MERALCO CORPORATE PARTNERS

POWER UP

FORUM SERIES

ENERGY MANAGEMENT AND EFFICIENCY

Engr. Edwin Santillan

4 May 2016

MERALCO CORPORATE PARTNERS
POWER UP
FORUM SERIES

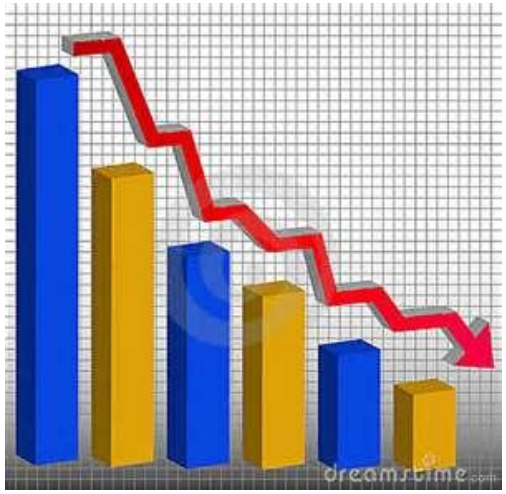
Energy Efficiency vs Energy Conservation

What is Energy Efficiency (EE)?

- Using less energy to provide same service or same output.

- Energy efficiency is achieved when energy intensity in a specific product or process is reduced **without affecting the output, product quality, level of comfort, or safety and environmental standard**

Energy Efficiency



Decreasing energy consumption trend doesn't necessarily mean being energy efficient!

Year	kWh	Product OutPut
2010	1,000,000	100,000
2011	850,000	70,833
2012	700,000	46,667
2013	500,000	25,000
2014	300,000	10,000

Energy Efficiency

Energy Intensity Index (EII)

-quantity of energy required to perform a particular activity, service or product

Examples :

- kWhr per unit of product
- kWhr per occupancy
- kWhr per area

Year	kWh	Product OutPut	EII
2010	1,000,000	100,000	10.00
2011	850,000	70,833	12.00
2012	700,000	46,667	15.00
2013	500,000	25,000	20.00
2014	300,000	10,000	30.00

Benefits of Energy Efficiency

- Empowered to make informed decisions
- Empowered to uplift the standard of living
- Improved performance through its effect on services, operations and maintenance
- Lower overhead costs
- Improved ability to withstand future energy cost increases or energy curtailments
- Better competitive position
- Sustained economic growth
- Environmental benefits due to reduced emission of greenhouse gases

Energy Efficient Practices and Opportunities

- Efficient operating procedure (no cost)
- Efficient equipment alternatives (with cost)
- Better building design and envelope
- Better maintenance program
- Enhanced awareness program

Effficient Operating Procedure

-streamlining processes by eliminating waste while continuing to deliver value to users/customers

Efficient Operating Procedure

Set the thermostat at comfortable temperature level, DOE's recommended temperature setting is at 24° C to 25° C

There's significant energy saving for every degree increase in thermostat setting

Efficient Operating Procedure

- Standby power is electric power consumed by equipment / appliances while they are switched off, in a standby mode or not performing their principal service
- Switch off or unplug computers, water coolers and other appliances that are not needed after office hours

Turn OFF computers when not in use

Screensavers do not save energy
Additional energy consumption of about 89% compared to sleep mode

	Active Operation	Screen Saver	Gaming	Internet Surfing	Sleep Mode
Cost per hour	0.77	0.67	0.96	0.85	0.07

Efficient Operating Procedure

Water Dispenser

Cooling = 90w

Heating = 550w

If not in use, do not leave the cooling and heating switches in “ON” position.

