

# Office Lighting: Title 24 & Technology Update

Supporting compliance with California's Title 24 Standards

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## OBJECTIVES

At the close of the class, attendees should be able to:

- Effectively apply the Title 24 Building Energy Efficiency Standards code requirements specific to lighting for office applications.
- Identify current lighting technologies and controls, including LED luminaires, that are available to fulfill code requirements.
- Review major lighting-related sections in the 2016 Building Energy Efficiency Standards code.
- Identify mandatory and prescriptive Standards' requirements, apply compliance methodology, and procedures in professional practice.
- Access resources through utility and lighting technology training centers for continued professional development.

## CALIFORNIA LIGHTING TECHNOLOGY CENTER, UC DAVIS

CLTC's Mission: To stimulate, facilitate and accelerate the development, application and commercialization of energy-efficient lighting and daylighting technologies in partnership with utilities, manufacturers, occupants, builders, designers, researchers, academicians, and government agencies.

Mission-driven Activities:

- Research & Development
- Demonstration & Outreach
- Education & Training



FOUNDING ORGANIZATIONS	
UTILITIES	
MANUFACTURERS	LARGE END-USERS

## Nonresidential Lighting Guide

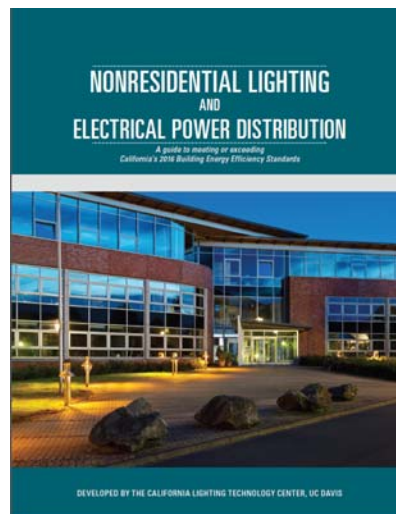
Provides a simplified and practical approach to lighting code compliance and design.

Topics include:

- Explanation of the code
- Technical guidelines
- Steps to compliance
- Lighting design examples

Available online for download!

[www.cltc.ucdavis.edu](http://www.cltc.ucdavis.edu)



## LIGHTING & ENERGY EFFICIENCY

### Light Sources

- One-time, long-term change
- Reduction of baseline
  - Light Source Efficacy
  - Luminaire Efficacy
  - Application Efficacy

### Light Controls

- Continuous, real-time change
- Fluctuations from baseline
  - Occupancy / Vacancy
  - Daylight Harvesting
  - Demand Response (DR)
  - Tuning
  - Personal Control



## ADAPTIVE SYSTEMS...

automatically adjust their light output...

- Total Luminous Flux
- Spectral Power Distribution
- Candle Power Distribution

based on sensor input from the space...

- Occupancy / Vacancy
- Daylight
- DR Signals

to optimize space and building performance.

