A monthly newsletter of
Indian Association of Energy Management Professionals

THE URJA WATCH

August 2009, Vol. II/Issue 14

It is about "Conscience Keeping on Energy Matters"

ENERGY MANAGEMENT IN BUILDINGS

ENERGY MANAGEMENT IN BUILDINGS

What's inside?

From the Editor's Desk...

Building a Greener Future

Dear Readers,

Improving the efficiency of energy-use in buildings is one of the key ways of saving money for businesses, schools and hospitals. Efficient energy management in buildings helps to reduce their carbon footprints and make a real contribution to fighting climate change.

Globally, buildings account for about 30% of all energy consumption. In most global property markets including India, effectively managing building energy use and associated costs are becoming an increasingly critical factor in commercial building management.

Construction is a booming business activity in our country. Several millions of square meters are added every year for commercial and residential buildings. According to the International Energy Agency (IEA), the buildings sector accounted for the largest share of India's final energy use between 1995 and 2005; the building sector alone consumed 47% of the total final energy use in the year 2005. Residential buildings accounted for the lion's share (93%) of the total building energy use the same year (IEA, 2007).

Within the buildings sector, air conditioning and lighting systems contribute to major energy consumption. Studies have shown that just improving efficiency of lighting, air conditioning and electrical systems could save as much as 20% of the energy used in existing buildings. Energy audits conducted in some of India's public buildings indicate total energy saving potential up to 40%.

Many countries have developed their own standards for energy efficient or green buildings. In recent years, India too has developed building codes and ratings that are appropriate to the country's building industry.

In 2005, the Bureau of Indian Standards (BIS) issued National Building Code of India (NBC 2005). It covered a wide range of structural, safety and other design issues but with scanty coverage on energy efficiency.

Two years later, in 2007, the Ministry of Power and the Bureau of Energy Efficiency (BEE) launched Energy Conservation Building Codes (ECBC). It covered codes for 5 climate zones in India. This is a good initiative on the part of BEE as it is the first time in India that codes are set to define performance parameters of built commercial spaces. The ECBC has set energy efficiency standards for design and construction of buildings. The building industry is yet to adopt the implementation of the new building energy code. Today, few buildings in India meet the code.

There are several other initiatives to strengthen India's building sector. The Energy Research Institute (TERI) has developed the Green Rating for Integrated Habitat Assessment (GRIHA) system applicable to the Indian building industry.

The Indian Green Building Council (IGBC) is actively promoting green buildings in India. Similar to the Leadership in Energy and Environmental Design (LEED) rating system, developed by the U.S. Green Building Council (USGBC), LEED-India promotes a whole-building approach to sustainability. In the LEED process, designers are encouraged to develop low-foot-print designs related to many attributes such as site planning; environmental architecture; energy efficient building materials; innovative space cooling/heating techniques and water conservation.

Despite these initiatives, a lot remains to be done in managing energy efficiently in buildings. IAEMP has made a small beginning in the residential sector by launching a Home Energy Management Program (HEMP). This month's issue provides an update on the HEMP program.

As ECBC is currently a voluntary code, improving energy management in commercial, government and other buildings is expected to be a painfully slow process. With energy demand growing rapidly, the country needs to make the best use of available energy. The national government must adopt ECBC as a mandatory regulation in order to begin enforcing it.

There is a great opportunity ahead in the buildings sector to implement energy efficiency measures and thereby build a greener future for the country.

Energetically,

S. Subramanian
Editor

Letters to the Editor

Dear Sir,

Your URJA watch seems to have an excellent effect on people's creativity.

Ideas like capturing kinetic energy from water gushing out of pumps as put forth by Mr. B.V. Subbarao and recovery of heat from large cooking vessels as told by Mr. Saurabh Pansare look practical. They seem workable with little bit of efforts.

K.Vijaya Kumar Gupta
President
AVOPA INDUSTRIALISTS' FORUM, Hyderabad

Dear Sir,

Re: "The Urja Watch" July 2009 on "Promoting Energy Efficiency & the role of NGOs", my comments are as follows:

1. Thanks, good effort.

2. The editorial / from editor's desk:- is very nicely written illustrating roles of NGOs, types, their working and more so good examples and brief work done including IAEMP.

3. Need of NGOs is made greatly clear.

4. NGOs on Energy:- It is good to know that several NGOs are working on Energy successfully with dedication.

5. Global Awards for NGOs:- is very motivating and encouraging. IAEMP can also apply for National/International awards.

6. Shri S.K. Sood has beautifully described "IAEMP and need for similar organization".

Congratulations and best of luck!

R.A.Sharma, Ex.G.M. Raasi Group and Ex. Director NPC, Hyderabad

Energy Management in Buildings

By N. Ravi Shankar

This article focuses on two major energy end uses in buildings – Lighting and Air-conditioning. It also suggests smart energy conservation plans.-Editor

In order to make the best use of electricity and energy bills, it is essential that the management of every commercial building put energy conservation schemes into practice in the most efficient way. Moreover, from social point of view, since commercial buildings are among top energy users therefore their effort in saving energy will significantly contribute to reduce the country's energy demand.

