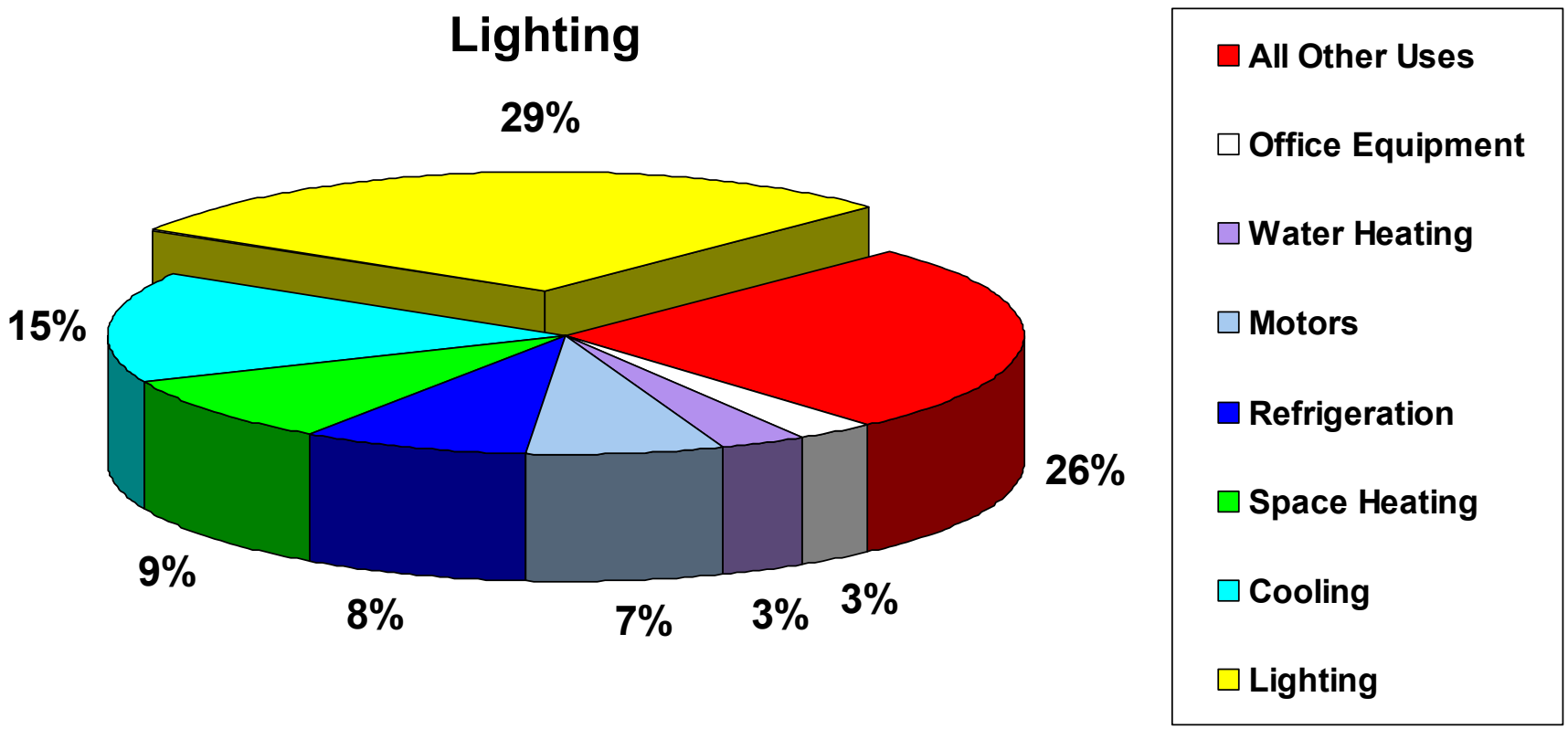
The ABCs of Energy

Understanding Lighting Systems and Retrofits

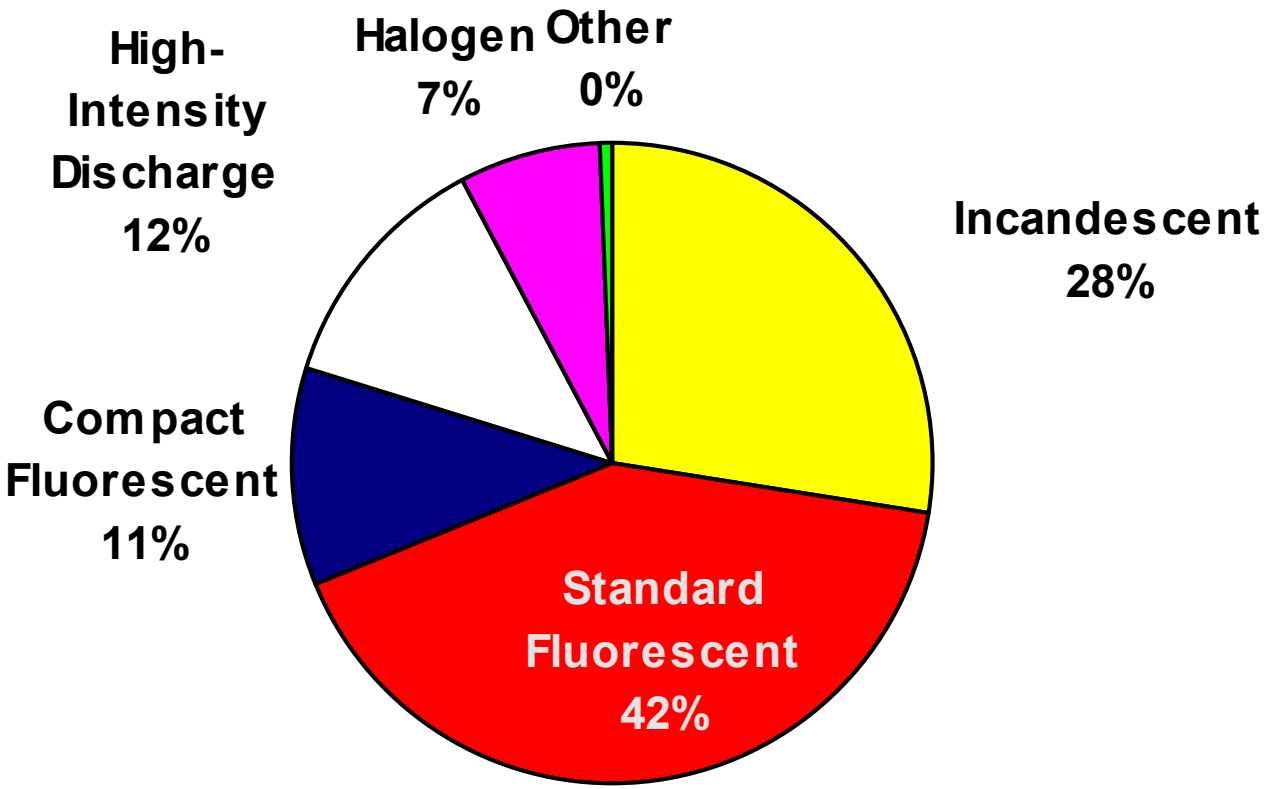
Lighting / Energy Overview

Electrical Usage

Nonresidential Buildings

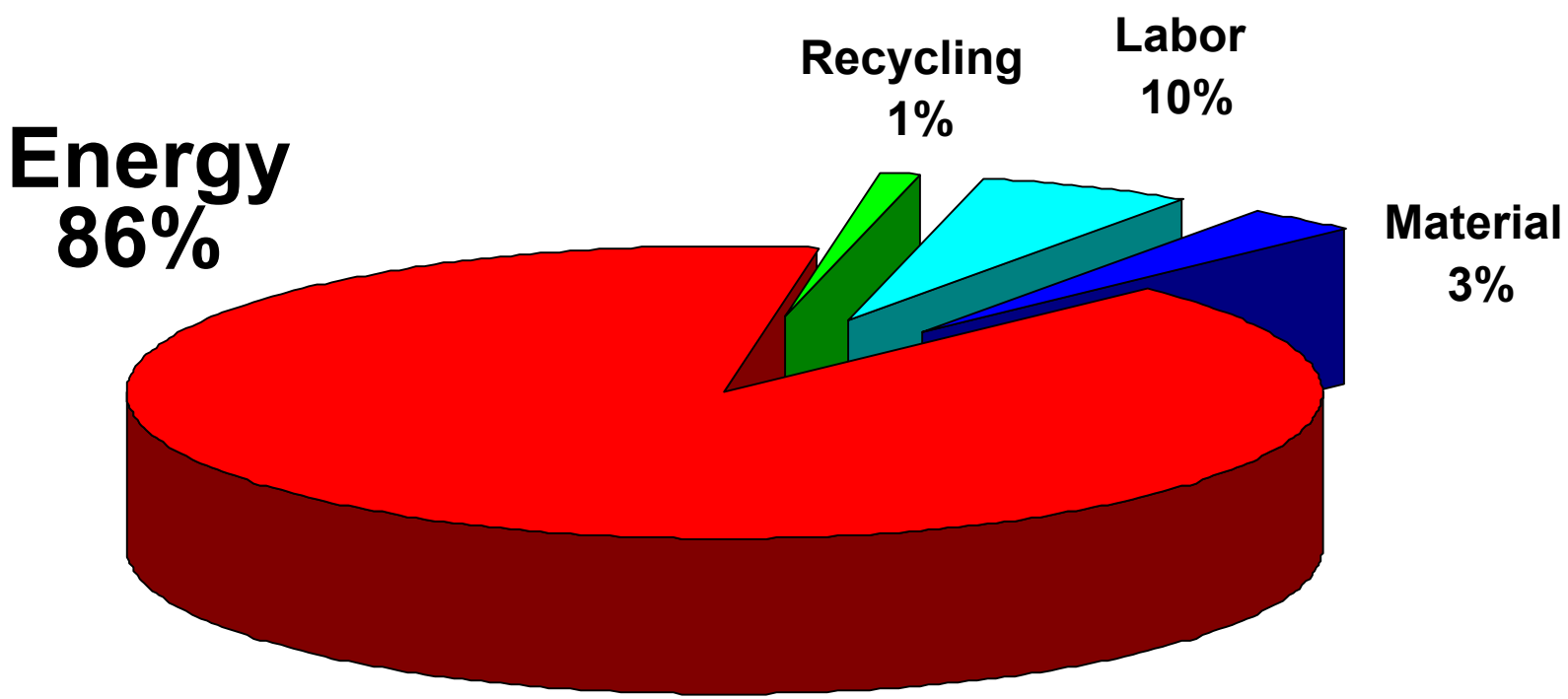


Building "Lighting" Breakdown



Electrical Usage

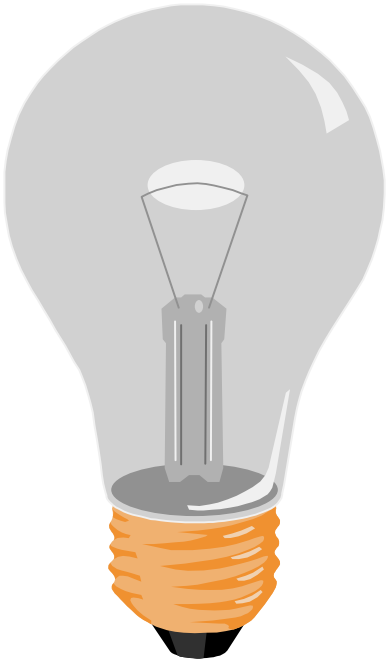
Life Cycle Cost or TCOO for Fluorescent Lighting Systems



Create "Smart Solutions"

Think in terms of the Quality of Light:

- Work Environment
- Age of Employees
- Safety and Security
- Uniformity/Spacing
- Glare/Brightness
- CRI/Color Temp



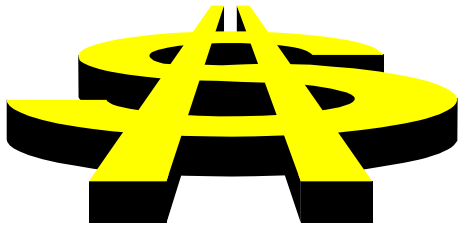
Create "Smart Solutions"

