Energy Efficiency in Hotels

Christine Wilkinson Nov. 2011

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DISCLAIMER:

The views and opinions are mine

The following presentation is an overview and not intended to be exhaustive

Energy Efficiency in Hotels

Agenda

1. Definition
2. Energy usage in hotels
3. The building
4. Human Factor
5. Air Conditioning
6. Lighting
7. Refrigeration
8. Pumps & Motors
9. Equipment
10. Renewable Energy
11. Summary

1. Definition

What is Efficient Energy Use?

- sometimes simply called **Energy Efficiency**,
- is the goal of efforts to reduce the amount of energy required to provide products and services.

- Efficiency: is the ratio of the useful output to the total input in any system

  or better
- Action or production which produces minimum waste, expense and unnecessary effort

1. Definition

- The first oil crisis in 1973 was the first instigator of looking at appliances and consumers in a different way.
- This oil crisis represented a shift in the approach of energy consumption – from how much more energy is needed

  to
- how can the existing energy supply be used most efficiently.

1. Definition

By improving energy efficiency:

- Reduced energy use reduces energy costs and will result in financial cost saving
- Reduced energy use is a key solution to the problem of reducing greenhouse gas emissions
- According to the International Energy Agency, improved energy efficiency in buildings, industrial processes and transportation could reduce the world's energy needs in 2050 by one third, and help control global emissions of greenhouse gases.

1. Definition

- Energy Efficiency and Renewable Energy are the *twin pillars* of any sustainable energy policy.
- In many countries Energy Efficiency is also seen to have a national security benefit because it can be used to reduce the level of energy imports from foreign countries.
- Some countries in the Caribbean are working on standards for energy efficiency to allow tax reduction on the importation of energy efficient equipment.

2. Energy Usage in Hotels

- The hotel industry is the biggest consumer of electricity in some of the Caribbean islands.
- In many facilities, energy costs are the second-highest operational costs after payroll
- Electricity is the biggest consumer of all utilities in a hotel operation.

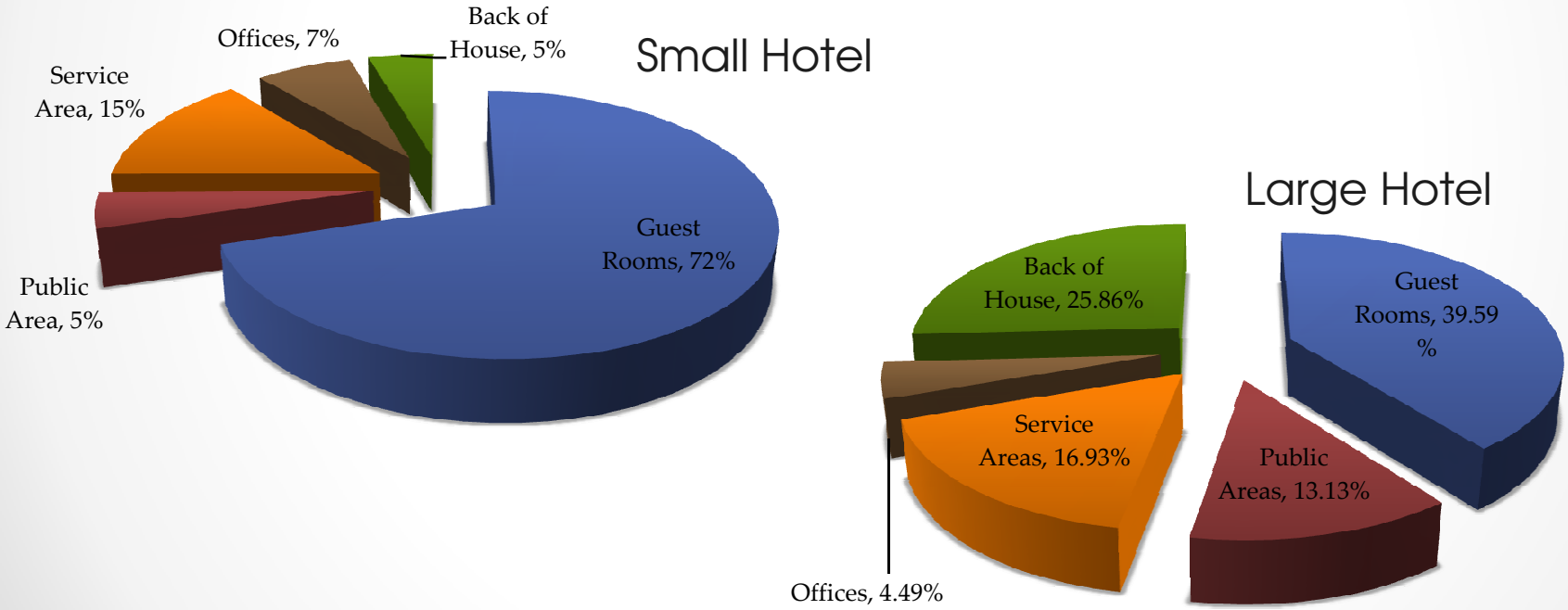
2.Energy Usage in Hotels

A hotel can be seen as the architectural combination of different distinct zones:

- Guest room area
- Public area
- Service area (restaurant, kitchens, laundry e.g.)
- Office Area
- Back of house area (incl. desalination plant, waste water treatment, e.g.)