In all commercial buildings, the "Shopping Mall" type has the highest growth in energy consumption due to its spacious size and long service hours per day.

"Shopping Mall" is a commercial center in which varieties of shops and other facilities such as parking spaces and restaurants are available. Currently there are enormous Buildings in the country which can be classified into 6 categories

- Office buildings (corporate/government buildings)
- Hotels (boarding as well as lodging)
- Hospitals/Clinics/Medical labs
- Shopping malls/Shopping plazas
- Schools/Colleges/Educational Institutions
- Others (Markets, Bus stand, Railway stations, Airports)

Among these, majority are "shopping mall"/commercial type buildings that consume energy, especially electricity, in a high range mostly to provide comforts for their customers.

Shopping mall category accounts for an estimated 40–50 per cent of total energy consumption, the highest among other Building categories.

Therefore in order to realize significant energy savings, shopping mall type buildings should be prioritized to activate energy conservation measures immediately.

Energy Consumption Overview

It is estimated that shopping mall type commercial buildings alone consume around 2.5 percent of the national electricity demand. Such commercial buildings can be categorized into 4 main groups as following:

1. Retail store that specializes in wholesaling/retailing of numerous consumer products especially foodstuff with bargained price. Target customer is middle to lower economic class.

2. Department Store that sells numerous goods. The store separates different kinds of goods for various consumer groups in different sections. Target customer is middle to upper economic class

3 .Shopping Plaza – a building that allocates almost all space for rental shops. Example: plazas like Spencer's Plaza and City Center in Chennai that sell all types of goods, combine different kinds of shops and goods.

4. Supermarket - a retail shop that focuses on groceries and needs for home. Examples include: Food World, Spencer's, Reliance and others.

In each of shopping mall type buildings, energy is consumed for different purposes and areas as can be shown in Figure 1 below:

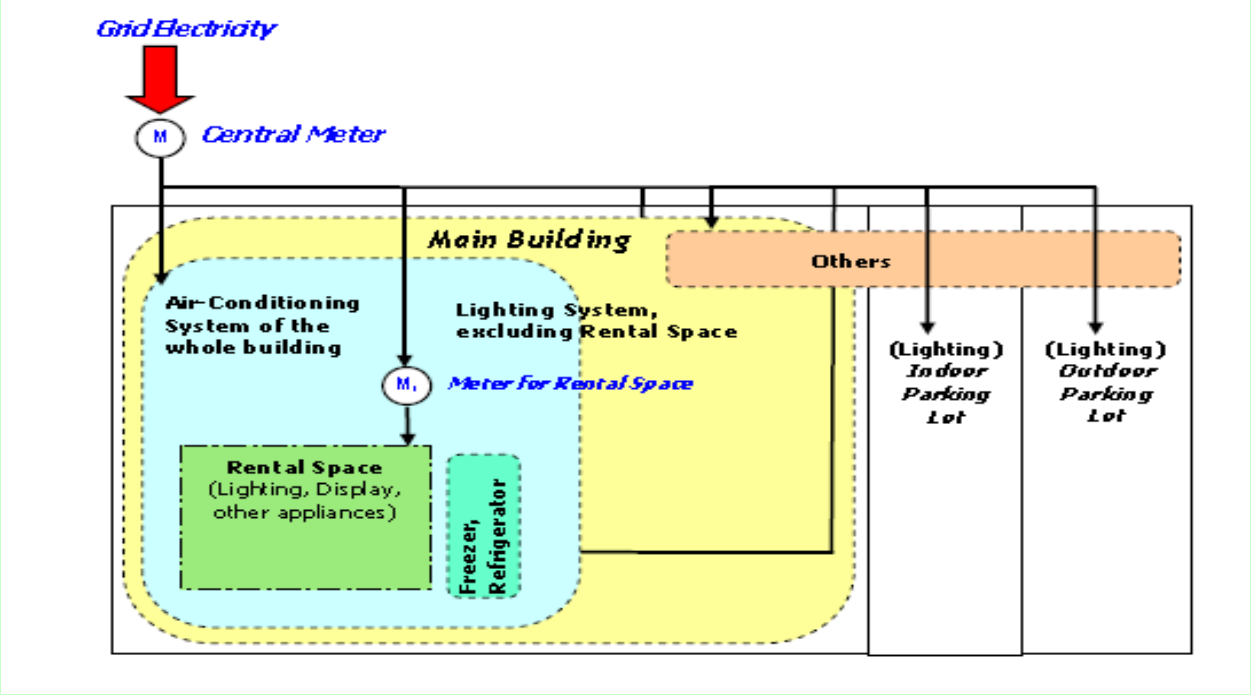

Figure 1. Electrical energy consuming systems in a 'shopping mall' type building

Now let us see how to derive Specific Energy Consumption Bench mark.