Think in terms of a Systems Approach:

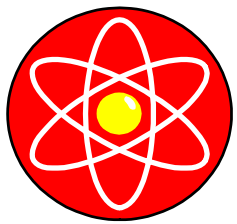
- Lumens Per watt
- Watts per square foot
- Advanced Technologies
- Life-cycle Cost / TCOO
- Return on Investment
- Increased Productivity
- Increased Profitability

Create "Smart Solutions"

- Improve your business with positive cash flow through quality, aesthetics and productivity gains



- Reduce your operating costs through energy savings



- Upgrade to products that are safe for the environment

Linear Fluorescent Systems

Lamp Life

Is affected by…

- Lamp type
- Starting method
- Burning hours

Starting Methods

- **Instant Start**
  - Instant on
  - Maximum energy savings
  - 10-15K switch cycles
- **Rapid Start**
  - Low voltage applied prior to lamp ignition
  - 1.5 – 2W loss per lamp
  - 15-20K switch cycles

Starting Methods

- **Program Rapid Start**
  - Pre-heats cathodes to 650°C
  - Used with occupancy sensors
  - 30K switch cycles
- **Programmed Start**
  - Pre-heats cathodes to 700°C
  - Maximum lamp life
  - Up to 50K switch cycles

T8 Ballasts

- Standard
- Multi-voltage
- Various light output levels (Ballast Factor)
  - Low watt / High light output
- Different starting methods
  - Instant Start / Rapid Start / Programmed Start
- High efficiency designs

T5 Lamps

- High efficiency – 28W, 2900 lms, 20K hrs
- High output – 54W, 5000 lms, 20K hrs