If possible, switch them ON only a few minutes before usage

Energy Efficient Practices and Opportunities

- Efficient operating procedure (no cost)
- Efficient equipment alternatives (with cost)
- Better building design and envelope
- Better maintenance program
- Enhanced awareness program

Efficient Equipment Alternatives

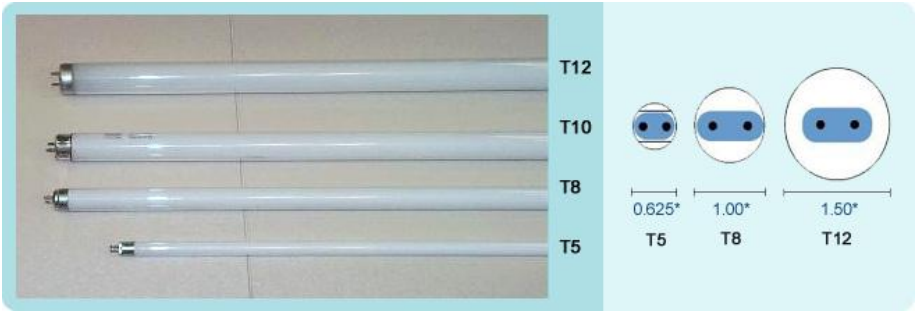
Lighting System

65% Savings

Efficient Equipment Alternatives

Lighting

Fluorescent Lamps



LED

Type of Lamp	40 Watts Fluorescent Lamp	36 Watts Fluorescent Lamp	28 Watts Fluorescent Lamp	19 Watts LED
Lighting System, Watts (includes ballast for FL)	50	38	30	19
Brightness (lumens)	2500	2500	2500	2500
Hours of usage	10	10	10	10
Energy consumption (kWh)	0.5	0.38	0.3	0.19
Energy savings (%)		24%	40%	62%

Efficient Equipment Alternatives

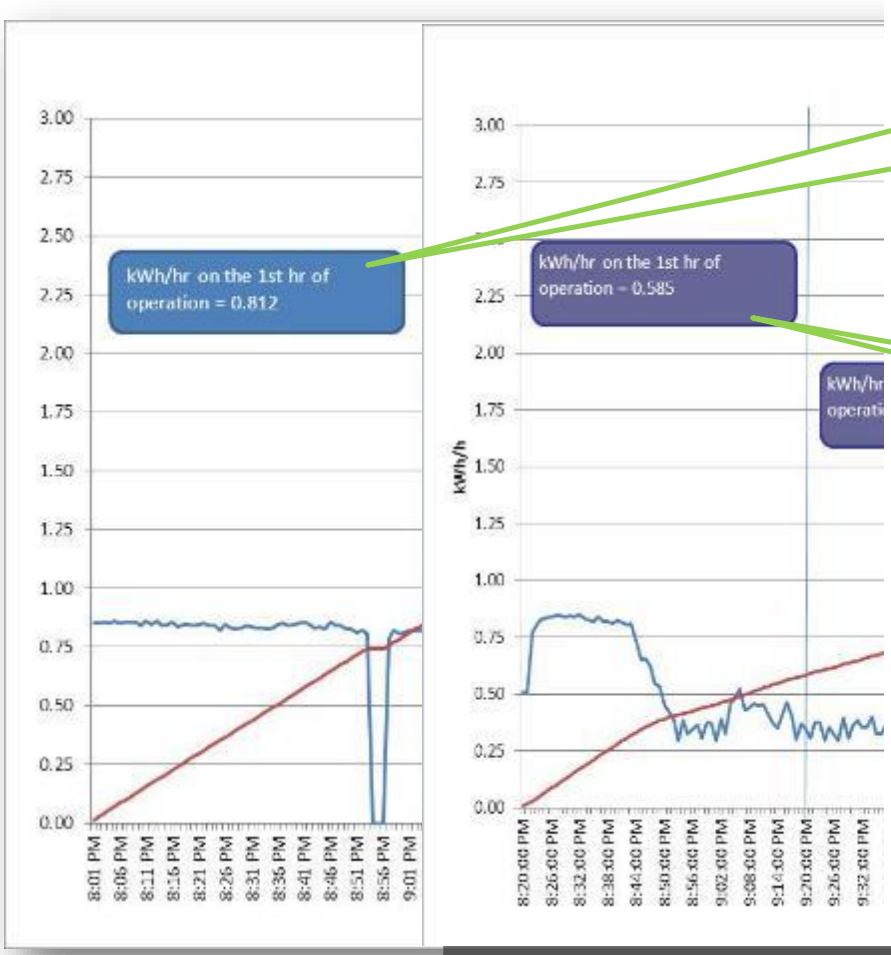
Consider using inverter aircon, it consumes less power compared to conventional units during entire operation by reaching the desired temperature quickly and keeping the temperature from drastically fluctuating. Inverter aircon can save up to **30%** of the aircon energy cost.

