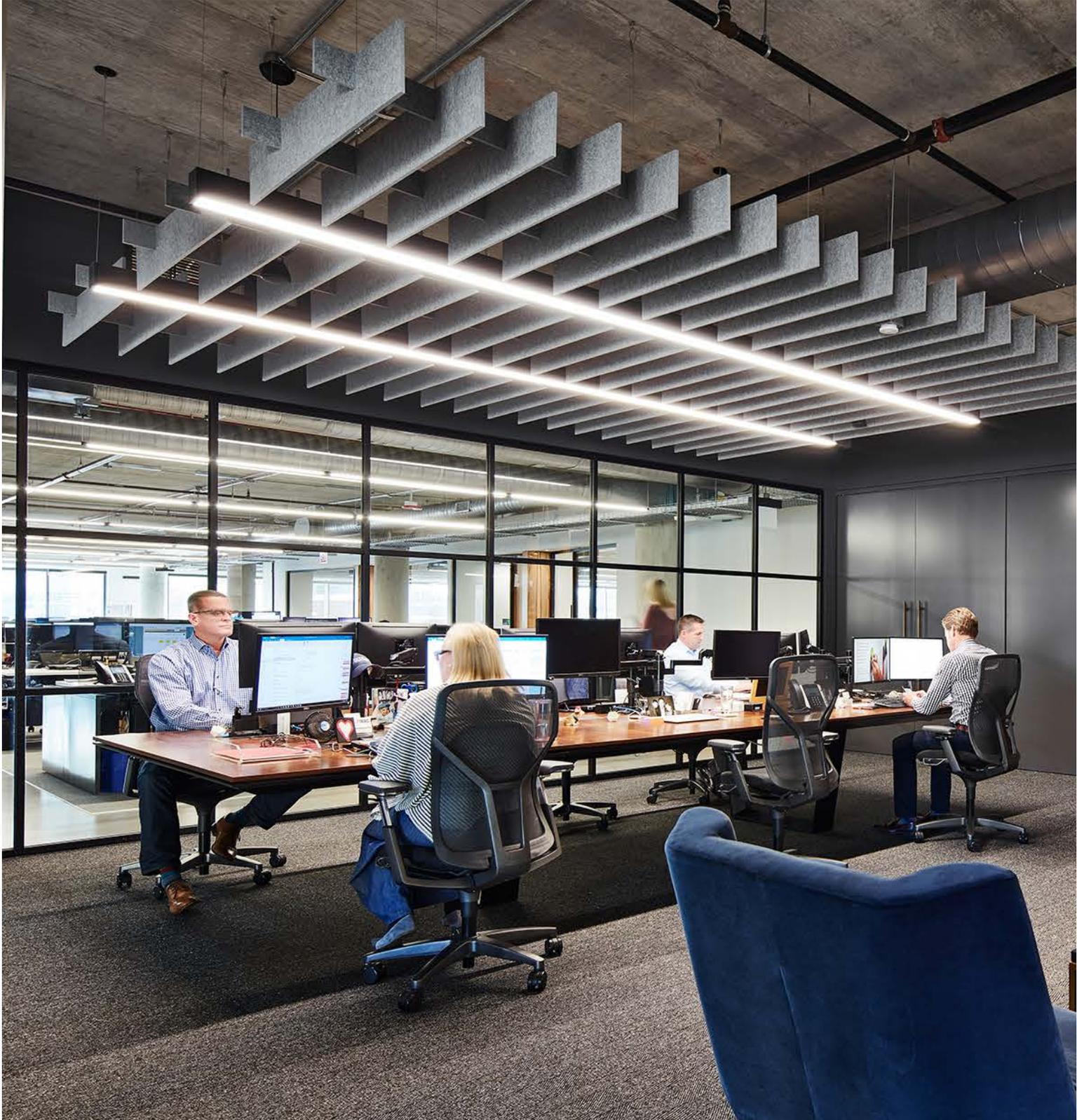