Specific Energy Consumption (SEC) Benchmark is to be derived from database of energy consumption of Commercial Buildings. This can be obtained from State Electricity Boards.

A survey has to be performed to analyze energy consumption in different systems, namely air conditioning, lighting, and refrigerating systems to determine SECs of each system. Out of the different SECs, a set of SEC values has to be chosen to be used as benchmarks in representing energy consumption pattern, and for comparing energy efficiency of commercial buildings, with respect to these criteria:

(1) Must be of common use, for example, energy consumption per area.

(2) Must cover major systems with high energy consumption in each and every type of building.

Specific Energy Consumption	Symbol	Calculation	Unit
1. SEC per service area	SEC	$\frac{\text{Annual Electricity Use}}{\text{Size of service area, excluding parking space}}$	$\left(\frac{kWh/yr}{m^2}\right)$
2. SEC in A/C system per air-conditioned area	$SEC\text{-}AC_{AREA}$	$\frac{\text{Annual Electricity Use in A/C system}}{\text{Air-conditioned area}}$	$\left(\frac{kWh/yr}{m^2}\right)$
3. SEC in Lighting System per service area, excluding parking and rental space	SEC-LT	$\frac{\text{Annual Electricity Use in lighting system}}{\text{Size of service area, excluding parking and rental space}}$	$\left(\frac{kWh/yr}{m^2}\right)$
4. SEC in Refrigerating System per refrigerated volume	SEC-RF	$\frac{\text{Annual Electricity Use in refrigerator system}}{\text{Total refrigerated volume}}$	$\left(\frac{kWh/yr}{m^3}\right)$

Figure 2. Specific Energy Consumption in different systems

The calculated SEC values represent energy consumption behavior of each category of buildings and help to establish bench mark on consumption.

Energy Management for All Buildings

In order to carry out energy conservation measures in any organization, energy management system is vital for improving management efficiency and preparing suitable program for each organization. Based on Value Engineering concepts, the energy management system has been developed and implemented for numerous buildings to improve their operation process and find out the energy saving solutions which are suitable for their conditions. In general, the energy management system is developed based on the "Plan, Do, Check and Act (PDCA) concept often referred to as the "Deming Cycle", named after the famous Quality Management expert, Dr. W. Edwards Deming.

Let's take a look at energy management of specific systems.

Lighting System:

1) High Intensity Discharge Dimming Technology (HID)

In all High Intensity Discharge lamps, light is produced by passing electricity a current through a metal vapor. An arc is established between two electrodes in a gas-filled tube which causes a metallic vapor to produce radiant energy. The wavelength (lighting color) of radiation depends on the energy zone of the disturbed electron and on the type of metal vapor used in the arc tube. These kinds of lamp are suitable to use where high lumens are required or have high ceiling to floor more than 3.5 meters. Examples of these kinds of technology are High Pressure Mercury, Metal Halide, and High Pressure Sodium.

Figure 3 A well-lit super market

High-intensity discharge (HID) lamp dimming has grown in popularity in recent years. Dimming reduces energy costs by reducing the input power to the lighting system by using Lighting Power Controller (LPC).

Generally the HID dimming technology can provide:

(1) Reduce power up to approximately 30–40%, depended on HID lamp technology
(2) Able to control at various dimming level, for example, at rated voltage (100% rated lumens) and lower voltage (lower lumens)
(3) No sine wave distortion
(4) No effect to power factor

Case	Power (kW)	Reduced (%)	Lumens Flux (Lux)
Full Lighting Capacity	4.21	-	12
Dimming Step 1	3.71	12 %	10
Dimming Step 2	3.46	18 %	9
Dimming Step 3	3.10	26 %	8
Dimming Step 4	2.96	30 %	7

Figure 4. Test results HID Dimming Technology. Table below illustrates energy and cost savings

For an investment of Rs.130400, savings on energy cost: Rs.58000.00
- A simple payback of 2.24 Years

NO	DETAILS	BEFORE	AFTER	SAVING	% SAVING
1	ENERGY CONSUMPTION KW Hr / Year	70300	50470	19830	28%
2	Energy Cost (@ Rs.2.90 per unit)	204000	146000	58000	

2) LED Lamp (Light Emitting Diode)

LED is a type of solid state lighting (SSL) that utilizes light-emitting diodes (LEDs) as a source of illumination

Figure 5. Picture of LED and its construction

Benefits of LED:

- **High durability -** no filament or tube to break
- **Long durability -** LEDs last more than 35,000 hours
- **Low power consumption -** approximately 2 Watt/lamp
- **Low heat consumption -** very little dissipation heat loss, no effect to room temperature rising
- **Application -** Produced to replace Halogen (Incandescent) lamp

Example: Investment return on using LED lamp, replacing Halogen lamp:

Halogen lamp = 50 watt/lamp; LED lamp = 2 watt/lamp
Number of lamps = 1 lamp
Lamp using hours = 4,380 hours/year
Energy saving = ((50-2) / 1000) x 4,380 = 210.24 kWh/year
Average electricity price = 3.30 Rs. /kWh
Energy cost saving = 210.24 x 3.30 = 694 Rs./year/lamp
LED price = 250 Rs. /lamp; Simple payback period = 0.36 year

Energy Conservation in Air Conditioning system

1) Criteria for chiller selection based on Load Profile of a Building

To select appropriate chiller, the chiller efficiency (kW/Ton) is the major concern to evaluate and select from various suppliers. However, the cooling load required for any building is varied throughout the day due to variation of ambient temperature, solar radiation, number of occupants, and others, therefore the efficiency of chillers at different part loads should be taken into consideration instead of their rated capacity only.

