

Retail Lighting: Title 24 & Technology Update

Supporting compliance with California's 2016 Title 24 standards

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3/22/2017 SLIDE 2 SECTION 1 PRESENTATION DISCLAIMER

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 retail 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.

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SLIDE 3

SECTION 1

OBJECTIVES

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



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SLIDE 4

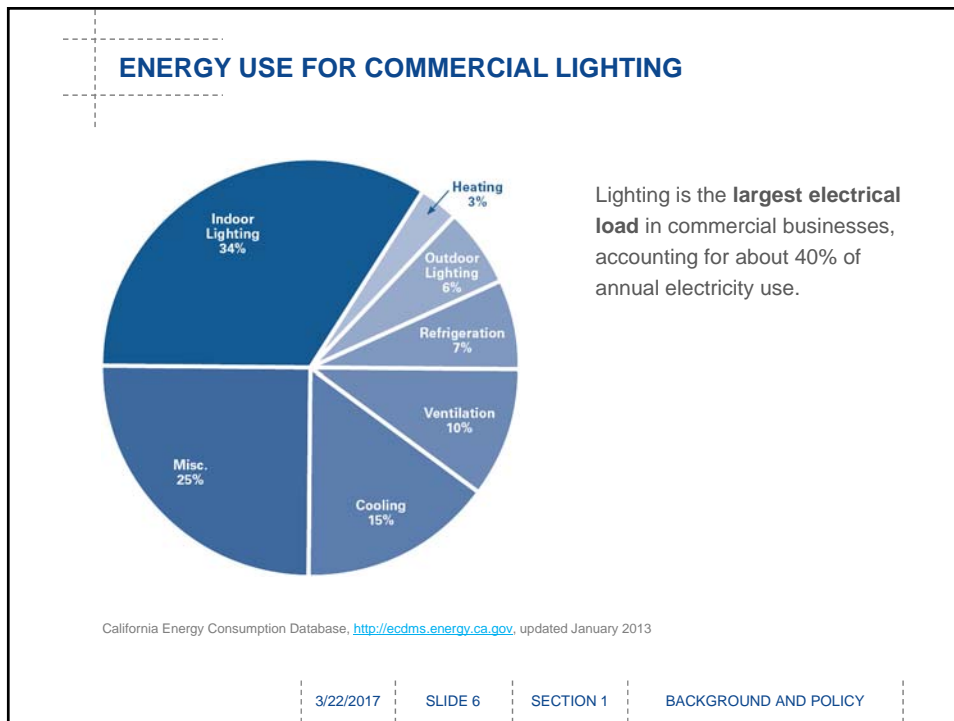
SECTION 1

OBJECTIVE AND INTRODUCTION

FOUNDING ORGANIZATIONS

UTILITIES

MANUFACTURERS			LARGE END-USERS




LIGHTING & ENERGY EFFICIENCY

Luminous Efficacy

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

Lighting Controls

- Continuous, real-time change
- Fluctuations from baseline
 - Occupancy / Vacancy
 - Daylighting
 - Demand Response
 - Tuning
 - Personal Control



3/22/2017 SLIDE 7 SECTION 1 OBJECTIVE AND INTRODUCTION

ADAPTIVE LIGHTING 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



3/22/2017 SLIDE 8 SECTION 1 OBJECTIVE AND INTRODUCTION

INTEGRATED CONTROL STRATEGY

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



3/22/2017 | SLIDE 9 | SECTION 1 | OBJECTIVE AND INTRODUCTION



Select the Appropriate

Source + Luminaire + Controls
(for the application)

Nonresidential Lighting Guide

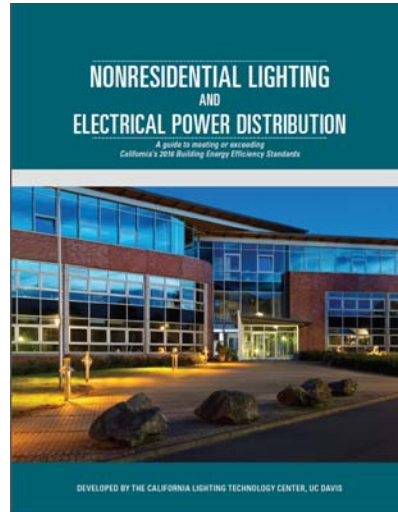
Provides a simplified and practical approach to lighting code compliance and design.

