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2015 IECC Commercial: Overview of the Lighting Requirements

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Section I

INTRODUCTION

Structure of the 2015 IECC

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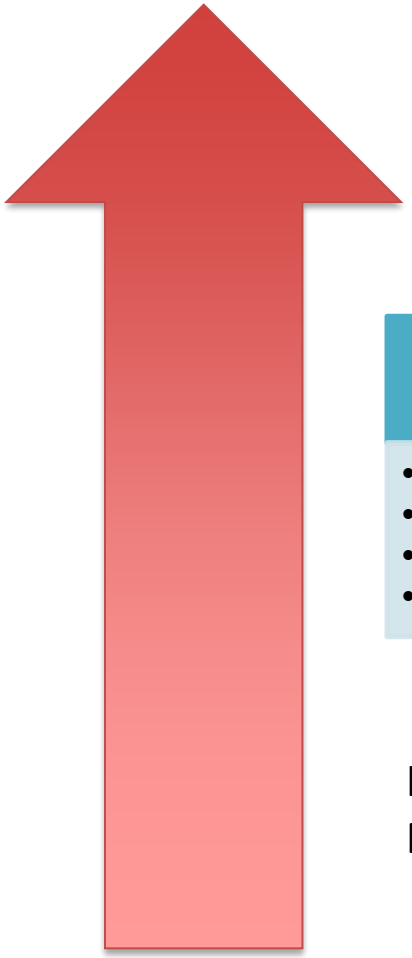
Energy Savings Potential for Adoption of the 2015 IECC



Cumulative Residential energy savings compared to the 2006 IECC	Cumulative Commercial energy savings compared to ASHRAE Standard 90.1-2004	Cumulative Net Savings
• **2 GWh/yr in 2016**	• **11 GWh/yr in 2016**	• **13 GWh/yr in 2016**
• 369 GWh/yr in 2026	• 715 GWh/yr in 2026	• 1,084 GWh/yr in 2026
• 687 GWh/yr in 2030	• 1,304 GWh/yr in 2030	• 1,991 GWh/yr 2030
• 1,317 GWh/yr in 2036	• 3,386 GWh/yr in 2036	• 4,703 GWh/yr in 2036

How Much is a Gigawatt:
Power for approximately 200,000 homes for one year

Section III

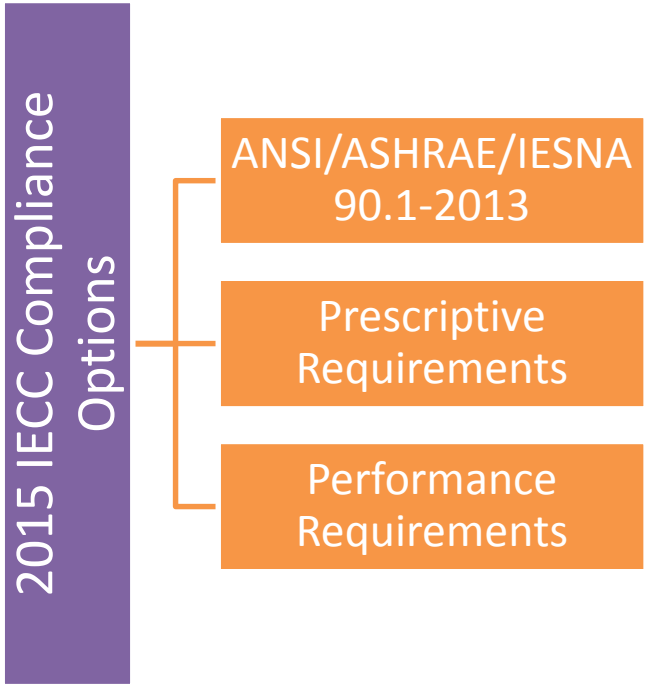
COMMERCIAL PROVISIONS: AN OVERVIEW

Section C401

General

Scope and Application
C401.1 and C401.2

C401.1 Scope. The provisions of this chapter are applicable to *commercial buildings* and their *build sites.*



Section C405

Electrical Power and Lighting Systems

Occupant Sensor Controls C405.2.1

Occupant sensor controls

The following space types must have occupant sensor controls installed to control lights:

- Classrooms/lecture/training rooms
- Conference/meeting/multipurpose rooms
- Copy/print rooms
- Lounges
- Employee lunch and break rooms
- Private offices
- Restrooms
- Storage rooms
- Janitorial closets
- Locker rooms
- Other spaces 300ft² or less that are enclosed by floor-to-ceiling height partitions
- Warehouses

Sensor control function

Occupant sensors for all spaces except warehouses must:

- Automatically turn off lights within 30 minutes of all occupancies leaving space
- Be manual on or controlled to automatically turn lighting on to not more than 50% power
- Include manual control to allow occupants to turn lights off

Warehouse control function

Lighting in aisleways and open areas must be individually controlled with occupant sensors that automatically reduce lighting power by >50% when areas are unoccupied

Time-Switch Controls C405.2.2

Each area that is not provided with occupant sensor controls must have time-switch controls