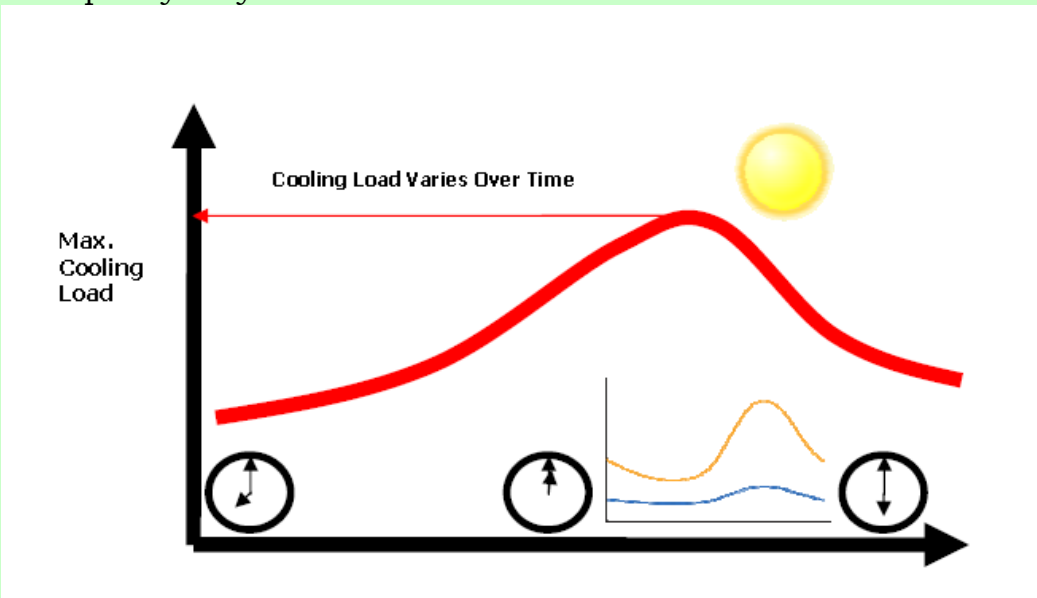

Figure 6. Cooling load variation – one day

The Air Conditioning and Refrigeration Institute (ARI) has developed the definitions to calculate chiller efficiency at part loads, which is referred to ARI Standard 550/590-98 as follows:

- IPLV (Integrated Part Load Value) is a single number; part-load efficiency indicator calculated using the ARI method at standard rating conditions.

- NPLV (Non-Standard Part Load Value) is a single number; part-load efficiency indicator calculated using the ARI method referenced to rating conditions other than ARI standard.

To calculate chiller efficiency at IPLV, the calculation formula is:

$$IPLV = \frac{1}{\frac{1\%}{A} + \frac{42\%}{B} + \frac{45\%}{C} + \frac{12\%}{D}}$$

Where A, B, C and D is the chiller efficiency (kW/Ton) at 100%, 75%, 50% and25%Load respectively

2) Implementing Variable Speed Drive with Rotating Machine

Variable Speed Drive (VSD) is generally applied to improve efficiency of motor equipped with centrifugal machine according to following affinity laws:

