

ESCO Project Experience

Energy Performance Contract

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Energy Audit Group

OSP ESCO International Inc.

Introduction



Certificate of Accreditation

The Department of Energy (DOE), thru the Energy Utilization Management Bureau (EUMB), hereby grants accreditation to

OSP-ESCO INTERNATIONAL, INC.

107 Lopez Jaena St., Manila Bay Cmpd., Tanong
Marikina City, Metro-Manila

as Class "A" Energy Service Company (ESCO) after having been assessed and found conforming to the requirements of DOE/EUMB for ESCO accreditation in the field of Energy Management System services from the design to implementation and management of energy & utility solutions and provides financing for the project through Performance Contracting.

This Certificate is issued this Oct. 2, 2017 and is valid until Oct. 2, 2020 subject to continuing conformity with the Criteria and Conditions of ESCO accreditation.

Signed at Taguig City, Metro-Manila


ALFONSO G. CUSI
Secretary



Companies with OSP's partnership were awarded by DOE on Don Emilio Abello Energy Efficiency Awards



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ENERGY EFFICIENCY AND CONSERVATION ACT APPROVED AFTER 30 YEARS

16 January 2019

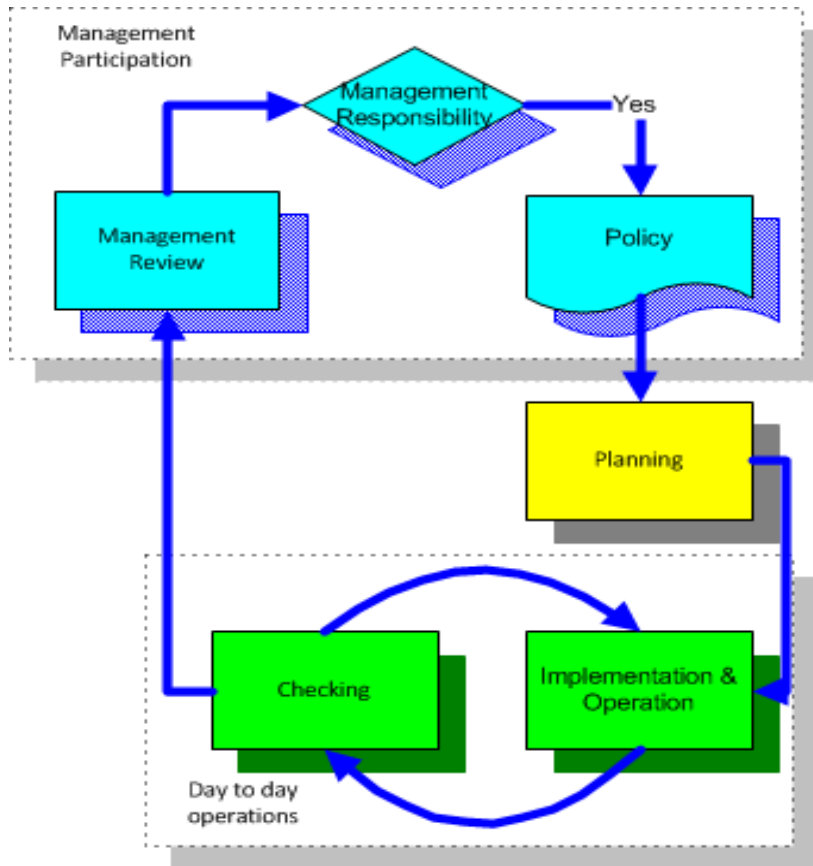


PASAY CITY – The Energy Efficiency and Conservation (EE&C) Act was finally approved yesterday (16 January) during the Bicameral Conference Committee Hearing held at the Senate of the Philippines.

