLOURESCENT	336	230	1	8	F	2,688
ROOM 106	11 FLOURESCENT	308	230	1	8	F	2,464
ROOM 105	12 FLOURESCENT	336	230	1	8	F	2,688
ROOM 104	24 FLOURESCENT	672	230	1	8	F	5,376
BROADCASTING ROOM	16 FLOURESCENT	448	230	1	8	F	3,584
CR - WOMEN	1 LIGHT BULB	7	230	1	5	F	0.035
CR - MEN	1 LIGHT BULB	7	230	1	5	F	0.035
INSTRUMENT ROOM	3 FLOURESCENT	168	230	1	8	F	1,344
ACCREDITATION	9 FLOURESCENT	504	230	1	8	F	4,032
DEAN'S	24 FLOURESCENT	672	230	1	8	F	5,376
READING CENTER	24 FLOURESCENT	672	230	1	8	F	5,376
SC ROOM 1	4 FLOURESCENT	112	230	1	8	F	0.896
SC ROOM 2	1 FLOURESCENT	28	230	1	8	F	0.224
SAC	1 FLOURESCENT	28	230	1	8	F	0.224
	1 BULB	7	230	1	8	F	0.056
9,531							68,198

Building/Site : Natinal Bioenergy Research and Innovation Center (MMSU)
Date

ACU EQUIPMENT INSPECTION FORM

Location	Fermentation Area		Bioprocessing Area		Bioprocessing Value added		Bio Separation Lab		Biotech	
Outdoor unit	ACU1	ACU2	ACU3	ACU4	ACU5	ACU6	ACU7	ACU8	ACU9	ACU10
Brand	KOLIN	KOLIN	KOLIN	KOLIN	KOLIN	KOLIN	KOLIN	KOLIN	KOLIN	KOLIN
Rated Cooling Load, kJ/h	37980	37980	37980	37980	37980	37980	37980	37980	37980	37980
Rated Power, W	3770	3770	3770	3770	3770	3770	3770	3770	3770	3770
Rated Ampere	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2
Actual Ampere	15	15	15	15	15	9	16	15	16.99	17.04
Indoor Actual tdb	25.3		25		27.9		25		25.5	
Actual RH	46		46		48		48		48	
Remarks	Ok	Ok	Ok	Ok	ok	not ok	Ok	Ok	Ok	Ok

Location	Small Conference		Dir meeting	Director	Tissue Lab	Front	Small Lab	Electric al/staff		
Outdoor unit	ACU11	ACU12	ACU13	ACU14	ACU15	ACU16	ACU17	ACU18		
Brand	KOLIN	EVEREST	KOLIN	KOLIN	KOLIN	KOLIN	KOLIN	KOLIN		
Rated Cooling Load, kJ/h	37980		12661	12661	37980	37980	37980	37980		
Rated Power, W	3770	4500	1096	1096	3770	3770	3770	3770		
Rated Ampere	17.2	22	4.76	4.76	17.2	17.2	17.2	17.2		
Actual Ampere	17.4	15.74	4.54	4.6	15.7	15.6	15.5	17.5		
Indoor Actual tdb	25.8		23.7	24	23.7	20	22	23.4		
Actual RH	58		54.6	55	54	49.9	48.6	50.2		
Remarks	ok	ok	ok	ok	ok	ok	ok	ok		

Summary of Findings

1. There were 18 ACU installed
2. One unit has a brand of Everest of low quality as per experience of the university
3. One unit (ACU 6) needs further evaluation of the contractor
4. Cladding (post) must be closed at the roof level
5. Electrical wires (outdoor units must be fixed)
6. Server and EE/CCTV rooms must be installed with AC (at least 1/2 HP window type aircon but to conceal/imbed drain and wires)
7. Generally, ACU works are 99% completed
8. New Aircon installation must be coordinated to the building contractor (until the building warranty).

Prepared by:


NATHANIEL ERICSON R. MATEO
TWG and End-User

Inventory and Assessment Form (ACU)

College/Unit: Administration Building
 Date/Time: July 07 2020 1:52 pm to 4:30 pm
 Outdoor Air Condition (tdb,twb,RH): 34.5 and 28.5