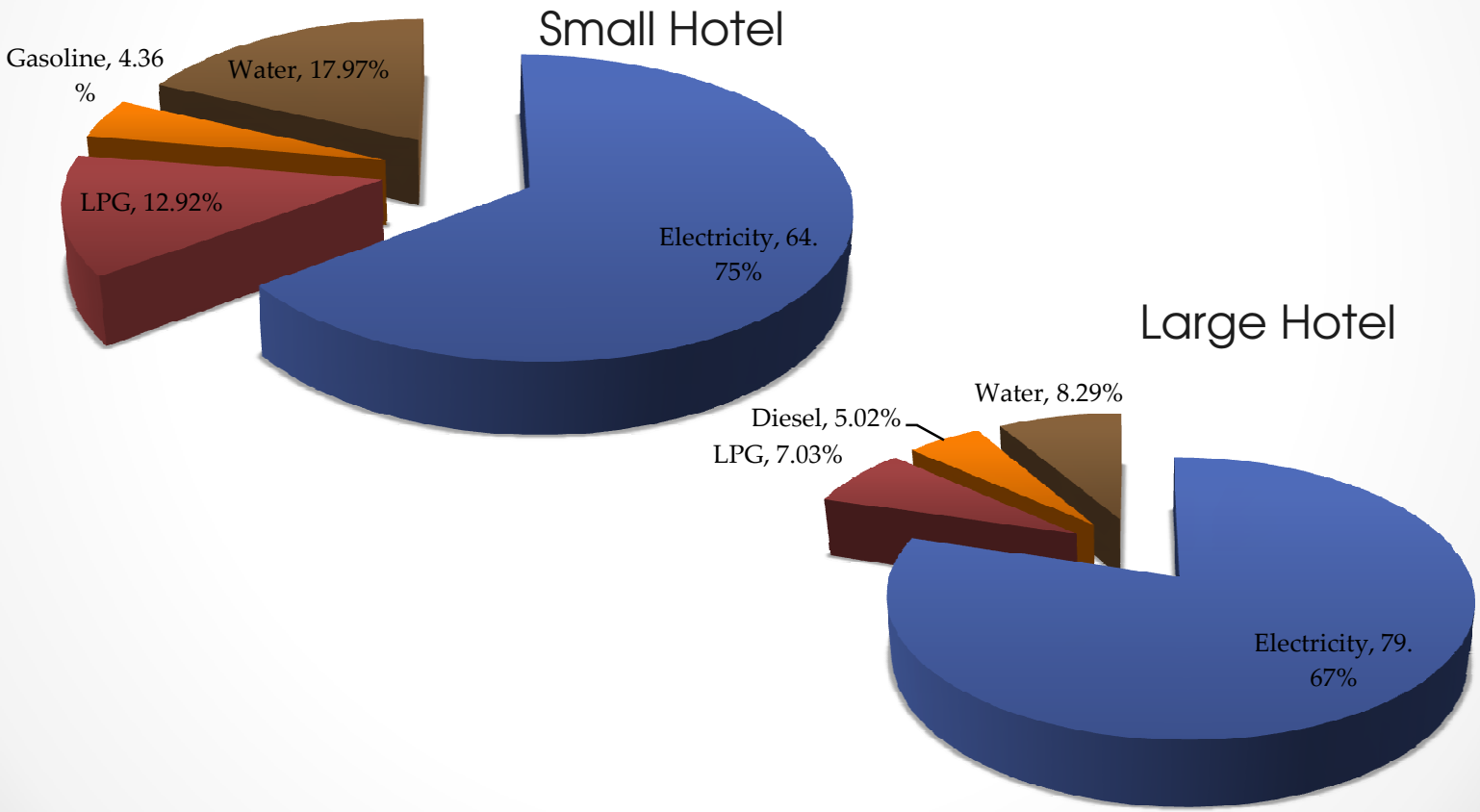
2.Energy Usage in Hotels

Small Hotels have a different usage than large hotels, although this is specific for each hotel, depending on size of property, size of rooms, if and how many restaurants, pools etc.



2.Energy Usage in Hotels

We can establish as well how Energy and Water are used:
(as per costs for 2010)



2.Energy Usage in Hotels

Costs for electricity amount clearly for the highest costs in the utilities, small and large hotels the same.
Costs will vary over the years as electricity costs are based on world oil prices (if electricity is made with Diesel generators, like on most of our islands)

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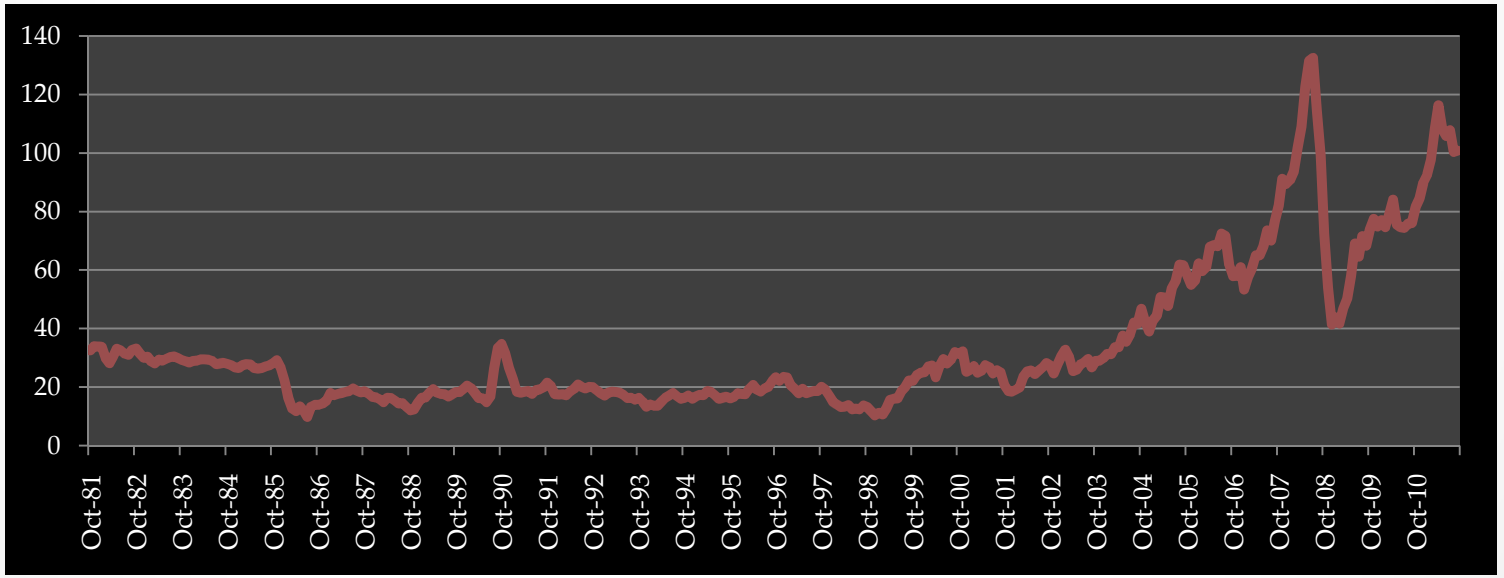


Costs of Crude Oil in US$ from Oct. 1981 to Sep. 2011.
www.indexmundi.com

2.Energy Usage in Hotels

As we cannot change the cost of electricity, we need to change the consumption!