Barriers to Energy Efficiency

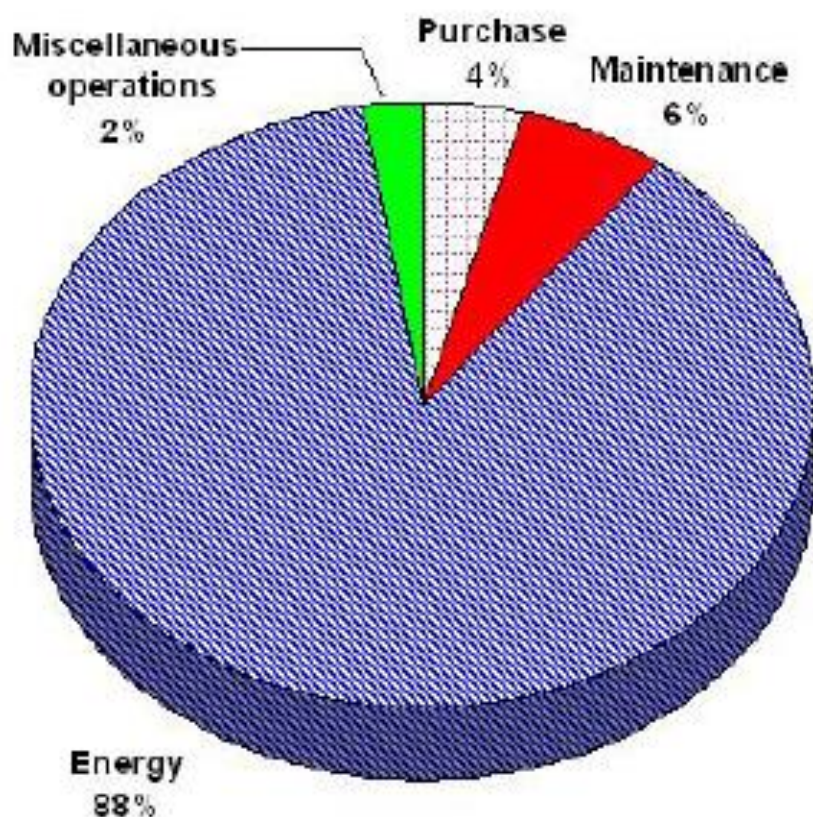
- **Corporate Management focus is on increasing business operation and not on energy efficiency**
- **Lack of information and understanding of financial and qualitative benefits**
- **Lack of adequate technical skills for developing and implementing EE measures and projects**
- **Poor monitoring systems and data**
- **First costs more important than recurring costs → disconnection between capital and operating budgets**
- **When EE knowledge exists it very often resides with individuals rather than with the company/ organization → sustainability risk**
- **Defensiveness – “I’m already doing a good job!”**

Energy Management System (EnMS - ISO 50001) Six Key Concepts



1. Management Commitment
 - Roles and Responsibilities
2. Significant Energy Users (SEUs)
3. Energy Performance Indicators (EnPIs)
4. Opportunities List
5. Operational Control
6. Review

Life cycle cost - 200kW pump and motor
Pesos 812,340 initial cost; 121,851/yr maintenance