Exceptions: Automatic controls are not required in sleeping areas, spaces where patient care is directly provided, spaces where auto lighting would endanger safety or security, lighting intended for continuous operation, shop and laboratory classrooms

Each space with time-switch controls must also have a manual control for lighting reduction and include an override switching device that has:

- A 7-day clock
- 7 different day types/week
- An automatic holiday “shutoff”
- Program backup capabilities
- Limits for controlled lighting to be on for less than 2 hours
- Capability to control lighting for areas <5,000 ft^2

Light-Reduction Controls C405.2.2.2

Light-reduction controls must allow occupants to reduce connected lighting:

- By at least 50%
- In a reasonably uniform illumination pattern

Light-reduction methods include:

- Controlling all lamps or luminaires
- Dual switching of alternate rows of luminaires, alternate luminaires or alternate lamps.
- Switching of the middle lamp luminaires independently of the outer lamps.
- Switching each luminaire or lamp

Daylight-responsive controls
C405.2.3

Daylight-responsive controls must be provided to control electric lights within daylights zones in:

- Spaces with total of more than 150W of general lighting within sidelight daylight zones
- Spaces with total of more than 150W of general lighting within toplight daylight zones

Table C405.4.2(1) Interior Lighting Power Allowances: Building Area Method (partial)

Building Area Type	LPD (w/ft$^{2)}$
Automotive facility	.80
Convention Center	1.01
Courthouse	1.01
Dining: Bar lounge/leisure	1.01
Dining: Cafeteria/fast food	0.90
Dining: Family	0.95
Dormitory	0.57
Exercise Center	0.84
Fire Station	0.67
Gymnasium	0.94
Health Care Clinic	0.90

Table C405.4.2(2) Interior Lighting Power Allowances: Space-by-Space Method (partial)

Common Space Types	LPD (w/ft$^{2)}$
Atrium First 40 ft in height	0.03 per ft. in total height
Atrium Above 40ft in height	0.40 + 0.02 per ft. in total height
Audience/seating area	
For Auditorium	0.63
For Performing Arts Theatre	2.43
For Motion Picture Theatre	1.14
Class Room/Lecture/Training	1.24
Conference/Meeting/Multipurpose	1.23
Corridor	0.66
Dining Area	
In a penitentiary	0.96
In a facility for the visually impaired	1.90
Bar/Lounge/Leisure Dining	1.07
Family Dining Area	0.89
Electrical/Mechanical	0.95
Food Preparation	1.21

Table C405.5.2(1) Exterior Lighting Zones

Lighting Zone	Description
1	Developed areas of national parks, state parks, forest land, and rural areas
2	Areas predominantly consisting of residential zoning, neighborhood business districts, light industrial with limited nighttime use and residential mixed-use areas
3	All other areas not classified as lighting zone 1, 2 or 4
4	High-activity commercial districts in major metropolitan areas as designated by the local land use planning authority

Table C405.5.2(2) Individual Lighting Power Allowances for Building Exteriors (Partial)

		Lighting Zones			
		Zone 1	**Zone 2**	**Zone 3**	**Zone 4**
Base Site Allowance (Base allowance is usable in tradable or nontradable surfaces)		500 W	600 W	750 W	1300 W
Tradeable Surfaces (Lighting power densities for uncovered parking areas, building grounds, building entrances and exits, canopies and overhangs and outdoor sales areas are tradeable)	**Uncovered Parking Areas**				
	Parking areas and drives	0.04 W/ft^2	0.06 W/ft^2	0.10 W/ft^2	0.13 W/ft^2
	Building Grounds				
	Walkways less than 10 feet wide	0.7 W/linear foot	0.7 W/linear foot	0.8 W/linear foot	1.0 W/linear foot
	Walkways 10 feet wide or greater, plaza areas, special feature areas	0.14 W/ft^2	0.14 W/ft^2	0.16 W/ft^2	0.2 W/ft^2
	Stairways	0.75 W/ft^2	1.0 W/ft^2	1.0 W/ft^2	1.0 W/ft^2
	Pedestrian Tunnels	0.15 W/ft^2	0.15 W/ft^2	0.2 W/ft^2	0.3 W/ft^2
	Building Entrances and Exits				

Lighting System Functional Testing C408.3

- Test lighting control system to ensure control hardware and software are calibrated, adjusted, programmed and in proper working condition per the design and manufacturer's instructions
  - Applies to
    - Occupancy sensor controls
    - Time-switch controls
    - Daylight responsive controls

Sub-Metering
C405.10 Hawaii Specific

C405.10 Sub-metering (Mandatory). In new buildings with tenants, metering shall be collected for the entire building and individually for each tenant occupying 1,000 ft² (total enclosed and unenclosed) (93 m²) or more. Tenants shall have access to data collected for their space. A tenant is defined as "one who rents or leases from a landlord.

Section C406

Additional Efficiency Package Options

Requirements
C406.1

Buildings must comply with at least one additional efficiency feature:

1. More efficient HVAC
2. Reduced lighting power density
3. Enhanced lighting controls
4. On-site renewable energy
5. Dedicated outdoor air system
6. High-efficiency SWH


High Efficiency HVAC


On-Site Renewables

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