Only by looking at each consumer of electricity we can establish how this consumption is composed and how it can be reduced:

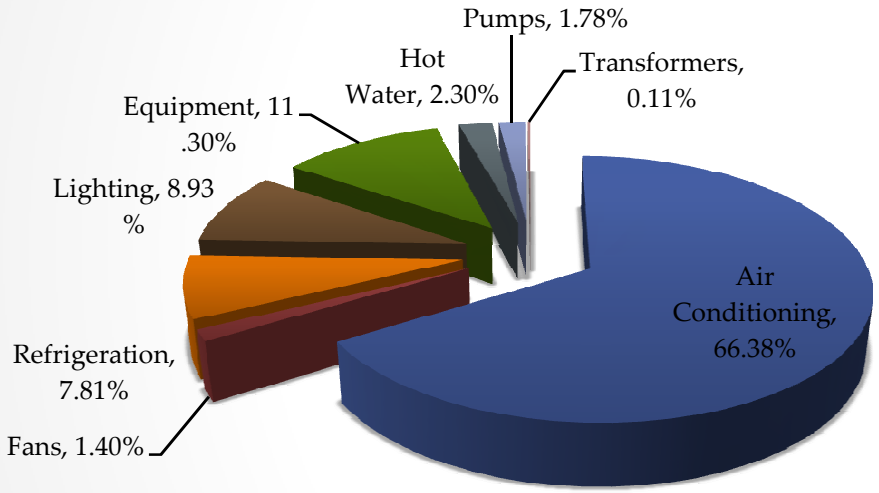
Categories:

- Air Conditioning
- Fans
- Refrigeration
- Lighting
- Equipment (guest rooms, offices, kitchen, laundry etc)
- Hot Water
- Pumps
- Transformers & UPS

2.Energy Usage in Hotels

Categories: examples

Small hotel



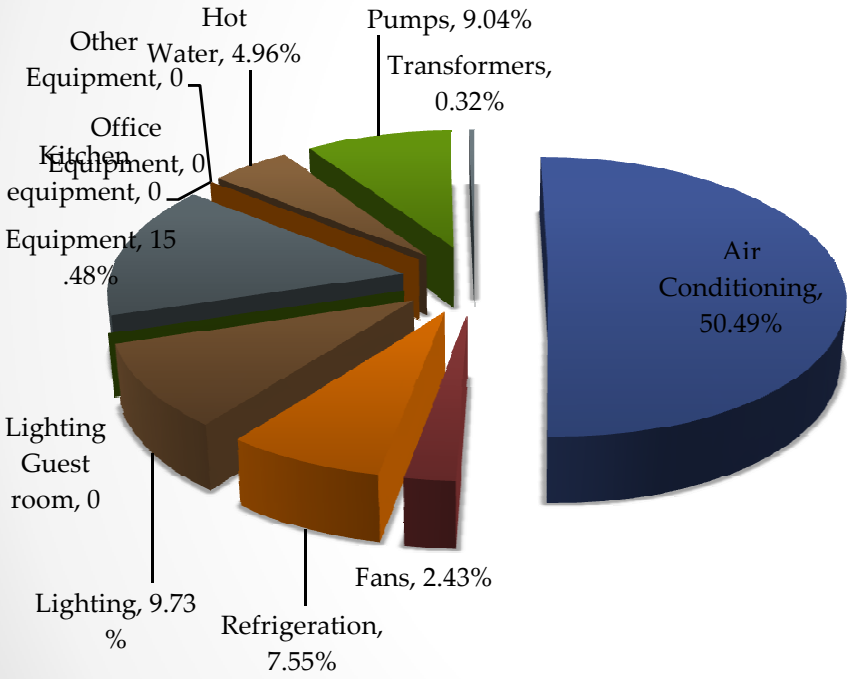
It can be clearly seen, that

- Air Conditioning is the biggest consumer of electricity, followed by
- Equipment
- Lighting,
- Refrigeration,
- Hot water production (back-up for solar)
- Pumps
- Fans and last
- Transformers

2.Energy Usage in Hotels

Categories: examples

Large hotel



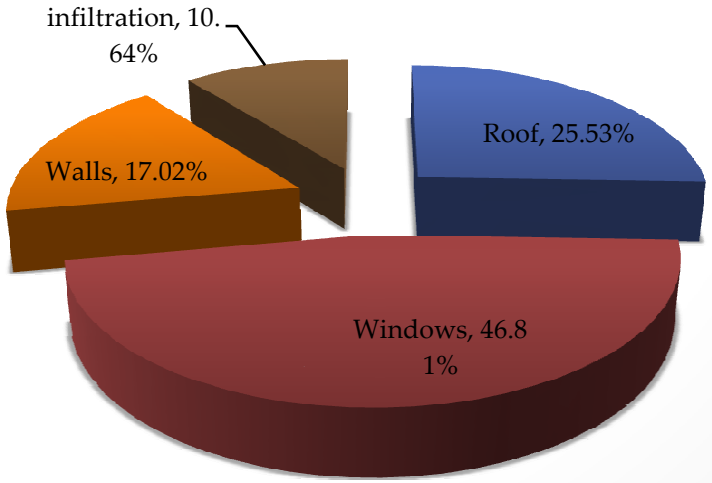
It can be clearly seen, that

- Air Conditioning is the biggest consumer of electricity, followed by
- Equipment
- Lighting,
- Pumps
- Refrigeration,
- Hot water production (only partially)
- Fans
- Transformers

3. Buildings

The old ways of building a house/ hotel etc. has to be rethought – we use now all the technologies of the first world so we need to build the same way;

- When cooling a building we need to consider the building envelope:



3. Buildings

- Exterior walls
- Glass windows and doors
- Sunlight striking windows, skylights, or glass doors and heating the room
- Partitions (that separate spaces of different temperatures)
- Ceilings under an attic
- Roofs
- Floors over an open crawl space
- Air infiltration through cracks in the building, doors, and windows

3. Buildings

WALLS:

INSULATION on walls, floors and ceilings: keep the cold in and the heat out – resulting in lower energy costs

- Insulation performance is measured by R-value—its ability to resist heat flow. Higher R-values mean more insulating power.
- important to seal air leaks before installing insulation

Insulation is needed as well for the partitions if temperature differences from one room to the next can occur (natural ventilated bathroom).

3. Buildings

INSULATION

When cold air hits a not insulated wall/ floor/ ceiling condensation is forming on the side with the hotter air.

Condensation is forming when temperature inside the room is lower than the daily DEW point (23-25°)

BENEFITS:

- Reduced utility bills associated with A/C
- Decreased size & prolonged life of air conditioning system
- No condensation on walls if guest turns off A/C
- Less problems with slip & fall accidents in guest rooms
- Less problems with mildew growth

3. Buildings

WINDOWS:

- Glass is the biggest transmitter of heat , triple or double pane windows with an air/gas pillow in between reduce therefore the heat/ cool loss without restricting light.
- Double-pane glass insulates almost twice as well as single-pane. Triple-pane glass maximizes your energy efficiency up to 74%.
- Low-E (Low-emissivity) glass coatings are layers of thermal protection inside insulating glass that help:
  - Reflect heat and retain interior cooling.
  - Block harmful UV rays to help prevent fade damage.