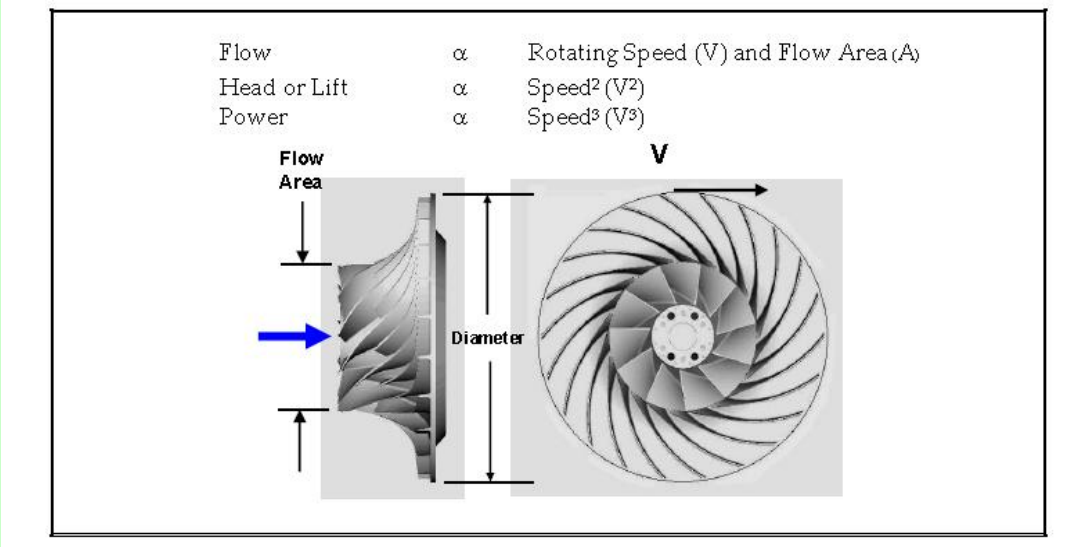

Figure 7. Rotating machine impeller

VSD takes advantage of the affinity laws which state: As the speed of a centrifugal load decrease, the horsepower requirement will decrease with the power three of the speed. If the flow is 50% of rated capacity, the power consumption shall be 12.5% of rated consumption at full load. Application of using VSD with Air Conditioning System components are:

- Rotary chiller, such as, Centrifugal Chiller
- Chilled water & Cooling water system
- Fan at Air Handling Unit: AHU

Energy saving from applying VSD with pump

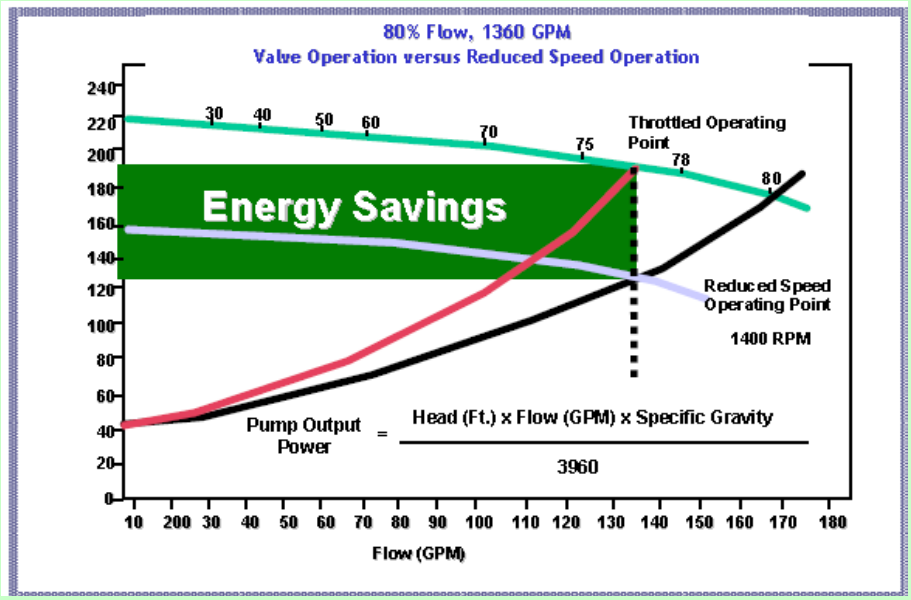

Figure 8. Energy savings with variable speed

Since a centrifugal chiller is a volumetric device, which inlet guide vane is used to create a flow restriction to reduce capacity, VSD is able to be used to reduce chiller capacity while the chiller is still operating at high efficiency region.