Efficient Equipment Alternatives

MERALCO CORPORATE PARTNERS
POWER UP FORUM SERIES

Conventional aircon vs. Inverter-type aircon

The inverter aircon is more energy efficient than its conventional counterpart by as much as 28% during the first hour of operation.



CONVENTIONAL ACU
KWHR/Hr = 0.812

Savings = 28%

INVERTER ACU
KWHR/Hr = 0.585

Efficient Equipment Alternatives

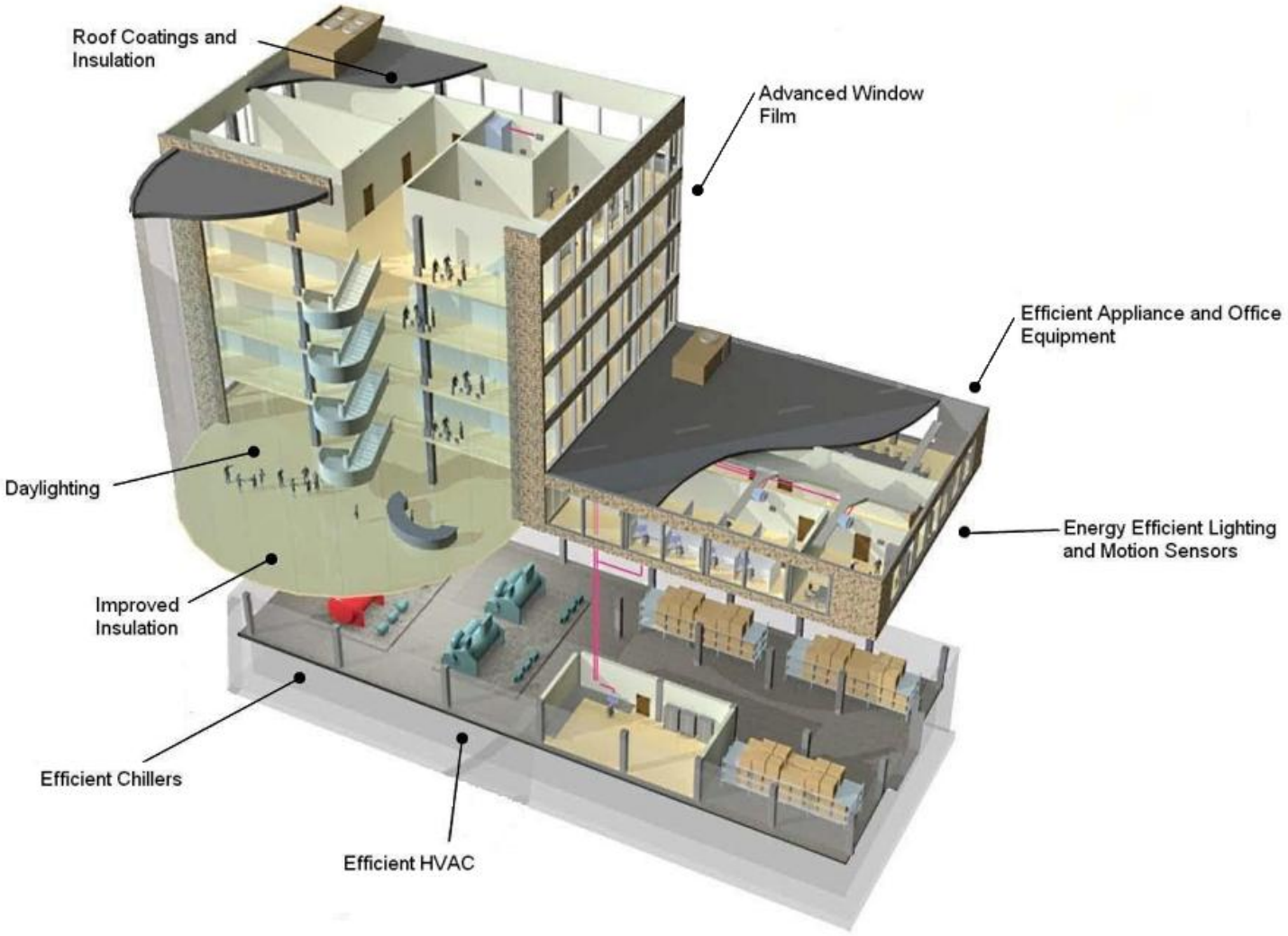
Water and energy are closely interconnected. Efficiency program that saves water will also save energy