**First year energy cost =
Pesos 2,978,580**



SM

NORTH EDSA



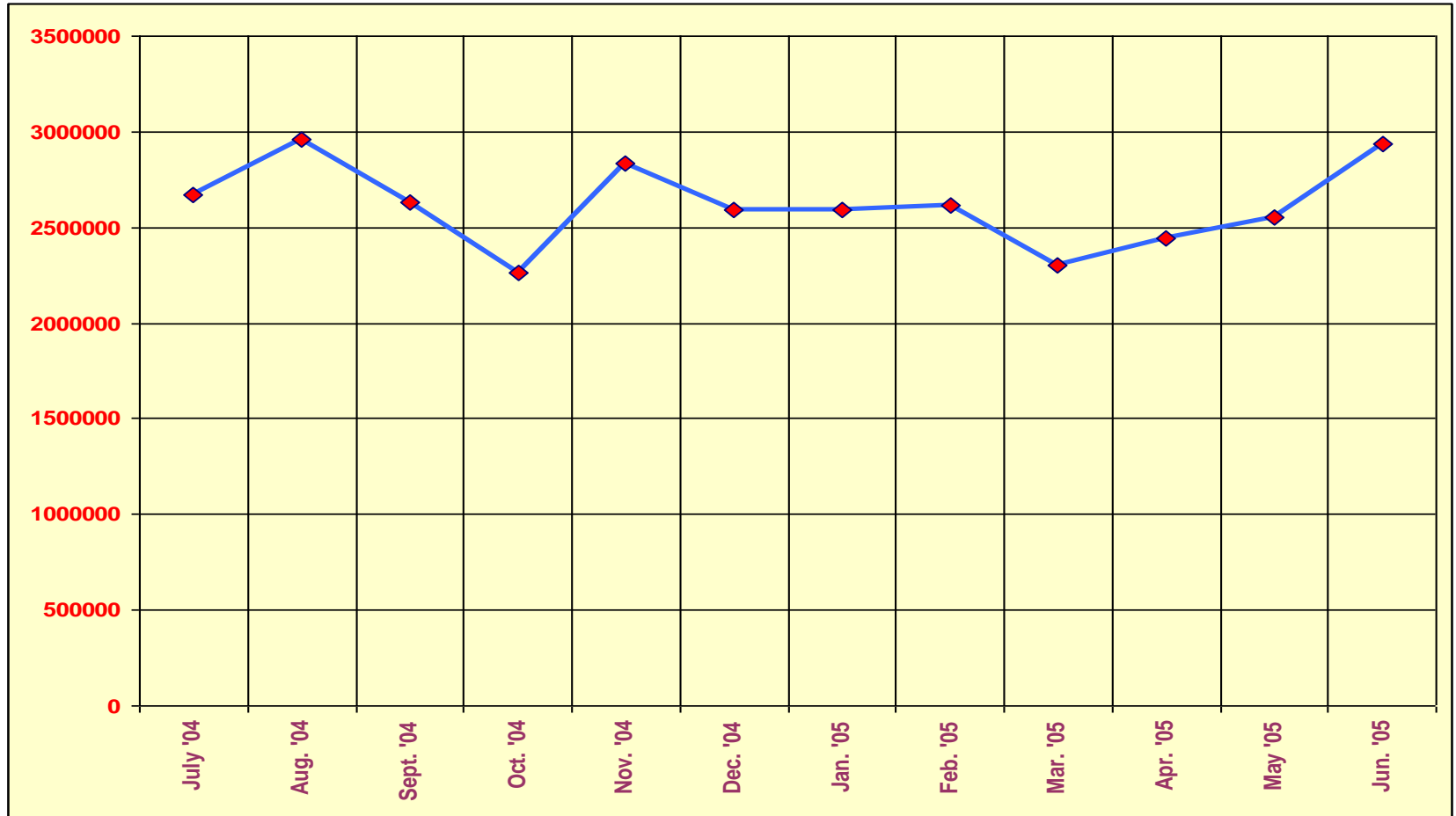


SM CITY NORTH EDSA PROFILE

- Began operations in 1985
- Owned by SM Prime Holdings founded by Filipino-Chinese businessman Henry Sy Sr.
- Located along North Avenue and EDSA, Quezon City
- Flagship store of SM Supermalls(First Mall)
- One of most populous malls in the Philippines
- Attracts an estimated 315,000 visitors daily

ENERGY USAGE

BEFORE RETROFIT(JULY 2004 – JUNE 2005)



MAXIMUM = 2,960,800 kWh (Aug. '04) MINIMUM = 2,263,342 kWh (March '05)
AVERAGE = 2,616,043.50 kWh/Month

ENERGY EFFICIENCY MEASURES

Major Works done by

SM-EDD/OSP-Honeywell ESCO, Inc.