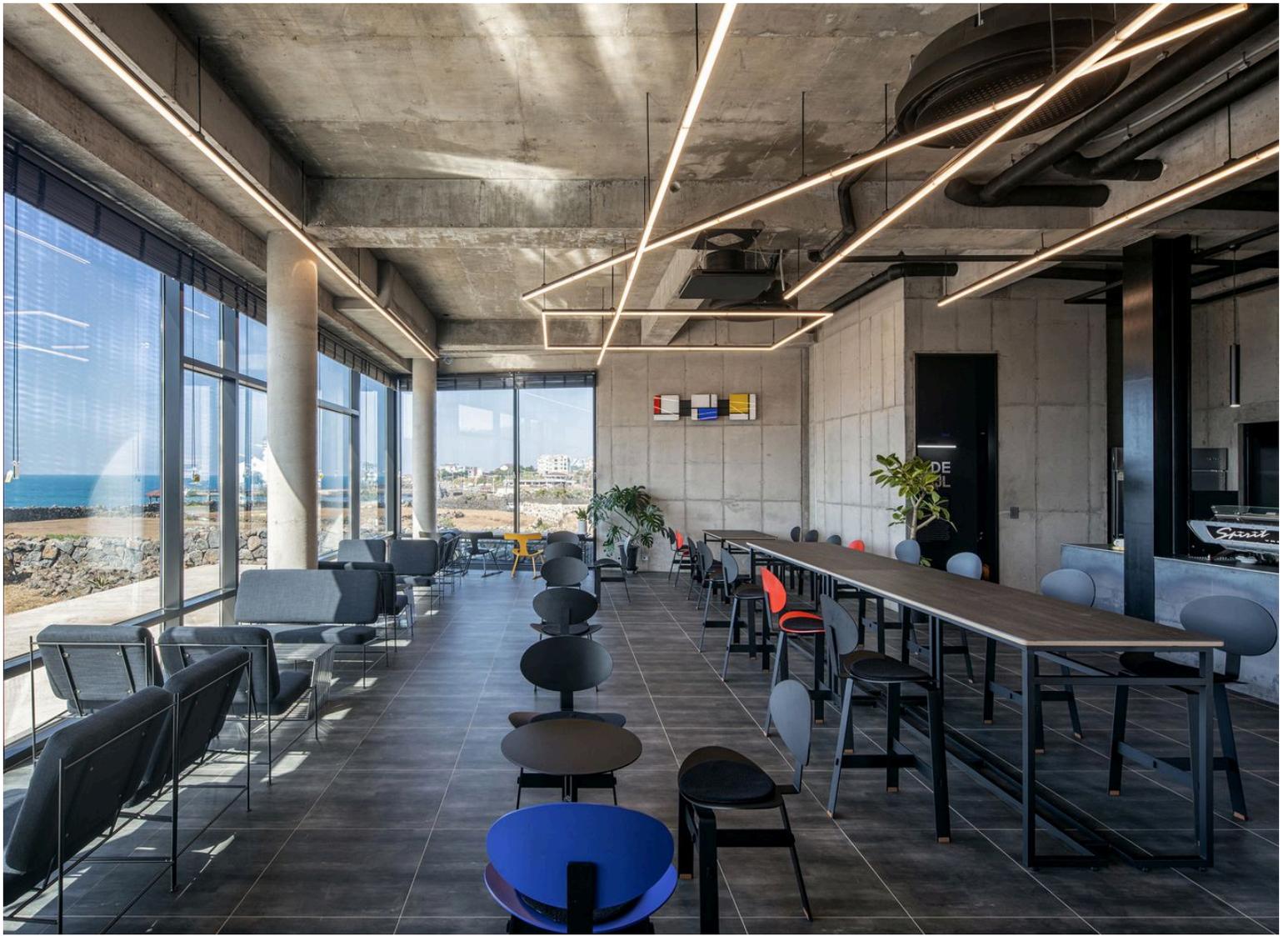


