

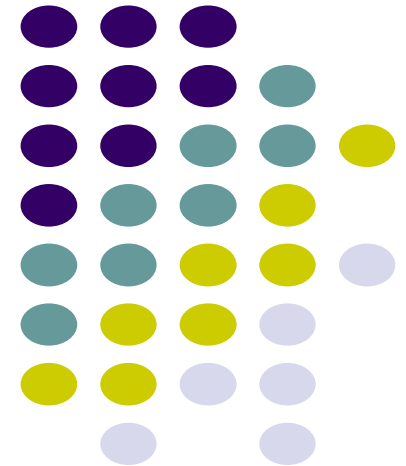
# City of Scottsdale Energy Code Adoption



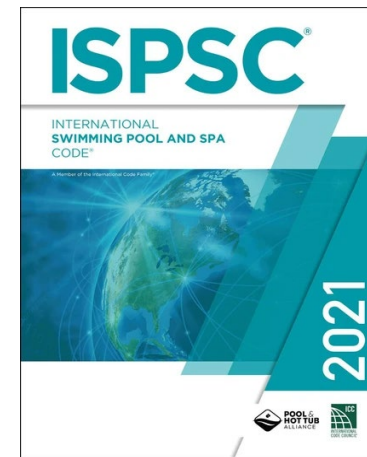
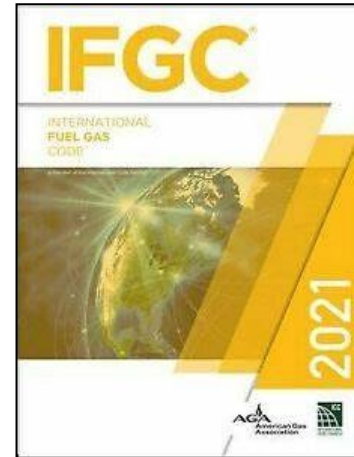
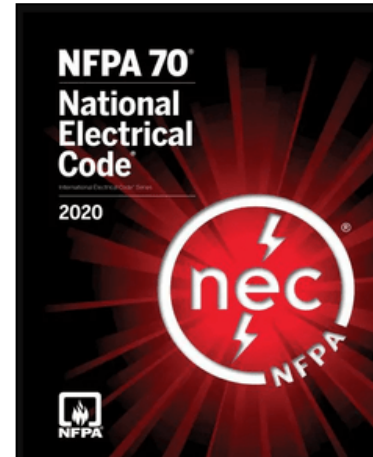
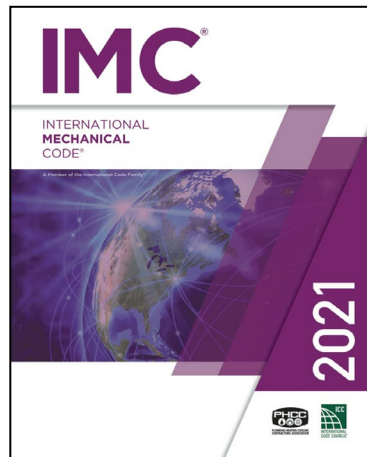
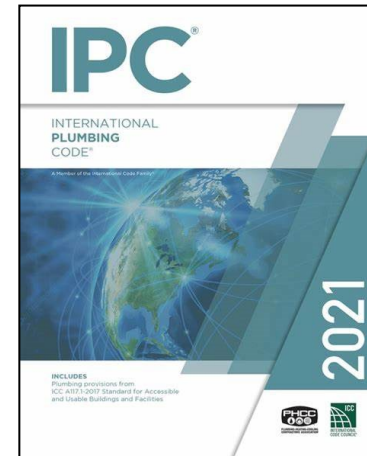
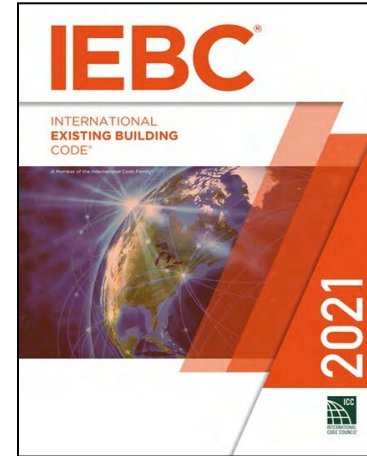
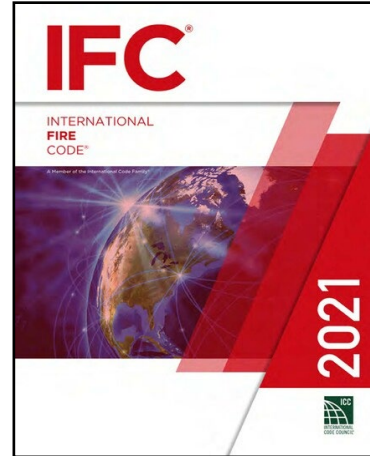
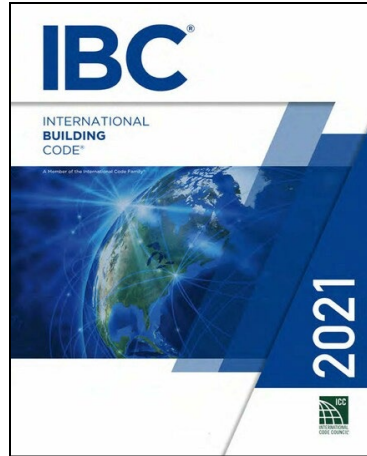
## Top 10 Commercial Energy Code Changes 2021 International Energy Conservation Code