(FY 2007: July 2006 - June 2007)

- **Combined Multiple Chilled Water Plant into a Single Chilled Water Plant**
- **Replacement of Inefficient Chillers with High Efficiency Chillers**
- **Replacement of Inefficient Cooling Towers and Relocated to most Effective Area(Better Air Cycle).**
- **Installation of Variable Frequency Drives for Cooling Towers for optimize control of fan speed**
- **Replacement of Inefficient Condenser Water Pumps with High Efficiency Motor Pumps**
- **Replacement of Inefficient Primary Chilled Water Pumps with High Efficiency Motor Pumps**
- **Installation of Variable Frequency Drives for Primary Chilled Water Pumps for Optimize Control of Chilled Water Flow**
- **Retired Inefficient Secondary Chilled Water Pumps**
- **Retired Inefficient Air-Cooled Chillers**
- **Installation of Building Management System(BMS) for Optimize Operation of A/C System**

HVAC EQUIPMENTS

(Before Retrofit)

EQUIPMENT	# OF UNITS	RATED kW	BRAND
WATER-COOLED CHILLERS	2	533	TRANE
	2	628	YORK
	1	541	TRANE
PCHWPs	5	37.3	LINCOLN
SCHWPs	5	75	LINCOLN
COWPs	5	75	LINCOLN
CTs	6	22.38	TECO
AIR-COOLED CHILLERS	5	112	YORK
CHWPs	3	15	TECO
CHWPs	4	22.38	TECO

TOTAL RATED kW = 4,628 kW

HVAC EQUIPMENTS

(After Retrofit)

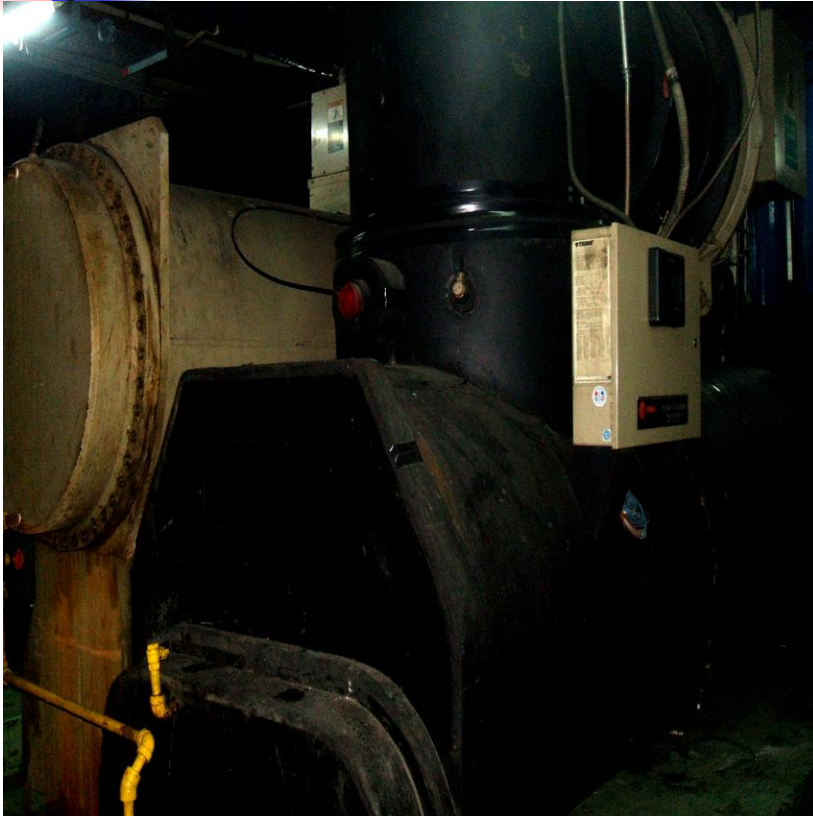
EQUIPMENT	# OF UNITS	RATED kW	BRAND
WATER-COOLED CHILLERS	4	488	TRANE
CHWPs	5	75	TECO
COWPs	5	45	TECO
COOLING TOWERS	6	56	TECO

TOTAL RATED kW = 2,887 kW

ENERGY DENSITY

FISCAL YEAR	PERIOD	kWh CONSUMPTION		ANNUAL LOE	TOTAL FLOOR AREA (m ²)	ENERGY CONSUMPTION DENSITY (kWh/m ²)
		QUARTERLY	ANNUALLY			
		2005	Jul-Sept '04			
Oct-Dec '04	8,032,342					
Jan-Mar '05	7,510,400					
Apr-Jun '05	7,934,000					
2006	Jul-Sept '05	7,904,800	28,448,662	7,425,101	165,514.3	171.9
	Oct-Dec '05	7,905,000				
	Jan-Mar '06	6,320,467				
	Apr-Jun '06	6,318,395				
2007	Jul-Sept '06	6,207,736	24,807,344	6,474,717	165,514.3	149.9
	Oct-Dec '06	6,246,346				
	Jan-Mar '07	5,950,906				
	Apr-Jun '07	6,402,356				