	Description (Type, Model, Brand, Refrigerant, etc.)	Location	Cooling Load (Btu/hr or Kj/h)	Input Power, A	Rated Amp, A	Actual Amp, A	Indoor Air: 1. LFC, 2. RFC, 3. Center, 4. LBC, 5. RBC			Remarks
							tdb, °C	twb, °C	RH	
ACU1	BRAND: HYUNDAI									
	MODEL: HAC - DC18C						LFC: 26	LFC: 18		The actual and rated are accurate. We observed that the ac unit is in good condition. The condensed water in discharged is flowing well. A = 58.1418sq meter
	TYPE: Wall Mounted SPLIT TYPE						RFC: 27	RFC: 20.5		
	POWER SOURCE: 230V -60 HZ.						C: 21	C: 18	81.53%	
	CAPACITY: 18000 BTU/HR	BAC Building	18000 BTU/HR	1552 W.	6.75A.	7.89 A.	LBC: 26	LBC: 24.5		
	CURRENT: 6.75A						RBC: 27	RBC: 19.5		
	POWR INPUT: 1552W.									
	EXCESSIVE OPERATING PRESSURE: 4.2 Mpa, 1.5 MPa									
	REFRIGERANT: r410a									
ACU2	MODEL: HAC - DC18C									Like in the first ac unit. The actual and rated are accurate. We observed that the ac unit is in good condition. The condensed water in discharged is flowing well. A = 58.1418sq meter
	TYPE: Wall Mounted SPLIT TYPE						LFC: 26	LFC: 16		
	POWER SOURCE: 230V -60 HZ.						RFC: 26	RFC: 18		
	CAPACITY: 18000 BTU/HR	BAC Building	18000 BTU/HR	1552 W.	6.75A.	7.67 A.	C: 26	C: 18.5	48%	
	CURRENT: 6.75A						LBC: 24.5	LBC: 17		
	POWR INPUT: 1552W.						RBC: 24.5	RBC: 17		
	EXCESSIVE OPERATING PRESSURE: 4.2 Mpa, 1.5 MPa									
	REFRIGERANT: r410a									
ACU3	MODEL: HAC-DC10C									The actual reading is less than the rated ampere. And we observed that the condensed water in the discharge is few
	TYPE: Wall Mounted SPLIT TYPE									
	OUTSIDE RESISTANCE CLASS: IP24									
	POWER SOURCE: 230V-60Hz, 1 Ph						C: 21.5	C: 15	49.49%	

	DISCHARGE: 4.2 Mpa	BAC Building	9000 BTU/HR	753 W.	3.27 A.	2.73 A.				amount. A = 15.71 Sq meter
	SUCTION:1.5 Mpa									
	REFRIGERANT: R410A / 550g									
ACU4	MODEL:38KUS055FS/42KTD0055FS						LFC: 27	LFC: 20		The ac unit is not always used,they only use in few conference meeting. A = 58.1418sq meter
	TYPE: Ceiling Cassette(Non- Inverter)						RFC: 26	RFC: 19.5		
	CURRENT: 15.8 A.						C: 27	C: 20	52.40%	
		CONFERR								
	FREQUENCY: 50 HZ.	ENCE ROOM			15.8 A.	14.11 A	LBC: 26.5	LBC: 19		
	POWER SUPPLY: 220 V- 240 V,1 Ph						RBC: 26.5	RBC: 19.5		
	CAPACITY: 55000 KJ/HR. - 5.5 hp									
	BRAND: CARRIER AIRCON									
	REFRIGERANT: R410A									
ACU5	MODEL:38KUS055FS/42KTD0055FS						LFC: 27	LFC: 20		Acu4 and Acu5 are near to each other.The ac unit is not always used,they only use in few conference meeting. The actual is lower than the rated ampere. A = 58.1418sq meter
	TYPE: Ceiling Cassette(Non- Inverter)						RFC: 26	RFC: 19.5		
	CURRENT: 15.8 A.						C: 27	C: 20	52.40%	
		CONFERR								
	FREQUENCY: 50 HZ.	ENCE ROOM			15.8 A	12.78 A	LBC: 26.5	LBC: 19		
	POWER SUPPLY: 220 V- 240 V,1 Ph						RBC: 26.5	RBC: 19.5		
	CAPACITY: 55000 KJ/HR. - 5.5 hp									
	BRAND: CARRIER AIRCON									
	REFRIGERANT: R410A									
ACU6	MODEL: HAC-DC12C BRAND: HYUNDAI									Beacause the area of the room is small the distribution of cooling air is easily to spread in the room. A =15.71 Sq meter
	TYPE: Wall mounted Split Type									
	CURRENT: 4.76A.									
		CONFERR								
	FREQUENCY: 60 HZ.	ENCE ROOM			4.76 A	5.21 A	C: 25	C:15.5	35.46%	

[illegible]

Outdoor Air Condition (tdb,twb,RH): 33.5 and 28

ADMIN SECOND FLOOR

[illegible]

ACU2	BRAND:PANASONIC AIR CONDITIONER						LFC: 29.5	LFC: 22.5		TS = 18 according to people occupants the temperature is slightly hot A = 122.753 Sq meter
	MODEL:CU-S28RKV TYPE:SPLIT TYPE						RFC: 30	RFC: 22.5		
	PHASE:1						C: 28	C: 22	55.13%	
		HUMAN RESOURCES MANAGEMENT								
	VOLTAGE: 220 V.						LBC: 29.5	LBC: 23		
	FREQUENCY:60 HZ.						RBC: 29	RBC: 22.5		
	MAX. INPUT: 3260W/14.6 A.									
	CAPACITY:7800 W.									
	CURRENT:12.6 A.									

ACU3	BRAND: PANASONIC						LFC: 29	LFC: 24	Ts = 16, The area is 94.835 sq
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[illegible]

CONDUCTED BY:
GROUP 1
ERNESTO GANOT JR
JHON MARK GATAB
DANIEL JADE MERCADO
MARK BRY.

Inventory And Summary (AC Units)

College/Unit: COLLEGE OF INDUSTRIAL TECHNOLOGY

Date/Time: July 21, 2020 1:25 P.M.

Outdoor Air Condition:

[illegible]