3. Buildings

ROOFS

- dark roofs absorb 39°C (70°F) more heat than white roofs – resulting in higher cooling costs.
- a US study showed 40% less cooling costs in buildings with a white roof than with a dark roof

Retrofits:

Cool Roof applications can be added:

- A cool roof reflects the sun's heat and emits radiation back into the atmosphere. The roof stays cooler and reduces the amount of heat transferred to the building below, keeping the building at a cooler and more constant temperature
- Spray on, paints

3. Buildings

BENEFITS of a Cool Roof Application

- Reducing utility bills associated with air conditioning
- Increasing occupant comfort and avoid installing an air conditioner where there isn't already one
- Decreasing the size and prolong the life of your air conditioning system
- Lowering roof maintenance costs and extend roof life, avoiding reroofing costs and with this reducing solid waste
- Maintain aesthetics with a roof that performs and looks good

3. Buildings

INFILTRATION

- **Sealed doors and windows**:

no air should be able to pass through the closed doors and windows – leaking of cold air or infiltration of hot air result in higher electricity costs due to more compressor work of the A/C

Chaucking of air leaks

3. Buildings

Conclusion:

by using insulation, double or triple pane glass windows, stopping the air leakage, savings of up to 20% on air conditioning consumption can be achieved.

Natural / Cross ventilation:

old fashioned natural ventilation as much as possible

- **Open louvers** e.g. in bathrooms
- **Open areas underneath the roof** to allow air circulation

3. Buildings

Rain water collection:

Water is due to the low cost a neglected utility.

But in times like after Hurricane Tomas, hotels had to close or import expensive water from overseas.

Solution: Include (underground) storage into the design of the hotel.

- with a filter (ozone) for general use
- with a sand filter with separate pipes for the toilets, top up of swimming pools etc.

- Dual Flush Toilets
- Low flow showerheads
- Faucet aerators

3. Buildings

- **All the things mentioned before are applicable with refurbishment – in addition:** (specifically before any refurbishment is started)

Audit: an outsider (new pair of eyes) will conduct the audit in order to determine

- how the energy is used
- by whom or what
- come up with recommendations based on the findings.

4. The Human Factor

People tend to FORGET certain procedures, like

TURN OFF WHEN NOT IN USE

REMINDERS, POSTERS, TRAINING all aid in reminding staff to conserve energy.

CONTROL LIGHTS (for solar back-up, walk-in chillers & freezers)

PHOTOCELLS, MOTION SENSORS, TIMERS to be used on lights, pumps and motors etc.

4. The Human Factor

Fact: only **WHAT IS MEASURED CAN BE CONTROLLED**

- Energy efficiency is everybody's business – from the illiterate gardener to the GM,
- Daily consumption has to be disseminated to all (notice boards, etc.).
- Training on efficiency in each department has to be done and repeated often.

4. The Human Factor

UTILITY MANAGEMENT Program

Any such program has success only when

- All employees incl. GM are part of it
- When it is understood by all
- When goals are set involving all employees
- Clear guidelines are given how to reach those goals
- Constant reminders and controls are implemented to reach those goals
- Annual evaluations of the process made are done
- best when audited by an outsider/ program which is unbiased and objective

4. The Human Factor

Utility Management
Program

Different Options:

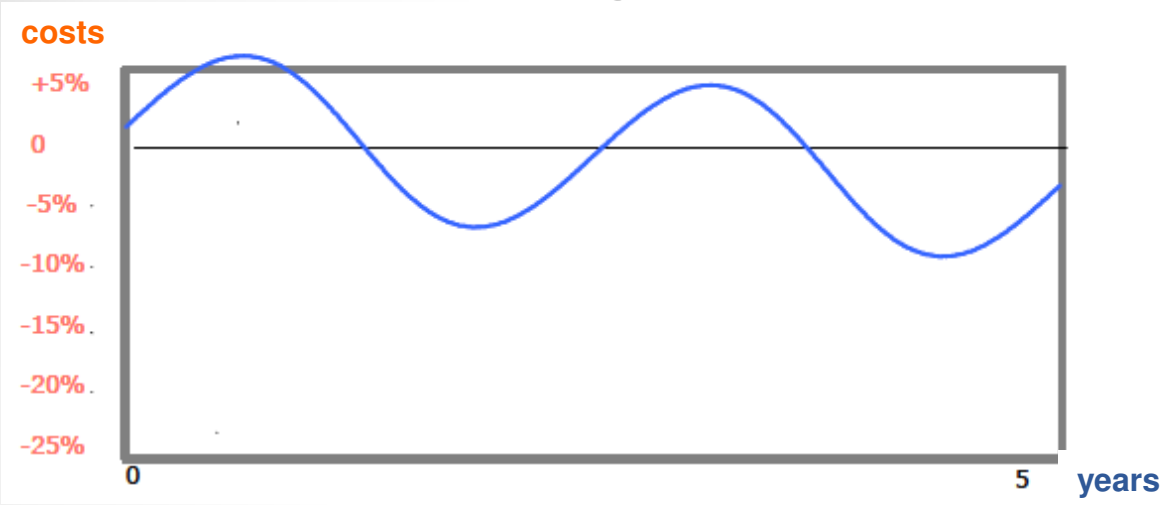
- Design your own program
- Join environmental Organizations like Green Globe, Earthcheck, etc.
- ISO 50001: Support of organisations to build up systems for energy efficiency improvement
- CRISTAL`s Check Safety First – with their environmental program

4. The Human Factor

- An ENERGY POLICY which is understandable for all should be developed and implemented with the help of an Energy management plan.
- The objectives of this energy management plan provide the clear sense of direction,
- indicate the actions to be taken and
- provide in the review the controls and monitoring processes which are needed to maintain the energy efficient performance.