Centrifugal Chiller with Method of Decreasing Capacity

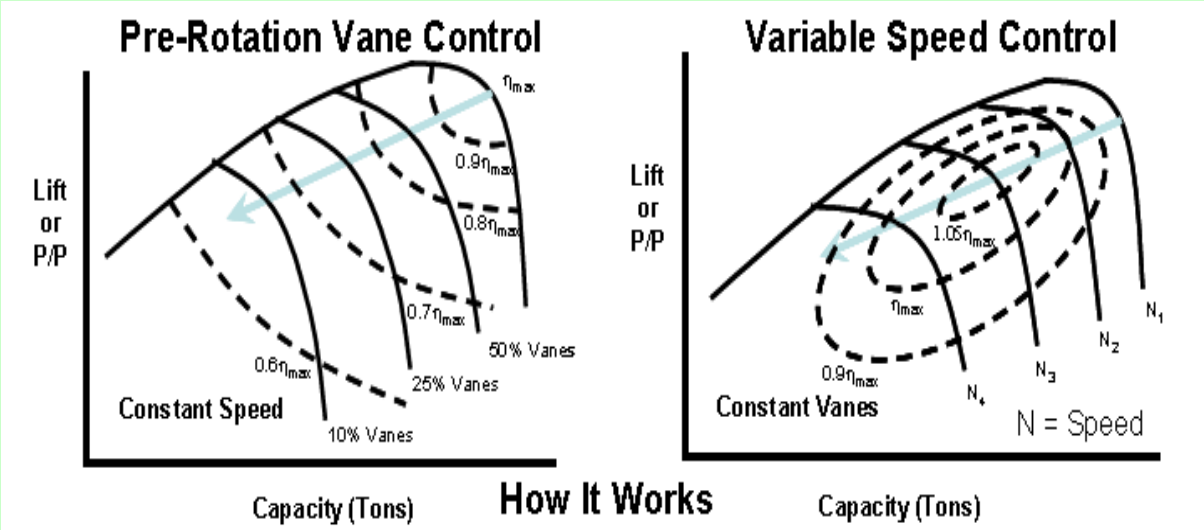

Figure 9. Illustration of variable speed control

Variable Speed VS Constant Speed Centrifugal Chiller

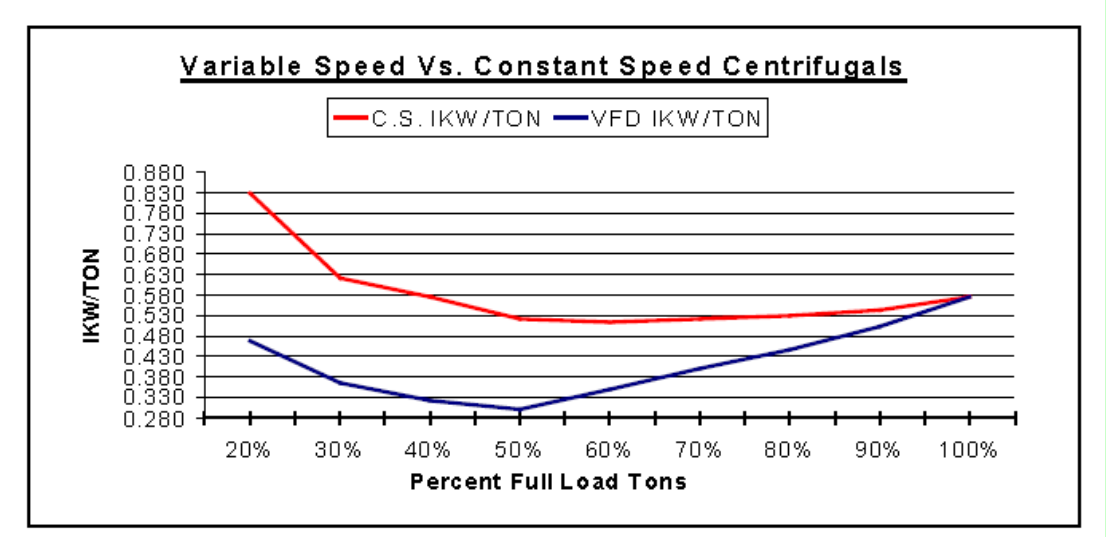

Figure 10. Comparison of constant and variable speed centrifugals

Suggested Energy Conservation Program

To achieve 10% energy savings target, there are 3-stage energy conservation plans (short-term, medium-term, and long-term). Details of the suggested plans are provided below:

Short term Energy Conservation Program (1-2 years):

Training – a series of training courses should be continually organized to build up knowledge and skills of all technicians involved.

- **Awareness raising campaign** – public relations activities to create awareness on energy conservation issue, environmental impact from energy consumption, and climate change/global warming.

- **Consultation support** – a subsidizing scheme can be established to encourage shopping malls to engage experts or specialized consultants in planning and executing energy management system and energy conservation program

- **Effective monitoring system** – there should be effective monitoring and control system that Designated Buildings must regularly update their energy database, consistently submit the energy report, including their energy management target and planning on a regular basis

- **Equipments and personal supports** – some of the measurement instruments are very costly. It helps to set up for equipment borrowings, or provide fee-paid technician assistance.

- **Information sharing and distribution** – share news and useful information with all concerned shopping malls

Medium term Energy Conservation Program (3 – 5 years):

- **Monetary subsidy for further actions** – the government can encourage private mall owners to invest in proven energy efficiency technologies with various monetary subsidy programs such as partial investment subsidy, interest rate subsidy.

- **Energy efficient building labeling** – set up a Labeling program to indicate different levels of energy efficiency in all shopping malls. By this way, energy efficiency assessment will be done annually and the label itself will help raise awareness of all persons involved.

- **Law and regulation update** – law and regulation should be up-to-date for encouraging energy efficient building from the designing step to daily operation

- **Establish 'Energy Management Network'** – there should be a network of key persons in charge of each shopping malls and related government offices so that effective information flow, knowledge sharing, and other cooperation can be assured

Long-term Energy Conservation Program (5 years onwards):

- **Continue the labeling program and revise necessary standards** to increase energy efficiency

- **Effective monitoring system -** for Designated Buildings to act according to the energy regulation

Information courtesy: www.energymanagertraining.com

About the contributor:

Mr. N. Ravishankar is a BEE Certified Energy Auditor having vast experience in machine maintenance, utilities O & M, machine reconditioning and Training & Development. He can be reached at ravishankar_nagarajan@yahoo.com or ravishankar_energyauditor@yahoo.co.in

The Growth of Green Buildings

By Sundaresan Subramanian

Buildings employing green strategies such as natural ventilation, sky lighting, and low energy consumption are not entirely new to India - they have been around for centuries. Take a look at some of our ancient buildings – old homes in villages, some of India's places of worship, architectural wonders like the Taj Mahal in Agra, Gol Gumbaj in Bijapur and many others. Most of these were built with locally available materials without using any of the energy-intensive products like cement, steel or lead-based paints. They relied on natural ventilation, used natural light and consequently, energy use was very minimal. These are examples of structures that caused little damage to the environment. We should be proud of them.