- Install low-flow faucets
- Use low volume or dual flush
- Use water – free urinals

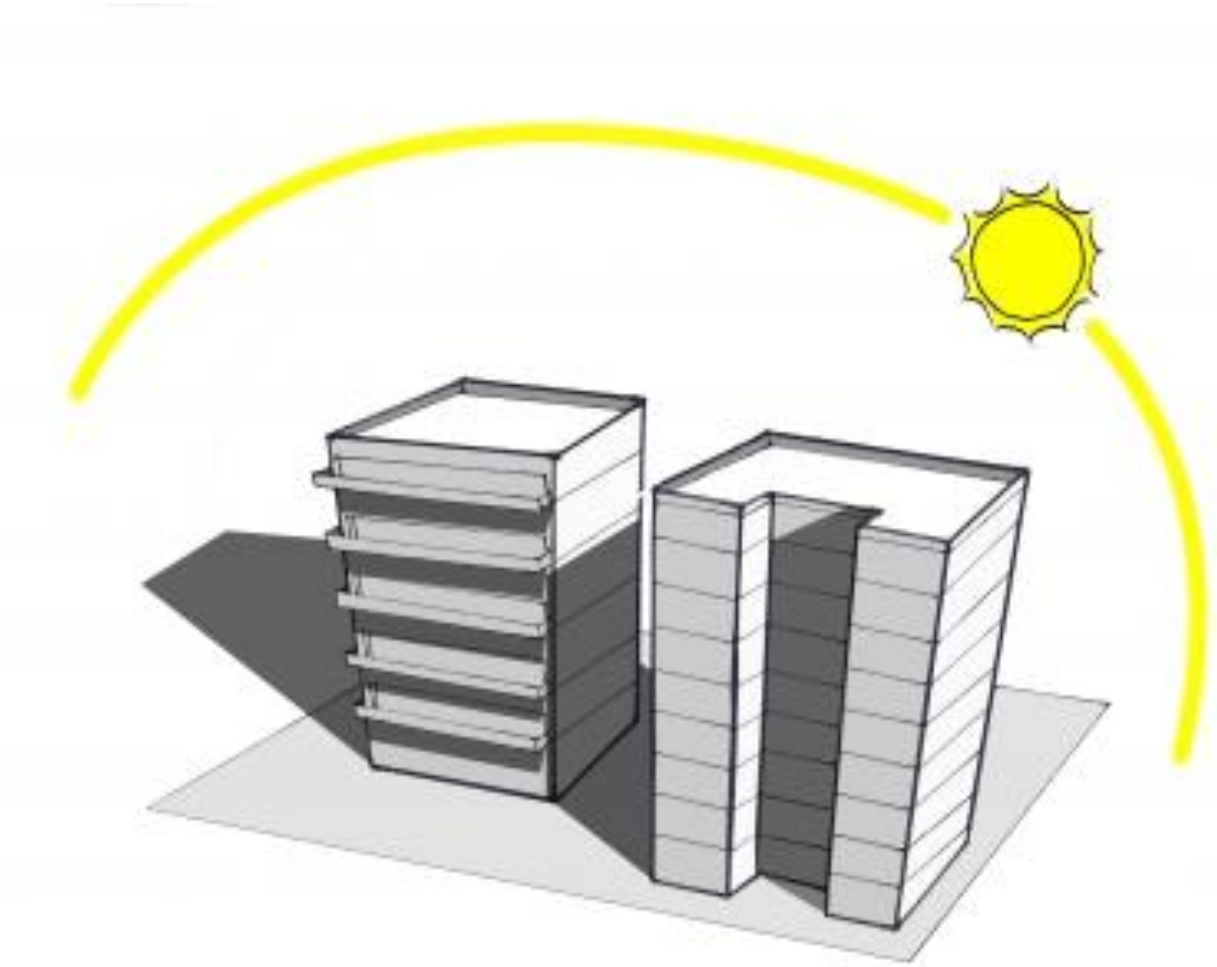
Energy Efficient Practices and Opportunities