CHILLER REPLACEMENT



OLD CHILLER

1000 TR (*0.541 kW/TR*)



NEW CHILLER

1000 TR (*0.488 kW/TR*)

COOLING TOWER REPLACEMENT

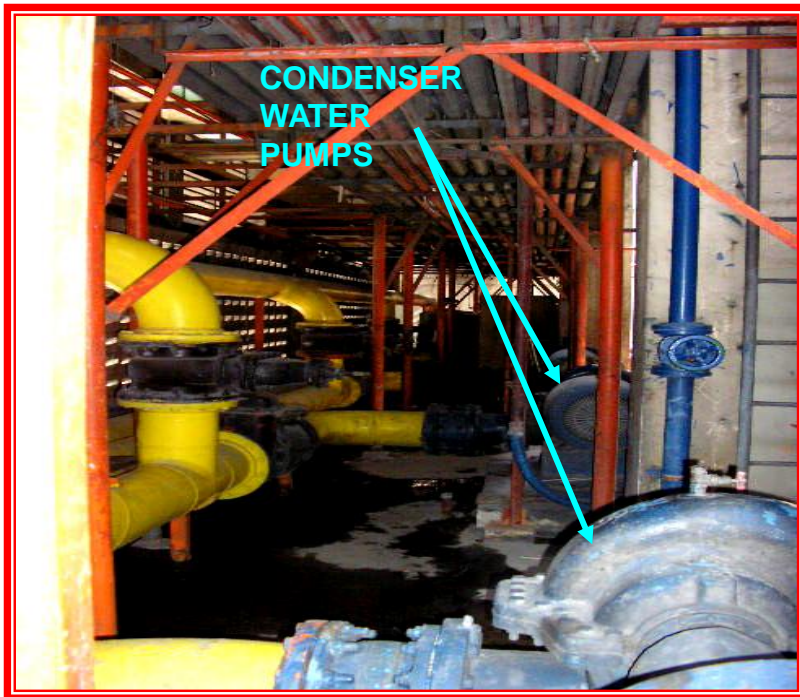


OLD COOLING TOWERS
(1000 TR)



NEW COOLING TOWERS
(1200 TR)

CONDENSER WATER PUMPS REPLACEMENT



OLD CONDENSER WATER PUMPS

(5 x 75 kW)



NEW CONDENSER WATER PUMPS

(5 x 45 kW)

VARIABLE FREQUENCY DRIVES FOR COOLING TOWERS



Installation of Variable Frequency Drives for cooling towers for optimized control of fan speed.

CHILLED WATER PUMPS REPLACEMENT



OLD PRIMARY CHILLED WATER PUMP
(5 x 37.3 kW)



NEW PRIMARY CHILLED WATER PUMP
(5 x 75kW)

VARIABLE FREQUENCY DRIVES FOR CHILLED WATER PUMPS



Installation of variable frequency drives for primary chilled water pumps for optimized control of chilled water flow.

BUILDING MANAGEMENT SYSTEM (BMS)



Installation of Building Management System (BMS) for optimize operation of the whole centralized A/C System

BUILDING MANAGEMENT SYSTEM (BMS)

WorkPlace Pro - [http://localhost/db/SMNORTH/GxPages/RefrigerationPlant\\$Workspace](http://localhost/db/SMNORTH/GxPages/RefrigerationPlant$Workspace)

File Edit Search View Workspace Commands Go Help

Locator: [http://localhost/db/SMNORTH/GxPages/RefrigerationPlant\\$Workspace](http://localhost/db/SMNORTH/GxPages/RefrigerationPlant$Workspace)

