

# **Energy Management in Hospitals**

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# Energy use in Hospitals

- Hospitals and hospital buildings are large consumers of energy
- Per square meter, hospitals are the second highest energy intensive space type in the US
- In this part of the world it is the highest .
- They have an energy intensity nearly twice that of average building

# Energy use in hospitals

- **Energy has always been an essential element to the delivery of quality services**
  - **Explosion in the use of technology by healthcare facilities - increased energy demand**

# Explosion .....Ten fold

- **Lighting**
- **Lifts**
- **Laundry**
- **Air conditioning ,refrigeration**
- **Advanced imaging systems**
- **Diagnostic equipments**

# Hospital energy balance

- Air conditioning - 45%
- Hot water - 5%
- Lighting - 20%
- Kitchen - 5%
- Other - 20%

# S.C.T.

- MRI 1.5 tessler-> 12 hours a day
- CT Scan
- 4 cath
- Bloodbank
- ECG,ECHO,UltraSound,TMT,X Ray
- 12 OTs
- Central Lab

## ...more

- 6 Cold rooms
- Mortuary
- > 50 Refrigerators
- 300T AC Plant, Window and split units
- Computers
- CSD
- Laundry –  
washing, extraction, driers, press

## ... more still

- Water pumps, Air compressors, vacuum pumps
- 6 lifts
- Lighting
- .....

# Power consumption daily...

- **SCT(250 beds) – 15,000 units**  
**-60units/bed/day**
- **Rs.22 lakhs. pm -**
- **SUT(150 beds) - 5000 units**  
**30units/bed/day.**
- **Rs 7.5 lakhs /pm**

# Consumption

- **Say 25 units /bed/day**
- **Kerala has more than 1,20,000 hospital beds**
- **>30,00,000 units of electricity per day**
- **> Rs 1 crore a day**

# Kerala Scenario

- **Healthcare facilities spend more than Rs.380 crores annually**
- **This amounts to one tenth the sales of KSEB**

# 10% Energy savings ...

- 25,000 tonnes of greenhouse gases
- 750 acres of forest preserved from deforestation

# Healthcare and Energy Impact...

- Importance of addressing climate changes
- Encouraging hospitals to cut their Carbon emission
- Healthcare should not create health problems

# Energy Management Opportunities

- **Cat. 1: Simple and easy housekeeping practices**
- **Cat. 2: More savings at a reasonable cash outlay**
- **Cat. 3: Substantial savings over a long term with capital investment**

**EMOs examples....**

**Category I EMOs**

# Air Conditioning

## Minimize Energy Use

- ❑ **Turn off AC right after use – affix “Save Energy” sticker near the exit**
- ❑ **Use natural ventilation or fan where possible**
- ❑ **Set AC at 24oC and suitable fan speed.  
Check temperature regularly**

# Air Conditioning

## Use Energy Efficiently

- **Set up maintenance programme to ensure efficient operation**
- **Clean AC and dust filter**
- **Replace room coolers with more energy efficient models**

# Air Conditioning

## Minimise Energy Loss

- **Keep windows and doors closed to minimise air infiltration when AC is running**
- **Lower window blinds or curtains to reduce direct sunlight during summer time**

# Lighting

- **Turn off unnecessary lighting for area not in use – affix “Save Energy” sticker near the switch**
- **Turn off or dim lighting in perimeter area**

# Lighting

**Examples for switching off**

# Office Equipment

- ❑ **Set all computers and office equipment to “energy saving” mode, and turn them off after use**
- ❑ **“Screen Saver” is actually “Energy Waster” & should not be used when computer is idle**
- ❑ **Unplug equipment chargers and adapters when these electronic equipment are not in use**
- ❑ **Arrange for last-man-out to turn off all equipment**

# Lifts & Escalators

**Use the stairs for 1 or 2 floors up or down – affix**

**“Save Energy” sticker near the lift**

**Shut down some of the lifts and escalators during non-peak hours**

**Switch off the lighting and ventilation fan inside**

**the lift car when the lift is in standby/idle mode**

# Facility Management

**Keep windows and doors shut for all AC areas**

**Avoid pre-cooling. If pre-cooling is necessary,**

**switch on AC not more than 15 minutes in advance**

**Turn on exterior lighting only when necessary**

# Get People Into Action

- **Get support from all staff**
- **Explain energy policy and housekeeping practices (and incentive scheme) through staff briefings, emails, newsletters or notice boards**
- **Affix “Save Energy” stickers at switches, doors, exits, lifts and escalators as a reminder**
- **Keep track of organisational performance in energy saving, and benchmark against targets**

**EMOs Examples.....**

**Category II**

## Category 2 Measures

- Energy Saving > Cat. 1**
- Small Capital Investment**
- Payback < 3 Years**
- Some Engineering Work**

# **Air Conditioning**

**Install Fresh Air Heat Exchanger**

**Air Conditioning**

# Fresh Air Heat Exchanger

**Energy saving about 10 ~ 15%**

# Air Conditioning

**Relocate temperature sensors to suitable location that can properly reflect the space conditions under control**

**□ Increase every 1oC of set point temperature**

**will save about 1.5% of electricity**

# Air Conditioning

**Use evaporative water-cooling for  
condensers**

**Energy saving about 10~15%**

# Lighting

**Replace tungsten lamps with fluorescent tubes or compact fluorescent lamps (CFLs) Energy saving up to 80%**

# Lighting

**Replace 'fat' tube (T12 or T10 fluorescent lamp) with 'thin' tube (T8 fluorescent lamp)**  
**Energy saving about 10%**

# Lighting

**Replace conventional magnetic ballasts  
with electronic type**

**Energy saving about 20~40%**

# Lighting

**Install separate control for lighting at window**

**perimeter to allow “switch off” during bright days**

**Energy saving about 10~15%**

# Lighting

**LED is gradually replacing some conventional lighting technologies**

- **Long life, maintenance free (up to 100,000 hours)**
- **Operates on extra-low voltage (12V and 24V)**
- **Range of colours**

# Energy Audit

- You can't manage what you don't measure
- Knowing where you stand is a crucial first step in creating an overall game plan for addressing the energy use

# Thanks

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