- Efficient operating procedure (no cost)
- Efficient equipment alternatives (with cost)
- Better building design and envelope
- Better maintenance program
- Enhanced awareness program

Better Building Design and Envelopes



Better Building Design and Envelopes



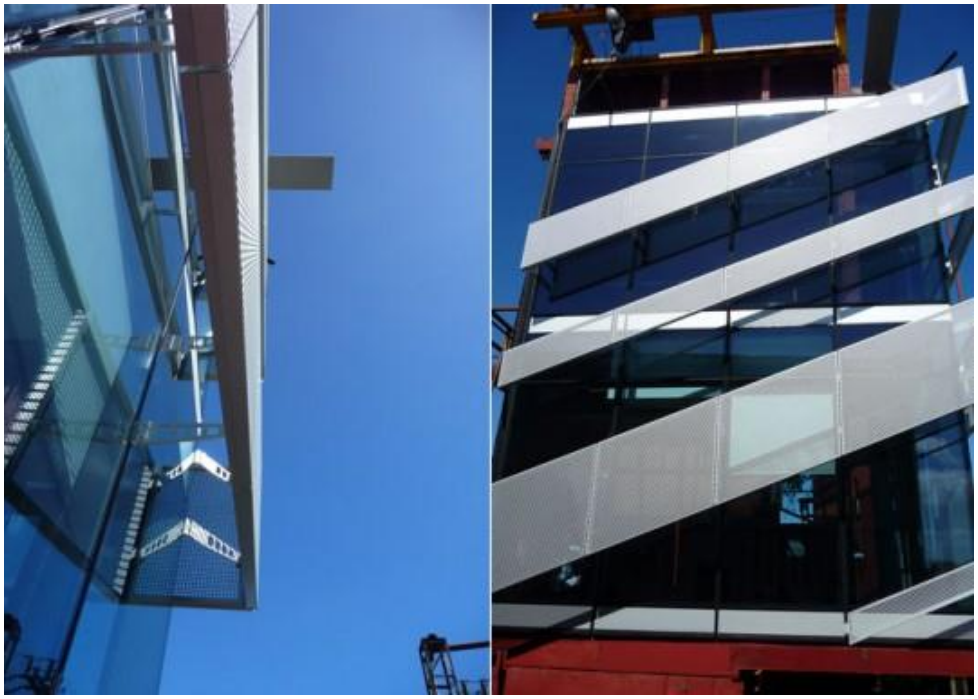
Better Building Design and Envelopes

- To reduce solar heat gain, use efficient film/tint on glass panes and windows

Better Building Design and Envelopes

- In addition to window film/tint, use solar screens especially when solar heat is intense at noon time

