

# Commercial Lighting: Making Advanced Technologies and Practices Mainstream

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# Advanced Lighting Systems to Discuss

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- High bay applications
  - Pulse metal halide
  - HID electronic ballasts
  - Fluorescent
- Fluorescent – “Super T8” and T5
- Controls
  - Daylight dimming
  - Occupancy sensors
- Low-ambient lighting designs
- Advanced concepts
  - Office of the Future
  - LEDs



# Lighting System Types



T8 Medium Bipin



T12 Medium Bipin

**Schematic of Typical 4-ft T8 and T12 Lamps**



**T5**



**Pulse-Start  
Metal Halide Lamp**

# Energy Savings with Fluorescent Systems

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- Fluorescent systems
  - “Super T8” lamp/ballast systems ~92 LPW, 11% higher than standard T8
  - Can save energy by:
    - Spacing fixtures farther apart
    - Using low BF ballasts
    - Using lower W lamps (e.g. 25 and 28 W)
  - With low-ambient designs and 1-2 lamp fixtures, can get down to ~0.65 W/sf in offices



# One and Two-Lamp Fixtures

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# Energy Savings with HID

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- Pulse-metal halide systems save ~15% relative to quartz metal halide
  - E.g. use 350 W lamps instead of 400 W plus ~20 W ballast savings
- Electronic ballasts can save an additional ~13%
  - E.g. Better lumen maintenance allows use 320 W lamps in the example above plus additional ballast savings



# Lighting Controls

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- Daylight dimming – can save ~50% in the 30% of space close enough to a window
- Occupancy sensors – save 5-60% depending on application and how often space occupied