4. The Human Factor

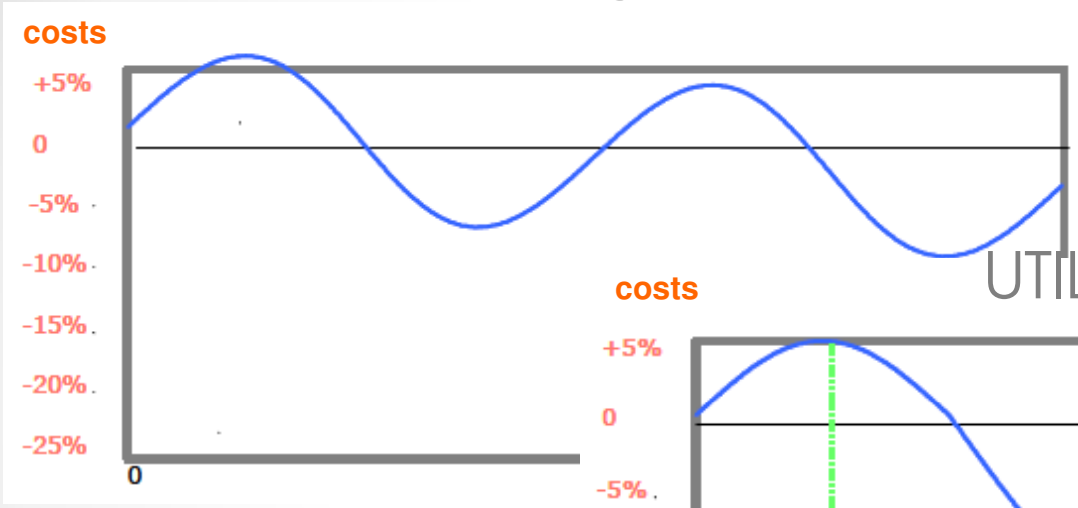
- Ad Hoc Management versus



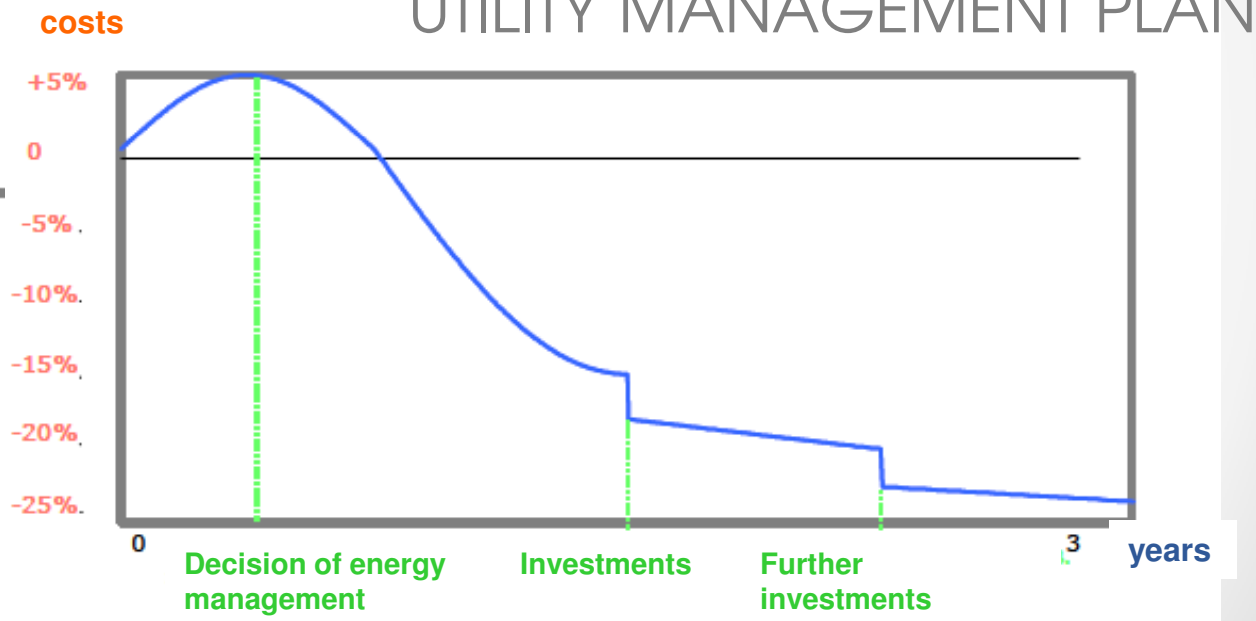
Rising energy consumption

4. The Human Factor

- Ad Hoc Management versus



UTILITY MANAGEMENT PLAN

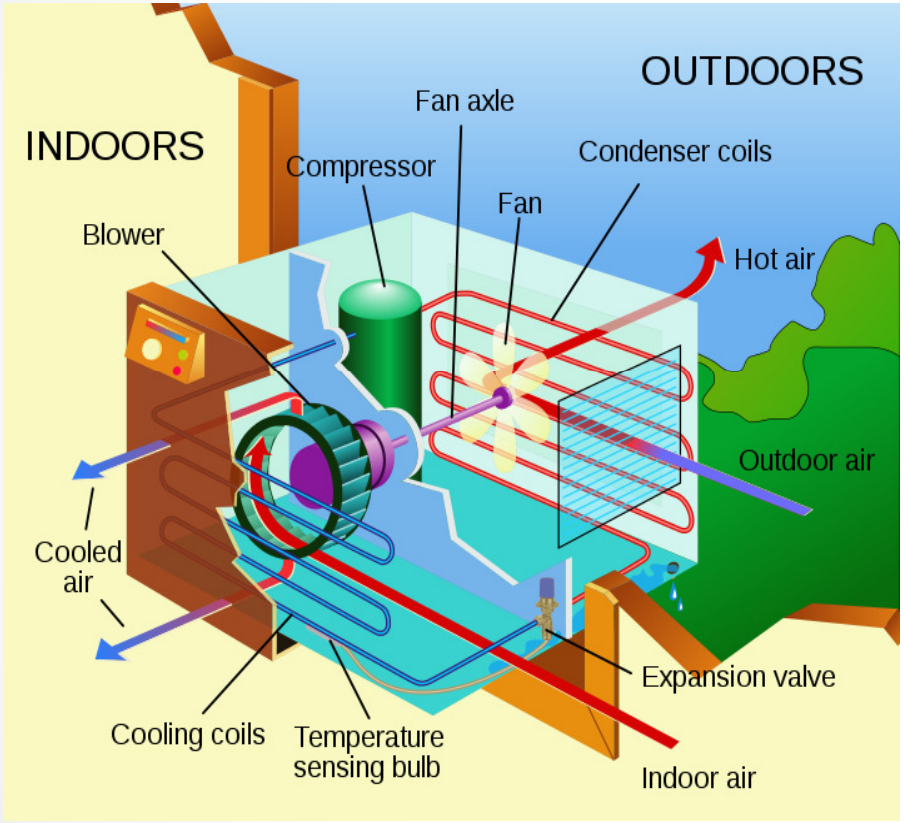


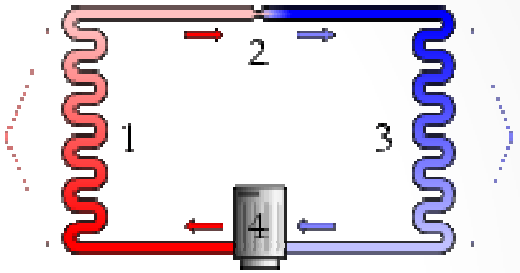
5. Air Conditioning

- A/C systems account, depending on system, between 45% to 65% of electricity costs in a hotel.
- Cooling Load is depending on:
  - Glass windows or doors
  - Sunlight striking windows, skylights, or glass doors and heating the room
  - Exterior walls
  - Partitions (that separate spaces of different temperatures)
  - Ceilings under an attic
  - Roofs
  - Floors over an open crawl space
  - Air infiltration through cracks in the building, doors, and windows
  - People in the building
  - Equipment and appliances
  - Lights

5. Air Conditioning

- Any A/C system consists of





A simple stylized diagram of the refrigeration cycle: 1) condensing coil, 2) expansion valve, 3) evaporator coil, 4) compressor.

