



# Lighting the Way Efficiently





# Buzzwords

## Energy Efficiency

Is a measure of the amount of energy which any technology can convert to useful work.

## Lighting Efficiency

Is a measure of how much visible light is given off from a lighting source per unit of energy .  
Light output (lumens) per unit of energy input (watts).







# History of Lighting



## The Birth of Light!

**Thomas Edison** announced to the world on **December 21, 1879** the invention of the first **electric light**

**Edison** tried **6,000** alternative filament materials over two years, and spent **\$40,000** conducting more than **1,200** experiments!

**Light bulbs** went on sale in **1880**  
**128 years ago!**





## Lighting the Key to Energy Saving

*'A global switch to efficient lighting systems would trim the world's electricity bill by nearly one-tenth'*

**International Energy Agency (IEA) 2006**



*Incandescent bulbs are very inefficient, converting only about 5% of the energy they receive into light.*





# Incandescent Lights

- ✓ The source of light which we probably use most frequently is the incandescent light globe.



- ✓ William David Coolidge was the first to patent the Tungsten filament which nearly all globes use today.





# Fluorescent



- Fluorescent globes are also popular choice in homes today, and are becoming increasingly popular as people look for light sources with more **energy-efficiency**.
- Fluorescent Lights use fluorone in their light producing reaction.
- Although they cost a little more than an incandescent bulb, they usually pay for themselves **within about 500 hours of use**







# Incandescent Vs Fluorescent

- **Incandescent** – Mostly used in homes
- **Fluorescent** - Used mainly in Commercial & Public Sector buildings

Incandescent wattage	CFL equivalent	Lifetime savings*
25-40W	11W	\$19-\$37
40-60W	13W	\$32-\$56
50-60W	15-16W	\$41-\$54
60-75W	18-20W	\$48-\$72
75-90W	22-23W	\$62-\$82
100W	25-27W	\$85-\$90
100-120W	30-32W	\$84-\$108
120-150W	38W	\$98-\$134
150-180W	52W	\$117-\$153





# Not all glowing for Fluorescent Lights!

- Fluorescent light bulbs need a **ballast** because they use a gas to create light. This gas is excited by electricity.
- A **ballast** supplies the initial electricity that creates the light, and then it regulates the amount of electricity flowing through the bulb so that the right amount of light is emitted!







# Not all glowing for Fluorescent Lights!

- **Ballasts** - All fluorescent lamp fittings come with either a magnetic ballast or an electronic ballast.

**Magnetic Ballasts** - Not very efficient

**Electronic ballast** - More efficient





# Electronic Ballasts

- **Energy Efficiency:** Electronic ballasts are up to 20% more efficient than magnetic ballast technology and can reduce energy consumption by an average of 10 watts per ballast.



When applied to the number of ballasts in a typical commercial installation, these savings can certainly help boost the bottom line and drive an attractive payback period and return on investment.

- **Electronic circuitry:** Electronic ballasts operate more quietly than magnetic ballasts and produce steadier light output, insuring smooth, flicker-free performance!
- **Ease of handling and installation:** Most electronic ballasts offer the same wiring configurations as their magnetic counterparts, easing the installation process and reducing maintenance concerns.

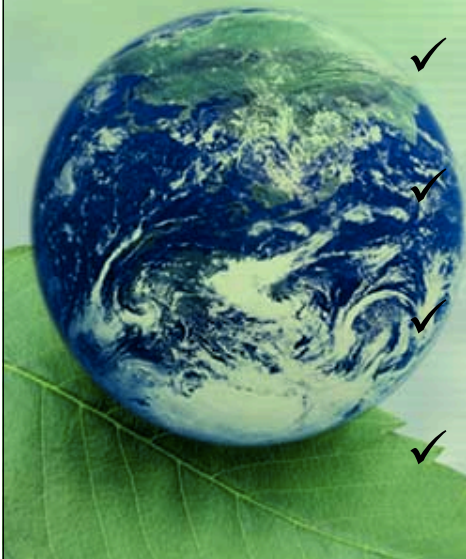






# Benefits of Electronic Ballasts

- ✓ Greater than 20% increase in efficiency
- ✓ Lowers lighting operation costs
- ✓ Full light output
- ✓ Provides same light levels as magnetic ballasts being replaced
- ✓ Significantly quieter than magnetic ballasts
- ✓ High frequency operation
- ✓ No lamp flickering
- ✓ Easier installation





# Compact Fluorescents



- These lights were a huge advance in energy efficient lighting--very efficient, with 10 times longer life than an incandescent bulb.
- Plus, the light quality (color temperature) is much warmer than normal fluorescents, they fit in most normal light fixtures, and flicker is hardly noticeable!