December 27, 2022

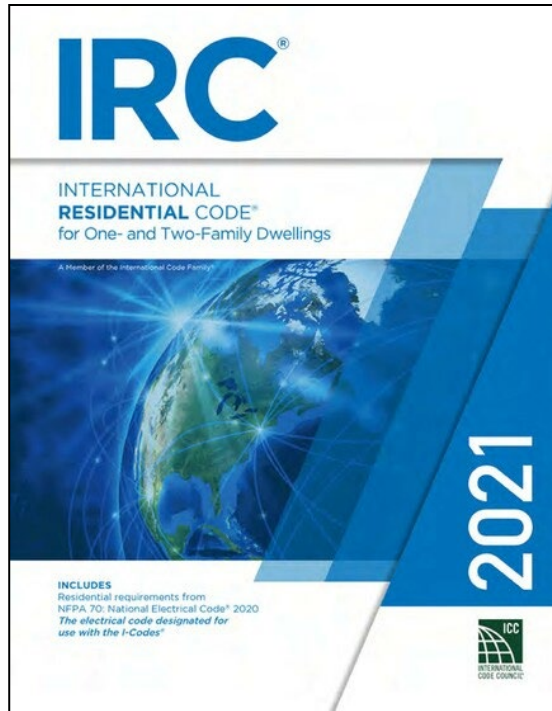
Anthony Floyd, FAIA, LEED BD+C, CEM  
Office of Environmental Initiatives  
Planning and Development  
Community and Economic Development  
City of Scottsdale



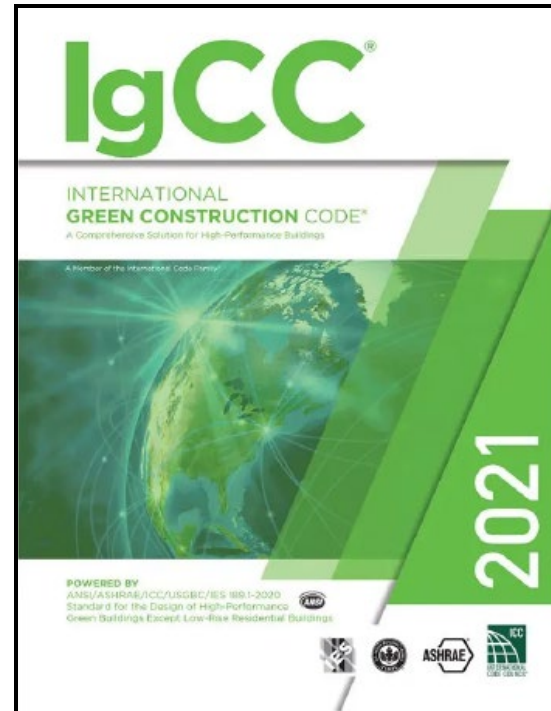
# These codes are effective January 1, 2023

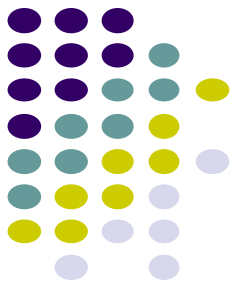


# The IRC and IECC codes are effective January 7, 2023



# The IgCC is effective July 1, 2023



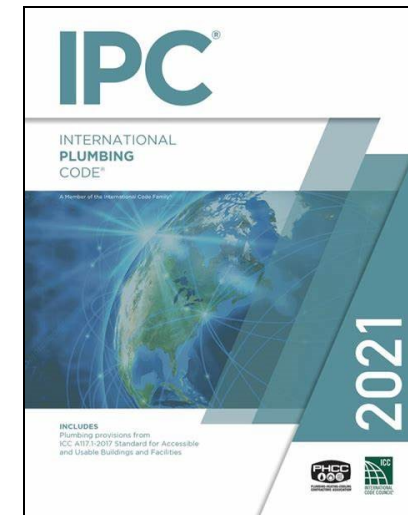


# IPC Amendments

## Single, Multifamily and Commercial

### Water Efficiency addressed in plumbing code

- High-efficiency plumbing fixtures and fittings
  - Water closets, urinals, lavatory faucets, showerheads, kitchen faucets
- Efficient hot water delivery
  - Demand-controlled recirc. pump for remotely located water heaters
- Water-bottle filling stations
  - Water-bottle filling stations for all drinking fountains