U.S. NON-RESIDENTIAL LIGHTING AND ENERGY REGULATIONS





Energy regulation in the U.S. is overseen by the Department of Energy (DOE) and the Federal Energy Regulatory Council (FERC). These agencies set the national policy that the commercial lighting industry must follow.

What's new for 2023? In May 2022, the U.S. Department of Energy announced:

"...beginning in April 2023, all new buildings and major retrofits constructed by the Federal government must comply with the International Energy Conservation Code (IECC)."

—U.S. Department of Energy

Why energy regulation matters

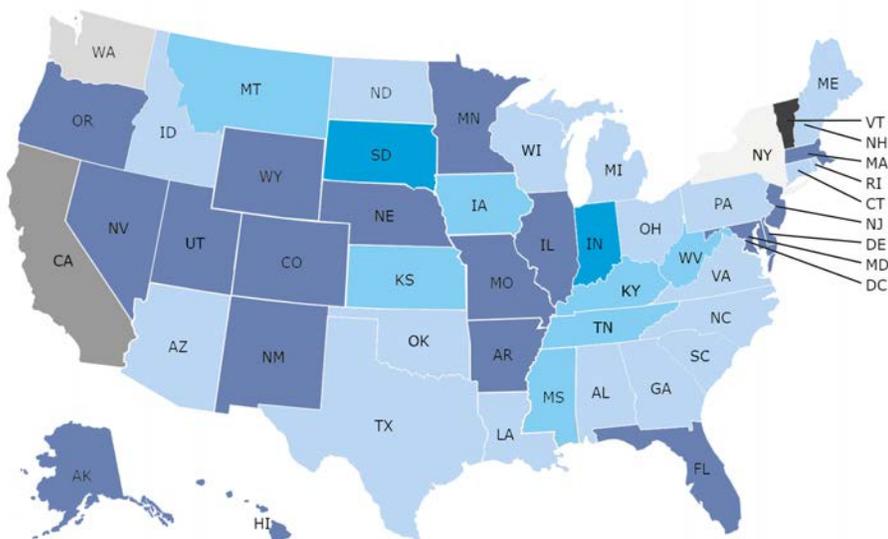
In practical terms, energy regulations aim to reduce energy consumption. The goal is to limit human impact on climate change. The latest global trend focuses on achieving net-zero emissions status. That means running entirely on renewable energy.

Many states have outlined plans and dates for achieving net-zero emissions status. The U.S. has committed to achieving net-zero emissions by 2050.

States leading the way on energy policy

Four states have codes that override and exceed Federal energy regulation:

1. The California Building Standards Commission (Title 24)
2. Vermont Commercial Building Energy Standards (CBES)
3. New York City Energy Conservation Code (NYCECC)
4. Washington State Energy Codes (WSEC)



MAP KEY

	Ashrae 90.1 2019 - IECC 2021		2019 Building Energy Efficiency Standards - Title 24
	Ashrae 90.1 2016 - IECC 2018		2018 Washington State Energy Code
	Ashrae 90.1 2013 - IECC 2015		NYC Energy Conservation Code (NYCECC)
	Ashrae 90.1 2010 - IECC 2012		2020 Vermont Commercial Building Energy Standards (CBES)
	Ashrae 90.1 2007 - IECC 2009		

California's Title 24 currently imposes the most stringent set of regulations.

The U.S. Energy Information Administration recently published a report detailing renewable energy goals and projections for each state.

U.S. Map Showing Energy Standard by State. Source: cove tools.

Commercial lighting standards for 2023

Regulatory changes for 2023 are likely to bring four terms to the forefront of commercial lighting standards. Below are the most significant energy regulation updates set for 2023 across the country.

Lighting Power Allowance

The Lighting Power Allowance (LPA) is the maximum allowed watts per square foot. In California's Title 24, the LPA is being reduced from .65 to .6 watts per square foot in 2023.

Open Office Occupancy Controls

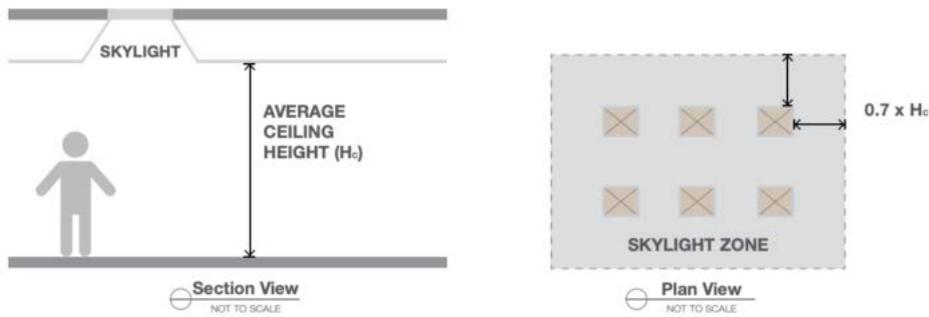
Occupant sensor controls are typically used in open-plan office spaces, cafeteria dining spaces, and fast-food dining spaces. Under regulations like Title 24, controls must be configured so general lighting can be controlled in "zones," with floor areas not greater than 600 square feet. General lighting in each controlled zone should turn off after 20 minutes of occupants leaving a particular zone.