What makes the modern green buildings any different from these ancient structures? To explain it in simple terms - it is the creative application of age-old green concepts in present day complex situation of high density population, scarcity of space and economic challenges that makes them different. Green buildings, then, represent at least in part a return to ancient architectural principles using latest technologies. In short, it means exploring the new world of energy efficiency and environmental benefits in twenty-first century style.

With mounting concerns over energy use and environmental damages, conservation is more important than ever before. Worldwide, energy used in different ways but buildings constitute one of the largest consumers of energy. To help conserve energy and improve all round environment, "Green Buildings" have risen in many parts of the world including India.

If you ask someone ‘what is a green building’, chances are that you will find a blinking face. What does it take to construct a building with green features? It all begins with a clear understanding of what contributes to making a green building.

What is a Green Building?

A green building is a structure that is designed, built, and operated in an ecological and resource-efficient manner to promote healthy living for the occupants and also improve the environment.

Green buildings are designed to meet certain recognized building codes that help in saving energy, water, use all resources more efficiently; and thus reduce the overall impact to the environment.
The design and construction of green buildings extend beyond energy and water conservation and must include sustainable building practices. They should incorporate environmentally sensitive site planning, resource efficient building materials and superior indoor environmental quality.

Benefits

There are many benefits in promoting the construction of green buildings. Key benefits include:

- Lower electric and water utility costs
- Environmentally effective use of building materials
- Enhanced health and productivity
- Long-term economic returns
- Reduced environmental impact

LEED Program

A well-known organization that spearheaded the movement towards green buildings globally is the U.S. Green Building Council (USGBC). We now have the Indian Green Building Council too that is ushering in a green building movement in India.

The USGBC has developed a rating system called LEED - an acronym for "Leadership in Energy and Environmental Design." USGBC developed LEED as a practical rating tool for the design and construction of green buildings. It is a voluntary, consensus-based national rating system. Basically, the system reviews different design and construction aspects of a building including water savings, energy efficiency, selection of materials and indoor air quality.

Established in 1998, LEED is now recognized as an internationally accepted benchmark for the design, construction and operation of high-performance green buildings. It has since grown into nine separate rating systems for various types of construction. The LEED rating system uses codes that are already in existence as a baseline for building guides. Most commonly, it uses existing ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) codes.

LEED certification has become an important and fundamental part of the global “Green Movement." Buildings that are rated using the LEED

system are assigned grades of Silver, Gold or Platinum depending upon how much they meet the specified criteria.

Opportunities and Trends

India's construction industry is on a fast-growing track with an annual rate of growth close to 10 percent. However, the energy usage in the building sector has climbed to nearly 40 percent energy, up from a low 14 percent in the 1970s. With ever-increasing energy costs, and campaigns against global warming, there is increased attention towards green buildings. The efficient use of energy and water in buildings is more in favour of working with nature rather than against it.

It is hardly surprising that green building has emerged as an effective strategy to improve the health of a building's occupants, cut energy usage and costs, combat global warming, enhance public image for companies, and save money for building owners.

As the economic benefits of green buildings become apparent, the demand for green products and processes and related consulting services is growing rapidly opening up great business opportunities. It requires a wide variety of skills this demand and there will be need for individuals with recognized expertise in specific areas like Heating, Ventilation and Air-conditioning (HVAC), efficient lighting, green building project management and monitoring.

As the green building designs keep improving, there are bound to be more innovations -like rain water harvesting, use of alternative sources of energy, making greater usage of natural resources. Green building costs are expected to decline while delivering greater benefits.

In our country, with more rural-to-urban migration, cities are growing much faster than ever before. This transformation will continue in the years to come imposing greater demands on energy and environmental needs. In such circumstances, the growth of green buildings makes a lot of sense.

***About the author**: Dr.Sundaresan Subramanian is a senior energy and environmental management professional with an array of international experiences. He serves as the editor of "The Urja Watch."*

Test your ability to follow instructions!

Contributed By :Sunil Sood

We often waste lot of energy in doing an assigned for a simple reasons that we did not follow the instructions properly. Please take an honest test presuming that you are sitting in an examination hall !