Topics include:

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

Available online for download!

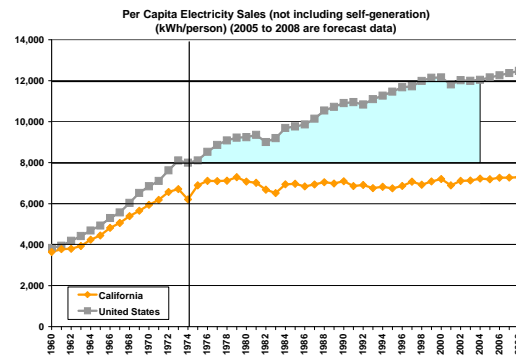
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Why Title 24, Part 6?

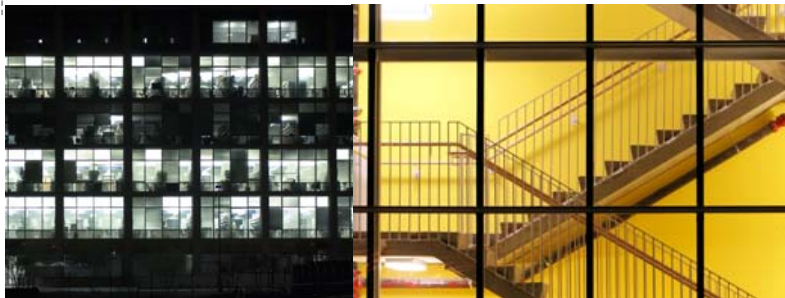
Efficiency before generation

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 ¹		100%			
	Existing Homes (reduction relative existing stock) ¹		40%			
Commercial Buildings	New Construction ZNE ¹				100%	
	Existing ZNE ¹				50%	
State Buildings	New Construction & Major Retrofits ZNE ²		50%	100%		
	Existing ZNE (by square footage) ²			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. ³	X	X	X	X	
GHG Emissions	Statewide GHG Emissions (all sources) ⁴		1990 Levels		40% Below 1990	80% Below 1990
Water Efficiency	25 percent reduction in urban water use ⁵	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/>

CALIFORNIA'S 2016 — NONRESIDENTIAL BUILDING ENERGY EFFICIENCY STANDARDS

CALIFORNIA ENERGY COMMISSION

The state's energy efficiency standards for new buildings and appliances have saved consumers billions in reduced electricity and natural gas bills. The building standards include better windows, insulation, lighting, air conditioning systems and other features that reduce energy consumption in homes and businesses. Since 1979 these standards have helped protect the environment by reducing more than 250 million metric tons of greenhouse gas emissions (or the equivalent of removing 37 million cars off California roads).

DOOR AND WINDOW INTERLOCKS

Sensors on doors and windows adjust the thermostat to turn off the heating or cooling if a door or window is left open for more than five minutes. This allows occupants to take advantage of outside temperatures and save on heating and cooling costs.

DIRECT DIGITAL CONTROLS

For larger heating, ventilation and air conditioning systems, installing digital controls enables communication with building energy management systems, allowing managers to tailor the building's heating and cooling demands and prevent waste.

ELEVATORS

Efficient ventilation fans and lighting sources installed within the elevator, along with controls that turn off the cab lighting and fans when the elevator is empty, save energy both when the elevator is in use and when empty.

OUTDOOR LIGHTING

The general power allowance for outdoor lighting has been lowered to include newer, more efficient luminaires which are widely available and commonly used for outdoor lighting applications.

ESCALATORS

Requires escalators and moving walkways in transit areas to run at a lower, less energy-consuming speed when not in use.

These are cost effective measures that builders may consider to achieve new levels of efficiency. They can be traded for other efficient technologies such as higher efficiency HVAC units, higher efficiency water heaters, etc.