Automatic Daylighting Controls

Automatic daylighting controls refer to a photosensor and switch or dimming control unit. The photosensor is mounted to the interior wall, ceiling, or light fixture within the daylighting zone. It sends a signal to the control unit when the preset lighting threshold is reached to reduce electrical light levels in a particular zone.



Toplighting (Skylight)



Daylighting zones include:

- Primary side-lighting
- Secondary side-lighting
- Top-lighting

Primary and secondary side-lighting zones are illuminated by windows, while top-lighting zones are illuminated by skylights.

Automatic Receptacle Control

Automatic Receptacle Control, also known as plug-load control, is required to reduce building energy use. The government control limits energy consumption at electrical receptacles during non-occupied times, which reduces what the government deems “unnecessary energy usage and cost and supports sustainability.” In addition, some states require these receptacles as part of code requirement.

Receptacle controlling methods include:

- **Schedule-based or timer-based receptacles** that can switch off at programmed times
- **Occupancy-based sensor** which must turn off electrical outlets within 20 minutes of all occupants leaving a space
- **System-based signal** from another control or alarm system which must turn off electrical outlets within 20 minutes after determining that the area is unoccupied.

Demand Responsive Lighting Controls

Demand Responsive Lighting Controls utilize control mechanisms to dim lighting levels during periods of high grid-wide demand, primarily to aid utilities in maintaining grid stability. According to the Demand Responsive Lighting Control Declaration of California’s Title 24, (Part 6, Section 110.12(a)1B)

“...requires that all demand responsive lighting controls be certified by the manufacturer as being capable of responding to signals from an OpenADR 2.0b Virtual End Node [utilities or state controlled software].”

—California Title 24 Demand Responsive Lighting Declaration, Part 6, Section 110.12(a)1B



What's new in commercial regulations?

1. More stringent controls on existing building lighting alterations
2. Consolidation of demand response controls and demand management requirements into a single new section
3. Requirement that all restrooms install occupancy sensor controls
4. LPD requirements are now based on LED lighting

“Lighting is one of the biggest changes with non-residential standards,” notes Brian Selby of Sacramento-based Selby Energy. “Rules are more stringent.” Selby detailed updates in commercial lighting regulations, including new lighting power allowances.

“Allowed watts per square footage is lower now,” Selby explained. “The lighting power density (LPD) requirements are now based [entirely] on LED, not fluorescent, lighting.”

What's coming in 2020 includes the addition of Group 1 medical facilities to T24 requirements (only Group 1-2) and a new code section grouping all demand responsive controls and demand management requirements. Section 130.1(a) now mandates that a manual area control must be in the same enclosed area unless an exception applies.

Keywords

LPD — Lighting Power Density. The lighting allowance allotted by Title 24 expressed as watts per square foot.

Why it's important: The 2016 edition of Title 24 reduced the LPD for many types of spaces and buildings, making the requirements even tougher than the 2013 edition. Fortunately, LEDs are still the solution for meeting Title 24 standards.

Acceptance Test — An engineering term for “testing to see if the requirements of the code are met”.

Why it's important: Acceptance testing is a requirement of Title 24.

Vacancy Sensor — Lights automatically turn OFF when the room is vacant for 20 minutes or longer, but only turn on manually.

Why it's important: A vacancy sensor is the most energy-friendly of all sensor options, because lights will automatically shut off if the room is unoccupied, and will only turn back on again manually.

Occupancy Sensor, Partial-ON — Lights automatically turn OFF when the room is vacant for 20 minutes or longer. Lights automatically turn ON to 50-70% when someone enters the room. *Why it's important:* Partial-ON is the second most energy friendly of all the sensor options. Lights will switch ON automatically but not to 100%, with the expectation that most people won't bother to turn on more lights or adjust the lighting level.

Occupancy Sensor, Partial-OFF — Lights automatically dim to 50% or less of full power when the space is vacant for 20 minutes or longer. Lights automatically turn ON when someone enters. *Why it's important:* Partial-OFF occupancy sensors are required for corridors, stairwells, and other spaces where full OFF is not feasible.