T5 Ballasts

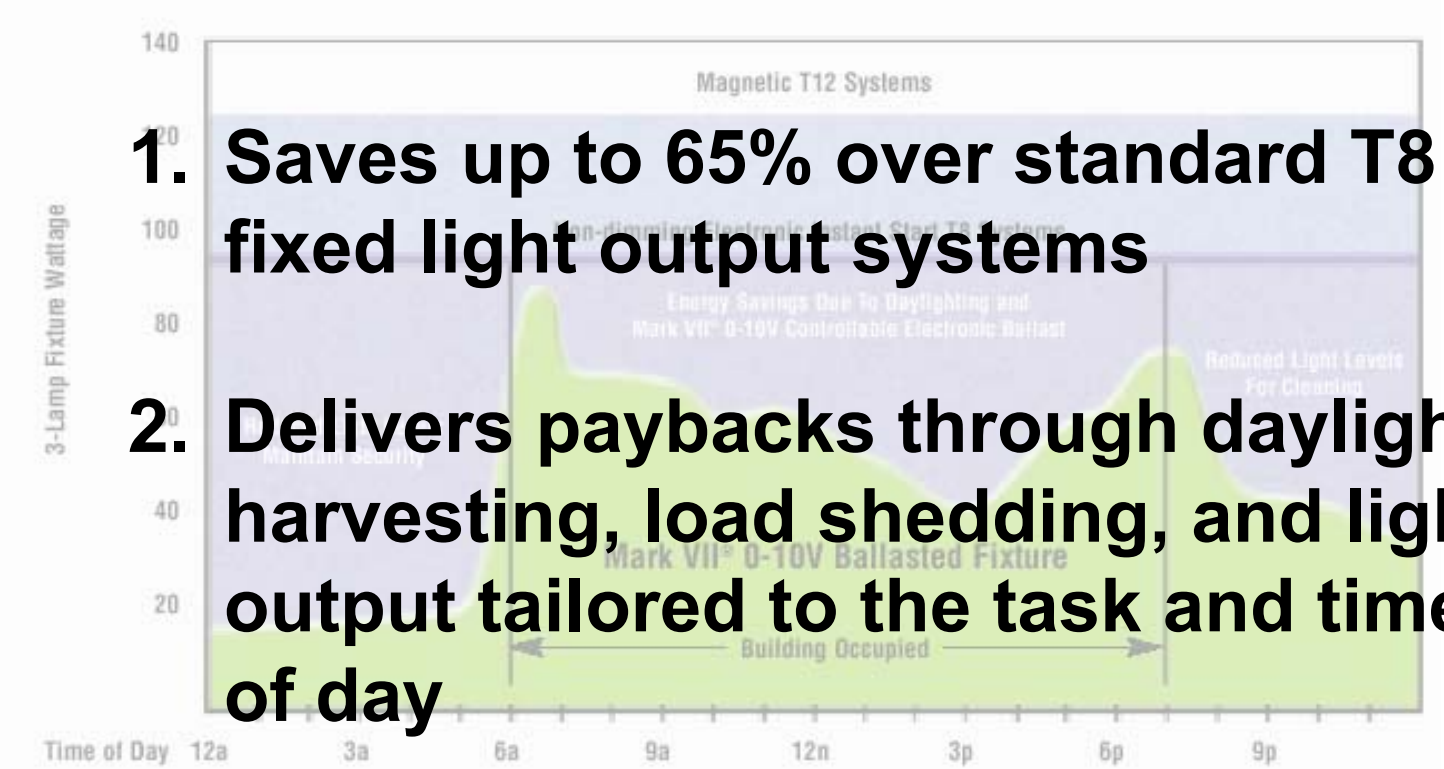
- Universal voltage
- Higher case temperatures (up to 90°C)
- Up to 4-lamp operation
- 480V compatibility
- Controllable
  - Dimmable
  - Switchable (number of lamps on)

Controlling Light Output

What ballast types are used to control light output?

- Fixed ballasts
- Step-dimming ballasts
- Continuous dimming ballasts

How can dimming save you energy?



1. Saves up to 65% over standard T8 fixed light output systems
2. Delivers paybacks through daylight harvesting, load shedding, and light output tailored to the task and time of day

Compact Fluorescent (CFL) Systems

High Intensity Discharge (HID) Systems

For ANY type of system, first determine…

What are your needs?

- Lowest energy consumption
- Maintain, increase or decrease existing light level
- Highest lumens/watt (LPW)
- Minimum upfront investment
- Longest lamp life
- Ease of Installation
- Cold temperature starting
- Lamp dimmability

The Bottom Line….

Improve YOUR Bottom Line with energy-efficient lighting

- **Existing Opportunities**…
  - Incandescent to CFL
  - Standard HID to Pulse-Start MH
  - T12 to T8 Fluorescent (Systems)
- **New and Emerging Opportunities**
  - T5/HO
  - Electronic HID

QUESTIONS?