5. Air Conditioning

COMPACT UNITS

Like the Window units

SPLIT UNITS

- Easy to install
- Cheap in investment,
- Can be done room by room
- Noisy
- Lifecycle in our climate 3 – 5 years
- Savings up to 30% can occur when choosing Energy Star rated models

5. Air Conditioning

CENTRAL A/C

Consist of the

•Chiller unit (on a roof, beside building, entire plants)

•Piping between Chiller and

•Air handlers inside the building

CHILLERS:

-COMPRESSOR Chillers compress the refrigerant

One system with back-up to supply the entire building

- Screw chillers
- Variable refrigerant flow systems
- And combination of both

-ABSORPTION Chillers

5. Air Conditioning

VARIABLE REFRIGERANT FLOW SYSTEMS

- One condensing unit for multiple indoor fan coil units
- Free hot water producing feature
- Uses less space than multiple units
- Can be supplied with occupancy sensors to reset room temperature when guests are not there
- Consumes less energy per unit ton when compared to typical splits
- Can produce energy savings of up to 30%
- Costs EC$ 5,400 per ton

5. Air Conditioning

ABSORPTION CHILLERS

An absorption chiller uses a heat source to provide energy needed to drive the cooling

- Following fuels can be used Steam/ Exhaust, Natural Gas, Diesel, LPG, Solar
- there is also a free hot water producing feature
- Have no moving parts, only a small pump – long lifecycle
- In combination with a solar thermal application a reduction on electricity usage up to 75% can be achieved

5. Air Conditioning

ABSORPTION CHILLERS

- Refrigerants are either water, ammonia, sodium bromide - depending on the cooling temperature needed – no negative effect on ozone layer
- Each chiller project is cost and designed based on the facility.
- Absorption chillers are available from 15 kW to 5000 kW
- (4.3 tons to 1,420 tons) and any size in between

70 year old absorption chiller at University

5. Air Conditioning

SOLAR COOLING

The combination of high temperature solar panels and an absorption chiller is now one of the most efficient cooling solutions, as the time with highest solar yield equals the time with the highest cooling demand.

- Most efficient in regions with high solar gain, like ours
- Savings up to 75% on electricity consumption for cooling
- Panels mounted on the roof of the building, additional savings due to reduction in cooling load of rooms underneath the roof
- Life cycle of a solar cooling plant is longer than 20 years
- Each plant is specifically designed and engineered for the user
- Investment from EC$ 800,000 upwards
- Payback depending on electricity price, under 10 years

5. Air Conditioning

A further differentiation of Central A/C systems is what kind of piping is used:

- Ducted – when cold air is transported to the building
- Refrigerant – like in the variable refrigerant flow(VRF)systems
- Chilled Water – when cold water is transported

5. Air Conditioning

Important:

All kinds of pipes, ducts and lines between compressor and air handler need to be insulated to avoid losses in the cooling media.

Outside: white insulation (to avoid heating up by the sun's radiation)

Central A/Cs

- Have a longer lifetime up to 14 years with less electricity consumption
- Higher investment
- Lower on noise

5. Air Conditioning

When choosing an A/C system:

- Determine size of system

a guestroom with 5 incandescent 75 Watt light bulbs (375 Watt) has a higher cooling demand than the same room with 5 L.E.D. of total 45 Watt

- Compare the different models based on
  - SEER rating (Seasonal Energy Efficiency Rating) or
  - EER rating (Energy Efficiency Rating)
  - COP (Coefficient of Performance) – all the higher the more efficient
  - Noise levels

5. Air Conditioning

When choosing an A/C system continued:

- ❑ Calculate the lifecycle costs for each system
- ❑ Check in regards of maintenance requirements
- ❑ Does the A/C company have any support system in place
- ❑ Check whether the company offers sensors for doors and windows

5. Air Conditioning

EXAMPLES:

- Assumption: 154 rooms, each room with 12,000 BTU (154 tons/542 kW cooling), cooled for 12 hours per day:
- EC$ 0.997 per kWh (as per LUCELEC May 2011)

What	Annual kWh Consumption	Costs in EC$	Costs over 10 years	Investment	Total Costs after 10 Years	Lifetime	Costs over 20 years
Minisplit	825,943	823,465	8,234,650	70,162	8,374,975	5	16,749,950
Minisplit	749,467	747,218	7,472,183	90,798	7,653,779	5	15,307,559
VRV SYSTEM	607,068	605,247	6,052,468	831,600	6,884,068	14	13,768,136
Chilled Water	607,068	605,247	6,052,468	825,440	6,877,908	14	13,755,816
Solar cooling	156,826	156,355	1,563,554	2,437,500	4,001,054	20	8,002,108

Not included were costs for Maintenance & refrigerant refills

6. Lighting

Lighting is needed specifically in hotels in

- guest rooms
- corridors
- public areas
- offices
- Kitchens, etc.

We need to differentiate as well how lights are used:

- Decorative lighting (guest rooms, landscaping)
- Task Lighting (workshops, offices)
- General lighting (walkways, kitchens)

6. Lighting

Lighting uses close to 10% of the annual electricity consumption, depending on size of property, standard, and what kind of bulbs are used.

Lighting replacements are quite easily undertaken although certain guidelines should be followed:

- Aesthetics (guest rooms)
- Lighting requirement (guest rooms for reading lights, kitchens, workshops, offices)
- Hours of usage (attic light once a year for an hour, versus lights on 24 hours)
- Location of light (5m above floor, on top of building)

6. Lighting

INCANDESCENT LIGHT BULB

•Should be more called a "heating bulb" than a light bulb
•95% of the consumption is "wasted" by heat
•5% used for light.

•Lifetime approx. 1,000 hours

Production will be discontinued and is already in several regions

6. Lighting

CFL = COMPACT FLUORESCENT

- Uses 80% less electricity than an incandescent light bulb;
- Lifetime depending on make 6,000 to 15,000 hours.
- Are available in all kinds of shapes, dimmable and colors

PAY BACK under 0.5 years

6. Lighting

LED = Light Emitting Diode

- Used since a long time for control lights in electric appliances and traffic lights.
- More expensive than CFLs but with a lifetime of up to 70,000 hours a real energy saver
- up to 20% more efficient than CFLs with a longer lifetime.
- are built for a wide range of voltage and have therefore no problems with power fluctuations
- Extremely efficient for dimmable lights (corridors on motion sensors)
- Come in all different kinds of shapes, colors and forms
- Pay back from 1 to 2 years

6. Lighting

FLUORESCENT LIGHT BULBS

Almost 70% of all artificial light is produced by those lamps.

They consist of starter and the tube, filled with

Mercury and should be recycled.