Multi-Level Lighting Controls — Lighting controls that reduce the power going to a lighting system in multiple steps—usually means a dimmer.

Why it's important: Multi-level Lighting Controls are required for any enclosed area 100 square feet or larger, with a connected lighting load that exceeds 0.5 watts per square foot.

Daylighting Controls — Controls that use one or more photosensors to detect changes in daylight illumination, adjusting the lighting level in response.

Why it's important: Daylighting controls are required in daylit zones, as defined by Title 24. Primary daylit zones must be controlled separately from secondary daylit zones.

Local Switch — Manual switch that is easily accessible.

Why it's important: Most spaces require a local switch, although there are exceptions for public restrooms, stairwells, and corridors.

Automatic Time-Switch Control — Programm-able time clock that turns off lighting when a space is typically unoccupied.

Why it's important: Meets the requirement for an occupancy/vacancy sensor for some types of spaces.

Area Category Method — Values for LPD in this document are those allotted by the Area Category Method, one of three possible methods for meeting Title 24 requirements.

Demand Management — engineering or controlling energy demand through various methods such as market controls, financial incentives and social, cultural and behavioral change, often through state-sponsored programs and campaigns.

Demand Response — a reduction in energy demand intended to reduce peak demand or avoid system emergencies. In this sense, demand response purports to be more efficient than adding generation capacity to meet peak and occasional demand.