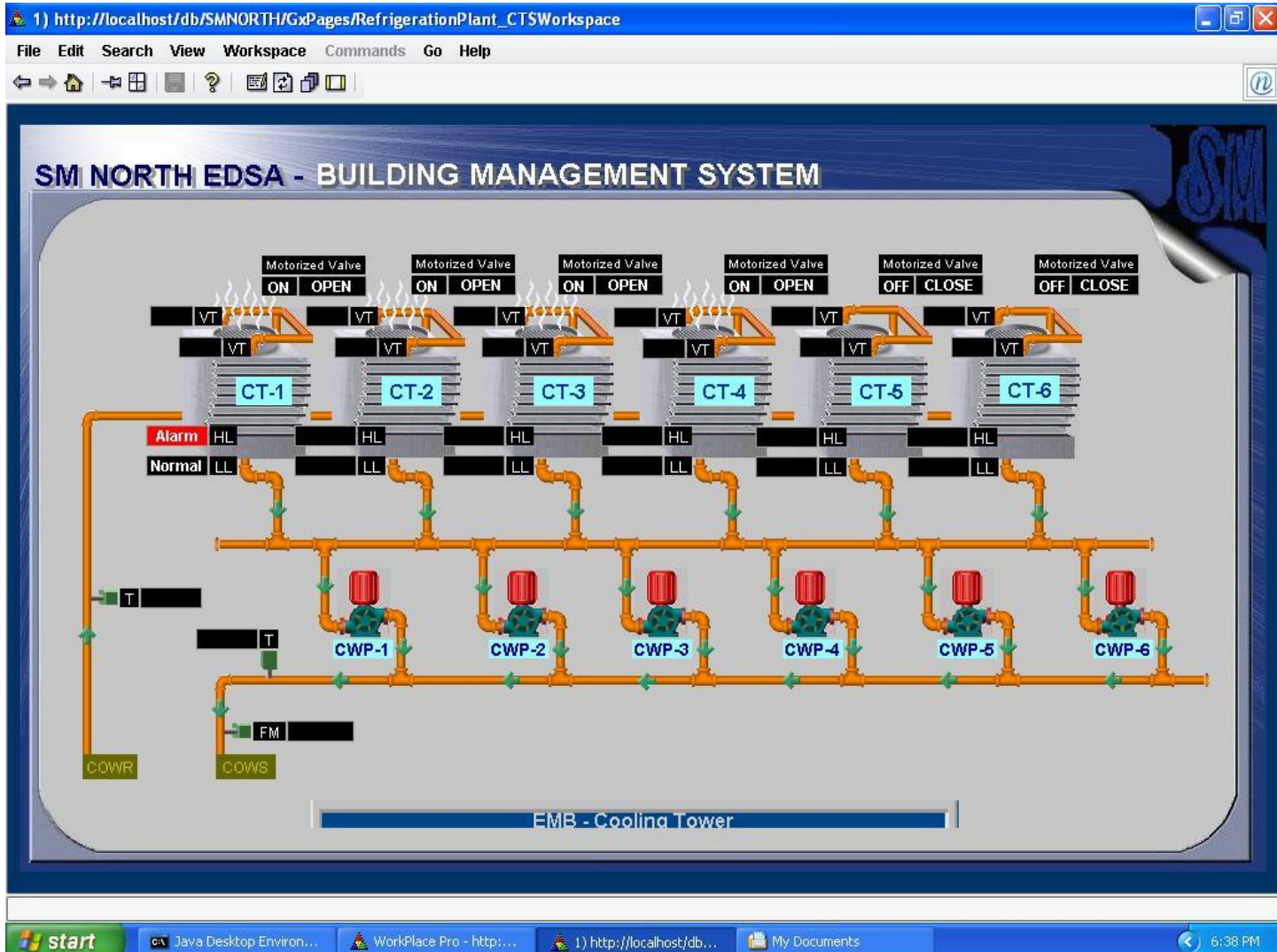
SM NORTH EDSA - BUILDING MANAGEMENT SYSTEM