- Comfort
- Energy Savings
- Peak Demand Reduction



## CONTROL STRATEGIES

During **occupancy**, focus on **comfort**

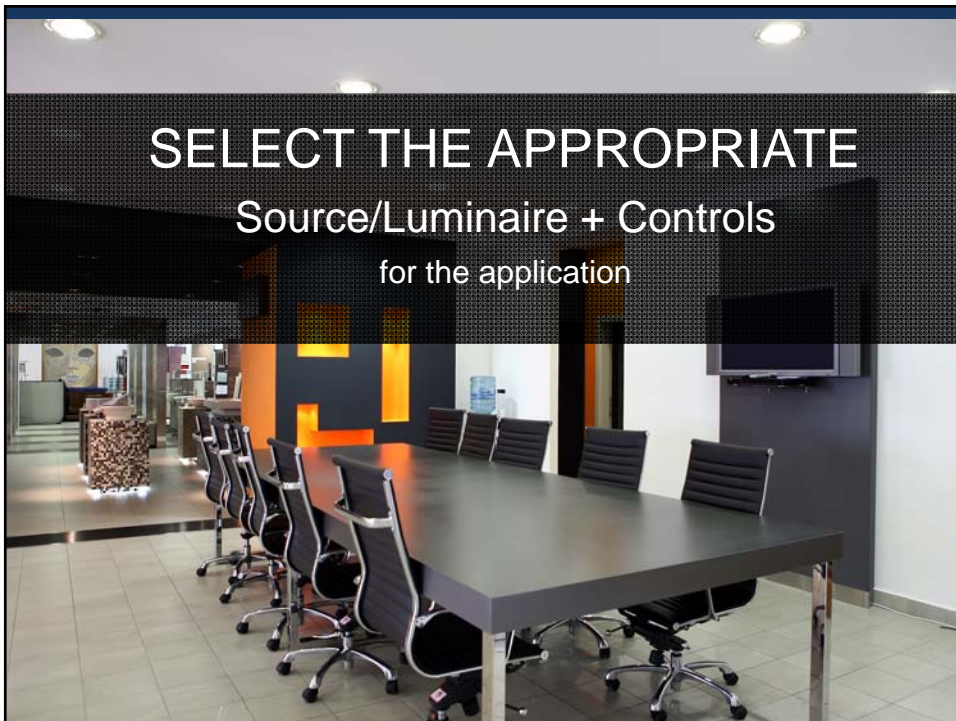
- Adjust fenestration for daylight penetration
- Adjust electric lighting for daylight contribution
- Offer manual control options
- Adjust electric lighting for demand response
- Adjust HVAC

During **vacancy**, focus on **energy efficiency**

- Adjust fenestration for cooling/heating loads
- Turn electric lighting off or dim down
- Adjust electric lighting for demand response
- Adjust HVAC



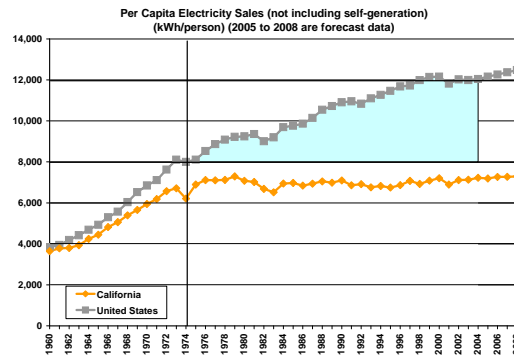
**SELECT THE APPROPRIATE**  
Source/Luminaire + Controls  
for the application



## Why Title 24, Part 6?

### Efficiency before generation

The California Energy Commission has found energy efficiency and demand response as the preferred means of meeting the energy needs of a growing population.





## Standards Development Obligations



- Technically feasible
- Cost-effective
- Performance-based and prescriptive compliance paths

## California's Policy Goals

Focus Area	Goal	Now	2020	2025	2030	2050
Residential Buildings	New Construction ZNE <sup>1</sup>		100%			
	Existing Homes (reduction relative existing stock) <sup>1</sup>		40%			
Commercial Buildings	New Construction ZNE <sup>1</sup>				100%	
	Existing ZNE <sup>1</sup>				50%	
State Buildings	New Construction & Major Renovation ZNE <sup>2</sup>		50%	100%		
	Existing ZNE (by square footage) <sup>2</sup>			80%		
SB 350	Increase energy efficiency in existing buildings				50%	
Existing Buildings	New and enhanced codes & standards, code simplification, increased compliance, asset ratings, purchase agreements, etc. <sup>3</sup>	X	X	X	X	
GHG Emissions	Statewide GHG Emissions (all sources) <sup>4</sup>		1990 Levels		40% Below 1990	80% Below 1990
Water Efficiency	25 percent reduction in urban water use <sup>5</sup>	X				

1. California's *Long Term Energy Efficiency Strategic Plan*.
2. Executive Order B-18-12
3. Assembly Bill 758: Existing Buildings Action Plan
4. Assembly Bill 32 for 2020; Executive Order B-30-15 for 2030 and 2050
5. Executive Order B-29-15

## Title 24 Code Cycle Timeline

The most recent revision, the 2016 Title 24 Building Energy Efficiency Standards, is effective now! Any application for a Building Permit submitted on or after January 1, 2017 must meet the 2016 standards.

The 2019 Title 24 Building Energy Efficiency Standards are currently being researched and developed. If you are interested in following the Codes and Standards Enhancement (CASE) process please participate in public events and docketing of comments on the California Energy Commission's website.

<http://www.energy.ca.gov/title24/2019standards/>

<http://title24stakeholders.com/>