T12 – fluorescents will be discontinued by 2012

T8 – are only produced with electronic ballast (since April 2010)

REPLACEMENTS:

T5 – (need an adapter in existing fixtures)

- up to 13 Watts less consumption per bulb compared to T8
- Double the life than a T8/ T12
- Same lighting level than T12 or T8
- Pay back within 1.5 years

6. Lighting

HALOGEN LIGHTS

A **halogen lamp**, also known as a **tungsten halogen lamp**, is an incandescent lamp with a tungsten filament contained within an inert gas. They can be operated at a higher temperature with a higher luminance than incandescent bulbs.

Halogen bulbs react to higher voltage with higher light emissions but those fluctuations shorten their lifetime – transformers

Halogen bulbs get much hotter and the glass coating is quite sensitive to touch by fingers – weakens the glass

Replacement:

L.E.D. bulbs from base G9, GU10 etc. can be used without transformer

Eg: G9 halogen 25 Watts can be replaced with LED G9 3.5 Watts

GU10 20 Watts – replacement with LED GU10 3 Watts

GU10 40 Watts – replacement with LED GU10 4 Watts

6. Lighting

HALOGEN LIGHTS

Halogen lights are as well used for outside lighting

- 150 Watts upwards
- Lifetime 1500 to 2500 hours

REPLACEMENT WITH L.E.D:

Here the whole fixture needs a replacement:

make	rating in kW	lumen total	investment in EC$ fixture incl. lamp	lamps lifetime hours	total kWh over lifetime	costs repleace-ment bulb in EC$	replacement over 50,000 hours	cost for replacement bulbsover 50000 hours	kWh consumption over 50,000 hours	total investment for replacement	total consumption @ EC$ 0.9 per kWh	total invest & consumption over 50,000 hours
Halogen	0.150	2400	41.83	1500	225	5.1724	33.33	172.41	7,500	214	7,333	7,547
LED Ecofix	0.030	3040	951.78	50000	1500	0	0	0	1,500	0	1,455	2,407
Halogen	0.300	4800	40.17	2000	600	5.7888	25.00	144.72	15,000	185	14,550	14,735
LED Ecofix	0.060	6080	1,350.56	50000	3000	0	0	0	3,000	0	2,910	4,261
Halogen	0.500	8500	53.57	2500	1250	44.086	20.00	881.72	25,000	935	24,250	25,185
LED Ecofix	0.090	9120	1,704.32	50000	4500	0	0	0	4,500	0	4,365	6,069

Not included is maintenance time for replacement!

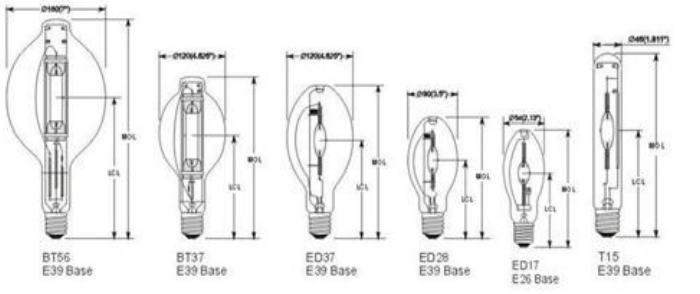
6. Lighting

METAL HALIDE LIGHTS

Belong to the group of High Intensity Discharge (HID) lights and need special fixtures with a ballast

Are used for street lighting, parking areas, tennis courts, etc

- Wattage:100 W to 1500 watts
- Average life: 10,000 – 20,000hrs
- Should be replaced before their end of life
- Should be used in fixtures with unbreakable glass cover to prevent Injuries if bulb explodes
- Should be bought only from reliable sources



6. Lighting

MERCURY VAPOR LIGHTS

Belong to the group of High Intensity Discharge (HID) lights and need special fixtures with a ballast

Are used for street lighting, parking areas, tennis courts, etc

- Wattage: 80 Watts to 1,500 Watts
- Average life: 24,000 hours
- are banned in US since 2008
- Will be banned in EU from 2015
- Lamps produce 50% less light every 5 years by drawing the same amount of power although it never burns out
- UV hazard if not special coated

6. Lighting

L.E.D. REPLACEMENT FOR HID LIGHTS

When replacing the HID lights the whole fixture needs to be replaced as LED lights do not need any ballast.

make	rating in kW	lumen total	investment in EC$ fixture incl. lamp	lamps lifetime hours	total kWh over lifetime	costs repleace-ment bulb in EC$	replaceme nt over 50,000 hours	cost for replacement bulbsover 50000 hours	kWh consumpti on over 50,000 hours	total investment for replaceme nt	total consumpti on @ EC$ 0.9 per kWh	total invest & consumpti on over 50,000 hours
Mercury Vapor	0.050	1575	173.88	24000	1200	34.71	2.08	72	2,500	246	2,425	2,671
LED Ecofix	0.030	3040	951.78	50000	1500	0.00	0	0	1,500	0	1,455	2,407
Mercury Vapor	0.075	2800	173.88	24000	1800	48.11	2.08	100	3,750	274	3,638	3,912
LED Ecofix	0.030	3040	951.78	50000	1500	0.00	0	0	1,500	0	1,455	2,407
Mercury Vapor	0.100	3900	173.88	24000	2400	48.11	2.08	100	5,000	274	4,850	5,124
LED Ecofix	0.030	3040	951.78	50000	1500	0.00	0	0	1,500	0	1,455	2,407
Mercury Vapor	0.160	2500	173.88	24000	3840	61.51	2.08	128	8,000	302	7,760	8,062
LED Ecofix	0.030	3040	951.78	50000	1500	0.00	0	0	1,500	0	1,455	2,407
Mercury Vapor	0.175	8400	40.17	24000	4200	48.11	2.08	100	8,750	140	8,488	8,628
LED Ecofix	0.090	9120	1,704.32	50000	4500	0.00	0	0	4,500	0	4,365	6,069

Not included is Maintenance Time & Costs for replacement!

7. Refrigeration

Refrigeration includes

- Guest room refrigerators
- Refrigerators in kitchens
- Walk-in chillers and freezers
- Ice Makers

Refrigerators last even in our surrounding 12 years, therefore the most important issue when purchasing a refrigerator is the costs it will accumulate over the next twelve years.

The purchasing price of the refrigerator is the smallest investment when compared to the consumption it will use over the next 10 years.

7. Refrigeration

- Energy Star Rated refrigerators save at least 10% of the electricity consumption.
- Investment on Energy Star rated refrigerators is 10% higher than not tested models
- Purchase models which fit your current, voltage and Hertz
- A refrigerator 110V/ 60 Hz will never reach its full potential when on a transformer to step down 240V/ 50 Hz to the required 110V. Transformers can only change voltage not the cycles!
- Clean and exchange the rubber seals around the door frequently
- Ensure the doors close properly

7. Refrigeration

Refrigerators in Guest Rooms:

Nowadays almost all guest rooms are equipped with refrigerators.