FMB - Refrigeration Plant System

START-UP SEQUENCE STOP SEQUENCE

start Java Desktop Environ... WorkPlace Pro - http... 1) http://localhost/db... 6:34 PM

BUILDING MANAGEMENT SYSTEM (BMS)



BUILDING MANAGEMENT SYSTEM (BMS)

WorkPlace Pro - http://localhost/db/SMNORTH/GxPages/LG_ahu1a4\$Workspace

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Locator: http://localhost/db/SMNORTH/GxPages/LG_ahu1a4\$Workspace

SM NORTH EDSA - BUILDING MANAGEMENT SYSTEM

System Config | Air Handling Unit | Fan Coil Unit | Ventilation Fan | Genset | Power Meter

AHU-1A1	AHU-1A2	AHU-1A3	AHU-1A4	AHU-5B	AHU-6B	AHU-43	AHU-44	AHU-2	AHU-1B
AHU-41	AHU-42	AHU-45	AHU-46	AHU-39	AHU-1A	AHU-7A	AHU-8A	AHU-1BC	AHU-OBM

AHU Control Panel

Command: ON
Mode: Auto

Schedule: Occupied
Mode: AUTO

24.85 °C Return Air Temp.

Filter: Dirty Filter

ON Airflow

Supply Air Temp. 18.80 °C

Cooling Valve 69.80 %

Space Temperature 1 18.00 °C
Space Temperature 2 27.00 °C

AHU-1A4 (FOOD COURT)
MAIN BUILDING - LOWER GROUND

Main Building
Cyberzone Bldg.
EMB

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ENERGY EFFICIENCY MEASURES

Major Works done by
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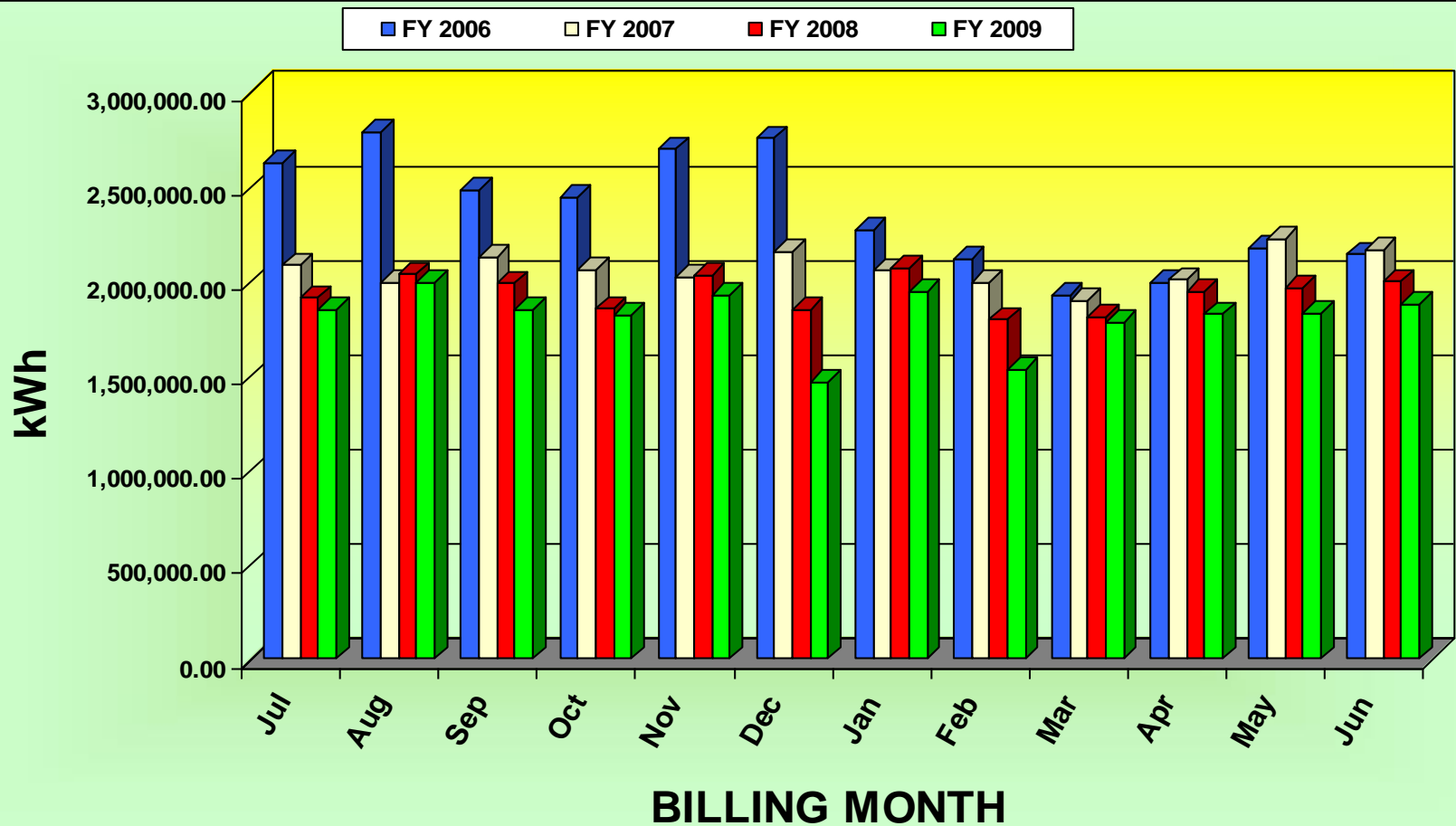
(FY 2008 & 2009: July 2007 - June 2009)