Time : 3 Minutes

FOLLOW THE INSTRUCTIONS

1. Read everything before doing anything,but work as rapidly as you can
2. Put your name in the upper right-hand corner
3. Do you like this weather? ----------
4. Draw a circle around the title of this paper
5. Add 35 and 143 on the reverse side of this paper
6. Are you happy in your place of work/school/college?
   underline ---YES ---NO ---REASONABLY
7. Pat your neighbour on the back
8. Write last three letters of English alphabets ----------
9. Draw a small square on upper left corner of this paper.
10. Write names of friends i) ----------
    ii) ----------
11. In your normal voice count 1 to 10 out-loud,backwards
12. Would you like to have more authority in your organisation/home
13. Are you happy with your friends ? YES /NO
14. If you have come so far, say your full name out-loud
15. Draw a triangle on lower left corner
16. Say loudly - A,B,C,D,E,F,G
17. Please sit quietly until everyone in the group has finished the exercise
18. Now that you have read the instructions carefully,do only items 1,2 and 4

Laughter Energy!

Contributed By :Sunil Sood

COMMUNICATION - CASE STUDY

A Case study made by a psychologist about the distortion of a message in the disciplined system of armed forces

A. WING COMMANDER TO SQUADRON LEADER

At 9 O'clock tomorrow there will be an eclipse of the sun, something which does not occur every day. Get the men to fall on the lal Bahadur Shastri Marg in their uniform so that they will see this rare phenomenon and I will explain it to them. In case of rain, we will not be able to see anything. So take the men to the gymkhana.

B. SQUADRON LEADER TO FLYING OFFICER

By order of the Wing Commander, tomorrow at 9 O'clock there will be an eclipse of the sun, if it rains you will not be able to see it from the Lal Bahadur Shastri Marg, so then in uniform the eclipse of the sun will take place in gymkhana, something that does not occur every day.

C. FLYING OFFICER TO SERGEANT

By order of the Wing Commander in uniform tomorrow at 9 O'clock in the morning, the inauguration of the eclipse of the sun will take place in gymkhana. The Wing Commander will give the order to sun to eclipses in Lal Bahadur Shastri Marg if it should rain, something which occurs every day.

D. SERGEANT TO CORPORAL

Tomorrow at nine, the Wing Commander in uniform will eclipse the sun in the gymkhana, as it occurs every day if it is a nice day, if it rains, then in the Lal Bahadur Shastri Marg.

E. CORPORAL TO LANCE CORPORAL

Tomorrow at nine the eclipse of the Wing Commander in uniform will take place by cause of the sun. If it rains in the gymkhana, something which does not occur every day you will fall out in the Lal Bahadur Shastri Marg.

F. COMMENTS AMONG ALL THE UNIT

Tomorrow, if it rains, it looks as if the sun will eclipse the Wing Commander in the gymkhana. It is a shame that this does not occur every day.

"If you take any activity, any art, any discipline, any skill, take it and push it as far as it will go, push it beyond where it has ever been before, push it to the wildest edge of edges, then you force it into the realm of magic"

TOM ROBBINS, author

Upcoming Events

Green Building Congress 2009, Hyderabad, September 9-12, 2009

Theme: Affordable Green Buildings

Organized by Indian Green Building Council (IGBC)
Contact: k.raman@cii.in

Indian Environment Summit 2009 New Delhi Sept 14-16, 2009

Organizer: Indian Recycle & Waste Management Company, New Delhi.

www.iesummit.net

One Day Technical Workshop Lucknow 16th September 2009

Adoption of energy efficient process technologies & practices and implementation of Energy Conservation Building Codes (ECBC) in Buildings/Hotels/Hospitals

Organized by: BUREAU OF ENERGY EFFICIENCY, MINISTRY OF POWER, GOVERNMENT OF INDIA

www.energymanagertraining.com/new_index.php

India Energy 2009 Mumbai November 13-15, 2009

Organizer: UBM India Pvt. Ltd, Mumbai, India

www.indiaenergy.net

U.S. GREEN INDIA
Executive Mission New Delhi/Mumbai October 26 - 30, 2009

For further information, please consult the Mission website or contact Ted Jones at tjones@uschamber.com.

Share your experience

Do you have an area of expertise in energy management? Have you solved a difficult problem or have an interesting case study? Do you want to share a joke with others? Or just have a word of appreciation for this issue. Share your knowledge with others and promote yourself too, by writing to **The Urja Watch.**

You may also tell us about upcoming energy-related events in your area. Be sure to mention the title of the event, organizers, dates, venue, city, and contact information to get more details of the event.

Please note the following points while making your submissions:

- Articles must be original, in electronic version, 500 words or less. If you are using material from external sources, please acknowledge them.
- Please include contact information (full name, title/organization, phone numbers, and email ID) with your submission.
- Articles should be in MS word, single spaced, with easily readable font, preferably Arial size 12. Photos should be of high resolution.
- Please e-mail your submissions to The Editor, "The Urja Watch" at tellsubi@gmail.com
- There are no deadlines for submissions. You may submit articles anytime.
- We reserve the right to edit, rewrite or reject any article.

We Need Your Feedback Too!

Please write your views and suggestions to the editor at: tellsubi@gmail.com
Letters must include the writer's name, address, phone and email ID.

We appreciate your feedback and thank you for your support.