There is a wide range of models in different sizes, built into cupboards etc. available.

There are models with compressors and absorption refrigerators available.

- Turn off the refrigerator when the guest room is unoccupied for more than one day!
- Stock refrigerators as a minibar and make extra money

7. Refrigeration

Refrigeration in Kitchens

- Position the refrigerators away from any heat sources like stoves
- Stay away from chillers and specifically freezers with glass doors
- Don't overload them
- Don't put hot items into the refrigerator/ freezer unless it is a blast chiller

What	annual kWh	costs EC$	Lifetime	EC$ 12 years
Refrigerator				
Glass door	2481	2,474	12	29,683
Solid door	1796	1,791	12	21,487
Energy star rated	1192	1,188	12	14,261
Freezers				
Gass door	9281	9,253	12	111,038
Solid door	4709	4,695	12	56,338
Energy star rated	3840	3,828	12	45,942

7. Refrigeration

Walk-in Chillers and Freezers

- Ensure the entrance door is shaded and not exposed to the sun!
- Ensure Freezer Curtains are installed and in proper condition
- Don't overload – allow cold air to circulate
- Avoid loading during hot day time hours
- Ensure incandescent lights are exchanged to LED
- Keep access to chillers and freezers to a minimum/ certain time of day e.g. early morning, late afternoon
- Ensure door is closing properly and seals are in order
- Defrost overnight in the chiller – saves cooling costs of the chiller of approx. 10% and saves water when avoiding defrosting under running water/ or electricity when using a microwave

7. Refrigeration

Ice Makers

Ice makers are using a high amount of energy and use a lot of water!

- Energy star rated models will save more than 10% on electricity and water consumption.
- Ensure the position of the icemaker is in the shade
- Position it away from any heat source
- Ensure flap door is closing properly
- Don't distribute the ice in the hottest time of the day
- Don't over ice drinks, ice is quite expensive in our area!
- Collect the water, which is normally lost in the process, in a tank to be used for cleaning, etc.

8. Pumps & Motors

PUMPS & MOTORS

Every hotels uses quite a lot of pumps and motors;

- Pool pumps
- Whirlpool pumps
- Water pumps
- Lift Station & waste water treatment pumps
- Exhaust fans in kitchens

In the Caribbean we tend to oversize pumps which makes the pump work only on 50% efficiency than the supposed 85%, therefore wasting energy

When the pump breaks down we often rewire the motor which makes it still less efficient

8. Pumps & Motors

Recommendations for pumps & motors:

- Install timers on all pool pumps
- Install timers which can be manually over ridden for all decorative pumps (waterfalls to be turned off an a rainy day, etc.)
- Install level switches and smart control systems to lift stations
- Size pump properly for the job it is supposed to do
- When choosing pumps check their efficiency, COP and consumption before purchasing
- Service them regularly
- Install pumps with variable speed drives – they can save up to 30% on consumption

9. Equipment

We differentiate

- Equipment in guest rooms
- Equipment in offices
- Equipment in kitchens
- Transformers & UPS

Generally equipment should be evaluated as per the hours of usage.

A bread slicer in the kitchen used only once a day for 10 minutes needs less consideration than a transformer in a guest room block which is on 24/7 supplying only the plug-in outlets in the guestroom

9. Equipment

Equipment in guest rooms consist of

- Hair dryers
- Radios & alarm clock
- I-Pod stations
- TV, etc.

- Generally the equipment should be chosen as per the Voltage supplied by the power company.
- Everything can be purchased in 110 Volts or 240 Volts with the proper cycle rating.
- With hardly any difference in price, but with proper functionality and more efficient than when using transformers

9. Equipment

Equipment in Offices consist of

- Computers
- Printers
- Shredders, scanners, etc

- Ensure everything is turned off when not in use
- Ensure computers are on "power managed" – there is a difference in the annual consumption of almost 600 kWh between power managed and turned off to not power managed and left on
- Invest in flat screens – they are more efficient
- Almost all computers have dual voltage, use the one supplied by your power company
- Buying Energy star rated equipment saves at least 10% on consumption

9. Equipment

Equipment in Kitchens

- Ensure everything is turned off when not in use
- Investment in LPG appliances is generally higher than electric ones, but are more efficient (up to 75%)
- Clean pots and trays are more efficient than those which have a big layer of sooth
- Defrost in Chiller/ Refrigerator than in the microwave or under running water
- Buying Energy star rated equipment saves at least 10% on consumption

9. Equipment

- Transformers change voltage from 240 Volt to 110 Volt.
- Transformers cannot change the frequency – Hz – so appliances which are supposed to run on 110 Volt 60 Hz will never reach their full potential when stepped down from our 240 Volt 50 Hz.
- Depending on model, size and age of transformer they can consume up to 15% of their rating
- Fact is that a transformer consumes electricity, which is delivered to the surrounding by heat.
- The transformer consumes electricity even when the appliance is turned off

9. Equipment

- Transformers should be chosen as close as possible to the kW rating or consumption of the machine or appliance it is supplying.
- Transformer have to be checked regularly as any other appliance
- Times have changed and all hotels are equipped now with hair dryers etc. so the luggage of guests has changed as well.
- The chargers for camera, phone I-pod etc. have most voltage ranges from 110 to 240 volt and all they would need are adapters.
- For anything else purchase some small transformers for rent.

10. Renewable Energy

Renewable energy is energy which is unlimited available like the sun, the wind, the movement of the sea, etc.

The use of renewable energy the hotels sector is quite common when it comes to

Solar Hot Water Applications

But there is much more proven technology available:

- Photovoltaic applications
- Solar Cooling
- Wind Turbines, etc.

11. Summary

Energy Efficiency is not difficult as long as it is planned properly paired with a direction where you want to go and the consistency to reach the aim.

Energy Efficiency acquires to see certain things with a new pair of eyes or from another angle e.g. B.O.H.

- The guest pay for what they see – the back of the house costs the money!
- Better maintenance, better appliances, A/C etc. in the back of the house areas
- Guest areas have an occupancy of 85% - BOH – is 100%

10. Renewable Energy

PHOTOVOLTAIC (PV)Panels:

All power companies in the region are in the process of preparing policies for or allowing already the co generation of electricity by the users up to a certain amount of annual consumption.

PV panels collect the energy of the sun – invert it into electricity which is then fed back into the grid and credited to the consumer.

- Should only be installed when all other efficiency measures are undertaken
- Can be installed in smaller modules over years
- Investment from EC$ 11,000 per kWp
- Technical lifetime min. 20 years
- Payback around 10 years, depending on the cost of electricity (Increases of electricity cost versus decreasing costs for panels)

Energy Efficiency

QUESTIONS?

Thank You
for your attention!

Christine Wilkinson
Christine.wilkinson@credp.org
E3-consulting@hotmail.com