- **AHU Cooling Coil Replacement** for a more effective heat transfer and increased air volume flow
- **Installation of Balancing Valve & Motorized Actuator** on AHUs for optimum water volume flow and efficient chilled water system distribution
- **Installation of Variable Frequency Drives (VFDs)** on Air Handling Units (AHUs) for optimized control of fan speed
- **Chilled Water System Balancing** for even distribution

ENERGY INTENSITY

FISCAL YEAR	BILLING PERIOD	ELECTRICITY CONSUMPTION				TOTAL FLOOR AREA (m ²)	ENERGY CONSUMPTION DENSITY	
		kWh		LOE			kWh/m ²	LOE/m ²
		QUARTERLY	ANNUALLY	QUARTERLY	ANNUALLY			
2006	Jul - Sept '05	7,904,800	28,448,662	2,063,153	7,425,101	165,514.3	172	45
	Oct - Dec '05	7,905,000		2,063,205				
	Jan - Mar '06	6,320,467		1,649,642				
	Apr - Jun '06	6,318,395		1,649,101				
2007	Jul - Sept '06	6,207,736	24,807,344	1,620,219	6,474,717	165,514.3	150	39
	Oct - Dec '06	6,246,346		1,630,296				
	Jan - Mar '07	5,950,906		1,553,186				
	Apr - Jun '07	6,402,356		1,671,015				
2008	Jul - Sept '07	5,941,051	23,277,897	1,550,614	6,075,531	165,514.3	141	37
	Oct - Dec '07	5,738,592		1,497,772				
	Jan - Mar '08	5,684,210		1,483,579				
	Apr - Jun '08	5,914,044		1,543,566				
2009	Jul - Sept '08	5,692,533	21,714,335	1,485,751	5,667,441	165,514.3	131	34
	Oct - Dec '08	5,216,241		1,361,439				
	Jan - Mar '09	5,265,508		1,374,298				
	Apr - Jun '09	5,540,053		1,445,954				

kWh REDUCTION PROFILE (FY 2006 - FY 2009)



FISCAL YEAR 2009	Jul. '08	Aug. '08	Sept. '08	Oct. '08	Nov. '08	Dec. '08	Jan. '09	Feb. '09	Mar. '09	Apr. '09	May '09	Jun. '09
% SAVINGS	3.45	2.05	7.07	1.68	5.25	20.78	6.14	14.60	1.50	6.22	6.74	6.01
Max. Savings = 384,379 kWh (December 2008)				Min. Savings = 27,251 kWh (March 2009)				Ave. Savings = 130,297 kWh				



Thank you!