Better Building Design and Envelopes



Sun Shading and Curtain Wall

Net Lima, BERDE certified by PhilGBC (Philippine Green Building Council, Building for Ecologically Responsive Design Excellence)

Better Building Design and Envelopes

- Instead of jalousie type, use swing or sliding type windows

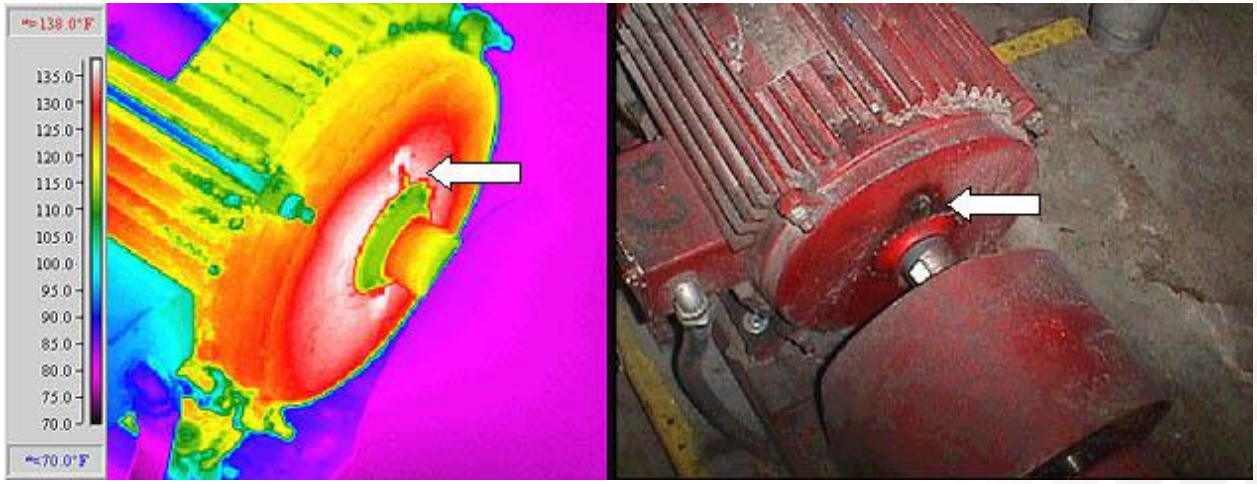
Energy Efficient Practices and Opportunities

- Efficient operating procedure (no cost)
- Efficient equipment alternatives (with cost)
- Better building design and envelope
- Better maintenance program
- Enhanced awareness program

Better Maintenance Program

- Establish an operating and maintenance program for the major electrical equipment and facilities

- Regular inspection with the aid of thermal scanning is an effective predictive maintenance practice



Better Maintenance Program

- Regularly clean and maintain airconditioning units
- It could improve aircon energy consumption by 5% to 15%
- It will also give quality indoor air

Source: familyhandyman.com

Better Maintenance Program

- Regularly clean and maintain electric fans and blowers, it could save up to 2% in energy cost
- It also gives peace of mind that the equipment is safe and properly functioning

Energy Efficient Practices and Opportunities

- Efficient operating procedure (no cost)
- Efficient equipment alternatives (with cost)
- Better building design and envelope
- Better maintenance program
- Enhanced awareness program

Enhanced Energy Awareness

- Encourage the value of participation and cooperation among the staff and management in improving energy efficiency through:
  - information campaign
  - training
  - team building
  - appraisal

SWITCH OFF when not in use

MERALCO CORPORATE PARTNERS
POWER UP
FORUM SERIES

Thank you.

Engr. Edwin P. Santillan
Energy Solutions Specialist
Corporate Business – Technical Services