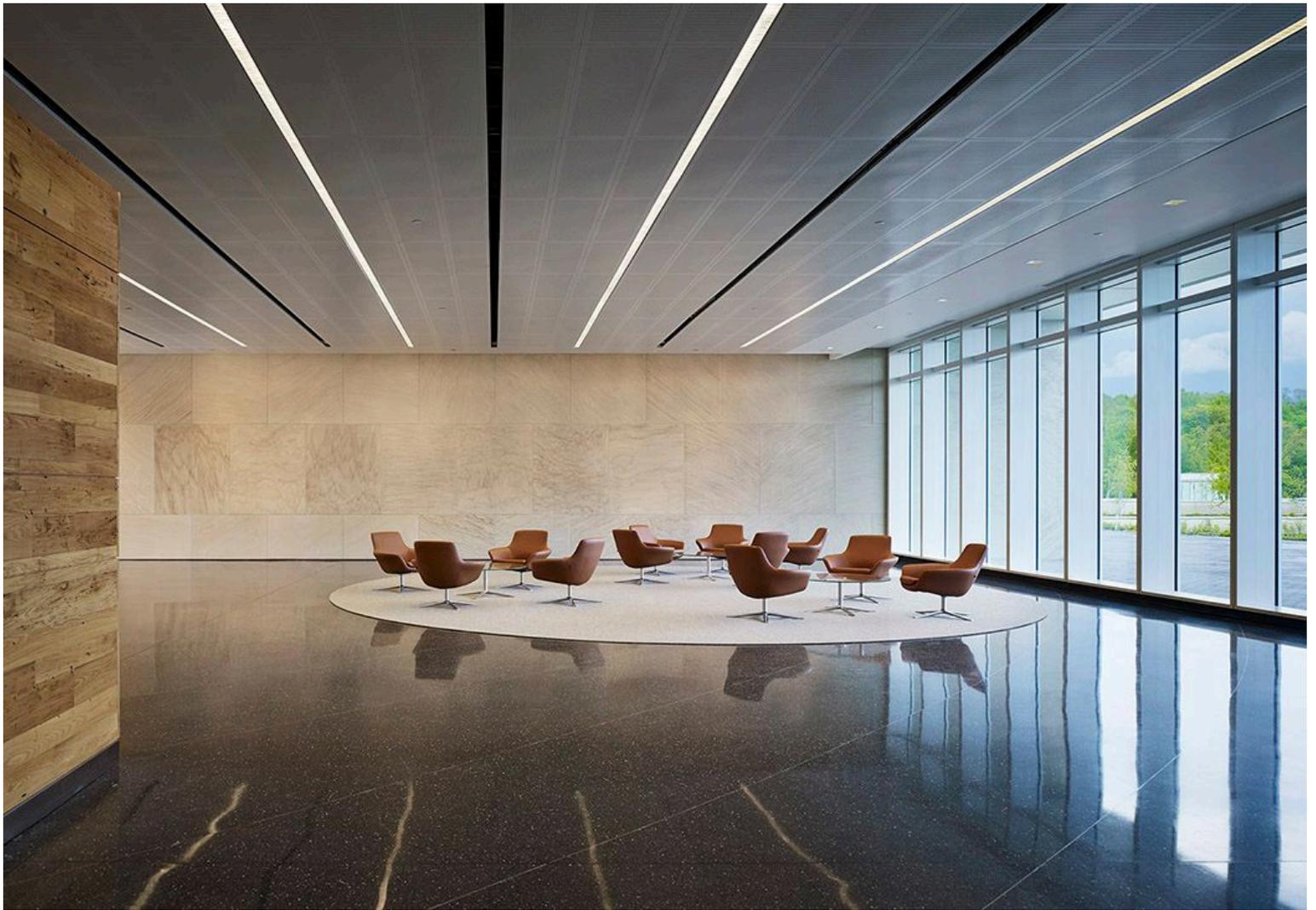


TABLE 140.6-C AREA CATEGORY METHOD-LIGHTING POWER DENSITY VALUES (WATTS/FT²)

PRIMARY FUNCTION AREA		ALLOWED LIGHTING POWER DENSITY (W/ft ²)	PRIMARY FUNCTION AREA		ALLOWED LIGHTING POWER DENSITY (W/ft ²)
Auditorium Area		1.40 ³	Library Area	Reading areas	1.1 ³
Auto Repair Area		0.90 ²		Stack areas	1.5 ³
Beauty Salon Area		1.7	Lobby Area	Hotel lobby	0.95 ³
Civic Meeting Place Area		1.3 ³		Main entry lobby	0.95 ³
Classroom, Lecture, Training, Vocational Areas		1.2 ⁵	Locker/Dressing Room		0.70
Commercial and Industrial Storage Areas (conditioned and unconditioned)		0.60	Lounge Area		0.90 ³
Commercial and Industrial Storage Areas (refrigerated)		0.7	Malls and Atria		0.95 ³
Convention, Conference, Multipurpose and Meeting Center Areas		1.2 ³	Medical and Clinical Care Area		1.2
Corridor, Restroom, Stair, and Support Areas		0.60	Office Area	> 250 square feet	0.75
Dining Area		1.0 ³		≤ 250 square feet	1.0
Electrical, Mechanical, Telephone Rooms		0.55 ²	Parking Garage Area	Parking Area ¹⁰	0.14
Exercise Center, Gymnasium Areas		1.0		Dedicated Ramps	0.30
Exhibit, Museum Areas		1.8		Daylight Adaptation Zones ⁹	0.60
Financial Transaction Area		1.0 ³	Religious Worship Area		1.5 ³
General Commercial and Industrial Work Areas	Low bay	0.9 ²	Retail Merchandise Sales, Wholesale Showroom Areas		1.2 ^{6 and 7}
	High bay	1.0 ²	Theater Area	Motion picture	
	Precision	1.2 ⁴		Performance	0.90 ³
Grocery Sales Area		1.2 ^{6 and 7}			1.4 ³

Type of Building	Lighting Power Allowance (W/ft ²)	
	2019	Δ
Assembly	0.7	↓ 0.7
Financial Institution	0.65	↓ 0.35
Grocery Store	0.95	↓ 0.55
Gymnasium	0.65	New
Library	0.7	↓ 0.5
Healthcare	0.9	New
Office	0.65	↓ 0.15
Parking Garage	0.13	↓ 0.07
Religious	0.7	↓ 0.8
Restaurant	0.7	↓ 0.4
Retail Store	0.9	New
School	0.65	↓ 0.3
Sports Arena	0.75	New
Motion Picture Theater	0.7	↓ 0.6
Performing Arts Theater	0.8	↓ 0.5
All Other Buildings	0.4	↓ 0.1

Based on Table 140.6-B in the Energy Standards



ALCON

L I G H T I N G

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This guide is strictly intended as general information about non-residential building energy efficiency updates and should not be used as a substitute for the energy code. Alcon Lighting strives to present accurate information, though it is not guaranteed. Please consult your local professional architect, electrician and/or contractor.