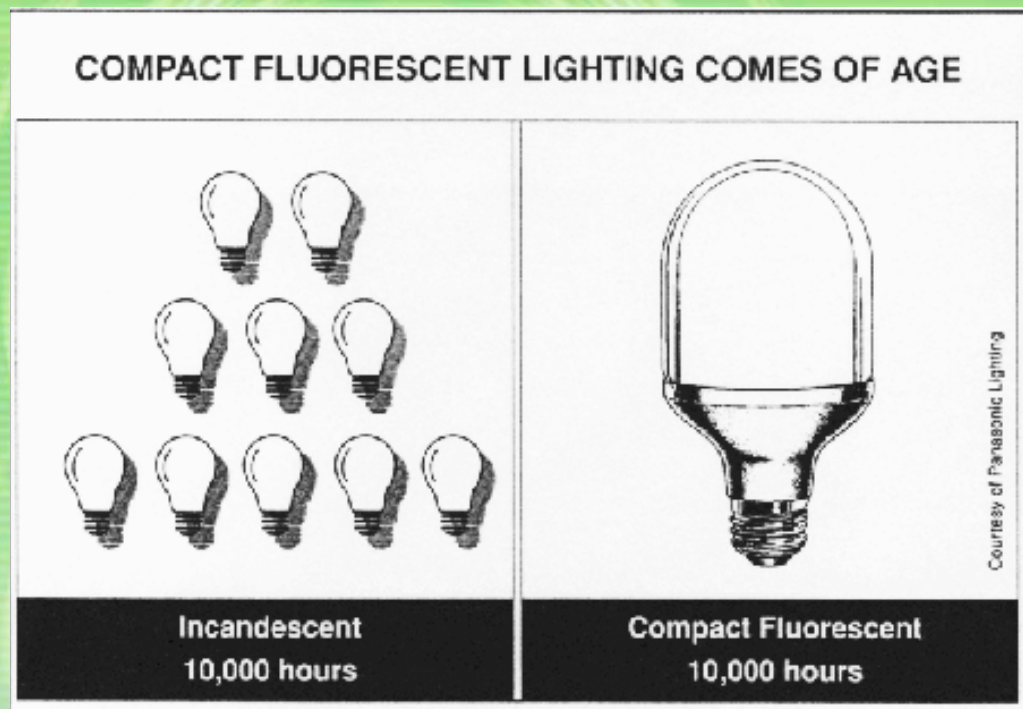
## Where should you use CFL's?

- Use in fixtures that are used at least 15 minutes at a time or several hours per day.
  - **Family and Living rooms**
  - **Kitchen**
  - **Dining room**
  - **Bedrooms**
  - **Outdoors**





# Incandescent vs. CFL



**Fluorescent lamps cut greenhouse gas emissions and running costs by 75% while producing as much light.**

They come as circular or linear tubes, or as plug-in compact fluorescent lamps (CFLs).







# CFL's for every job

- **"Daylight"** (6400 Kelvin) CFLs have a bluer tinge than "cool whites."
- A **"cool white"** bulb (4100 Kelvin) is generally cheaper, has a slight bluish cast and makes colors look more washed out than they are.
- A **"warm white"** (2700 Kelvin) is more expensive, makes colors look richer than they may normally be and can be used for general lighting. "Warm white" CFLs most capture the look and mood of an incandescent bulb, for a homey atmosphere.
- **"Full spectrum"** CFLs most accurately represent colors within the home as they are, and are brighter to the eye than any other option.
- Yellow CFLs are popular for use outside in shaded and covered areas, since insects aren't attracted to their glow.





# Next Generation Lights

*LED- (light emitting diode)*



- ✓ The Future may see even more efficient systems. LED's are currently **four times** as efficient as incandescent lights
- ✓ Manufacturers are aiming for 80% efficiency by the end of the decade, which would represent a **16-fold improvement on the traditional bulb.**

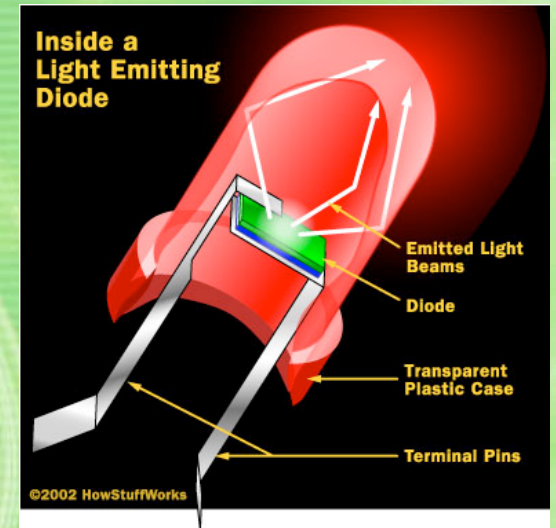






# LED's Benefits

- ✓ Excellent, efficient replacement for the inefficient SMALL incandescent bulbs found in task lights, nightlights, pathway lighting, exit signs, and ESPECIALLY flashlights.



- ✓ Imagine a nightlight made with white LEDs is almost three times as efficient as the incandescent it replaces

- ✓ LED lights should last tens of thousands of hours





**When buying a compact fluorescent light bulb, choose a wattage that's about one-fourth of what you usually buy (incandescent bulbs).**