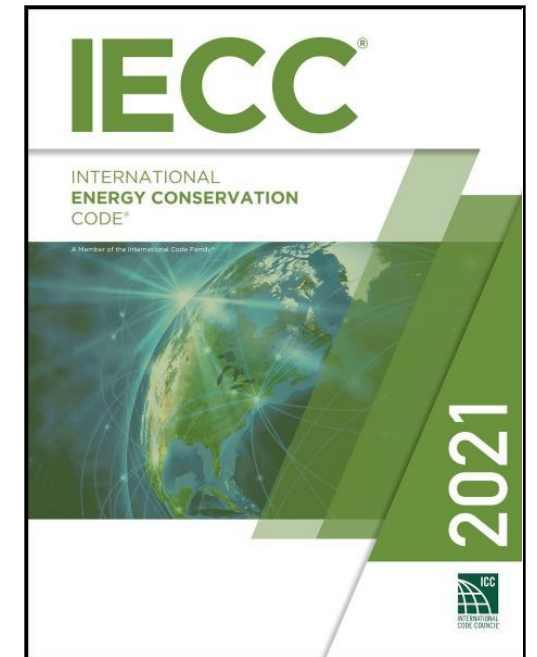




# IECC for Multifamily and Commercial

- **Top 10 Energy code Changes**

1. Thermal envelope certificate
2. Cool roofs for low slope roofs
3. Demand Control ventilation
4. Automatic HVAC controls in hotel guestrooms
5. Reduced lighting power allowances
6. Automatic receptacle control in offices
7. EV capable charging infrastructure
8. Additional efficiency requirement options
9. Commissioning of HVAC and lighting systems
10. Rooftop solar-ready zones



# 1

## Thermal Envelope Certificate – C401.3

- A permanent thermal certificate shall be completed by the builder or other *approved* party and posted on a wall in the space where the furnace is located, a utility room or other *approved* location:
  - R*-values of insulation in or on ceilings, roofs and walls.
  - U*-factors and *solar heat gain coefficient*.
  - Results from any building envelope air leakage testing.

### Commercial Thermal Envelope Certificate

Name of Designer/Builder: \_\_\_\_\_ Location (address): \_\_\_\_\_  
 Energy Code Edition: \_\_\_\_\_  
 2021 IECC: Yes  No  Permit Date: \_\_\_\_\_  
 ASHRAE 90.1-2019 Yes  No  Permit #: \_\_\_\_\_  
 Other (please indicate): \_\_\_\_\_ Building Area (sf): \_\_\_\_\_

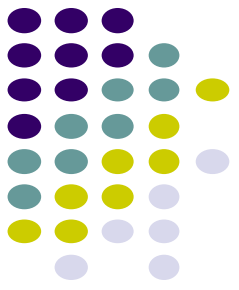
1. Insulation Rating			
Designation	R-Value <small>(per assembly)</small>	% <small>(of component)</small>	R-Value <small>(area-weighted average)</small>
Ceiling/Roof	_____	_____	_____
Walls (Above Grade)	_____	_____	_____
(Above Grade)	_____	_____	_____
(Below Grade)	_____	_____	_____
(Below Grade)	_____	_____	_____
Floors/Slabs	_____	_____	_____
Ducts	_____	_____	_____
(Unconditioned space)	_____	_____	_____
(Outdoor ducts)	_____	_____	_____

2. Fenestration Rating					
Designation	NFRC U-Factor <small>(per assembly)</small>	NFRC SHGC <small>(per assembly)</small>	% <small>(of component)</small>	NFRC U-Factor <small>(area-weighted average)</small>	NFRC SHGC <small>(area-weighted average)</small>
Window	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
Opaque door	_____	_____	_____	_____	_____
Skylight	_____	_____	_____	_____	_____

### 3. Air Leakage Test Results

Blower door \_\_\_\_\_ cfm/sf 75 Pa. Test date: \_\_\_\_\_ Tested by: \_\_\_\_\_

[smartenergy.illinois.edu/energy-code/](http://smartenergy.illinois.edu/energy-code/) | 800.214.7954 | [energycode@illinois.edu](mailto:energycode@illinois.edu)



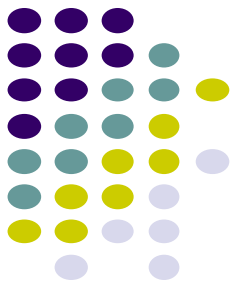
## 2 Cool/Light Reflective Coated Roofs

### Low Slope roofs (less than 2 in 12 slope) – C402.3

- Minimum solar reflectance index (SRI) of 64 over conditioned and non-conditioned spaces
- Required under both prescriptive and performance compliance paths



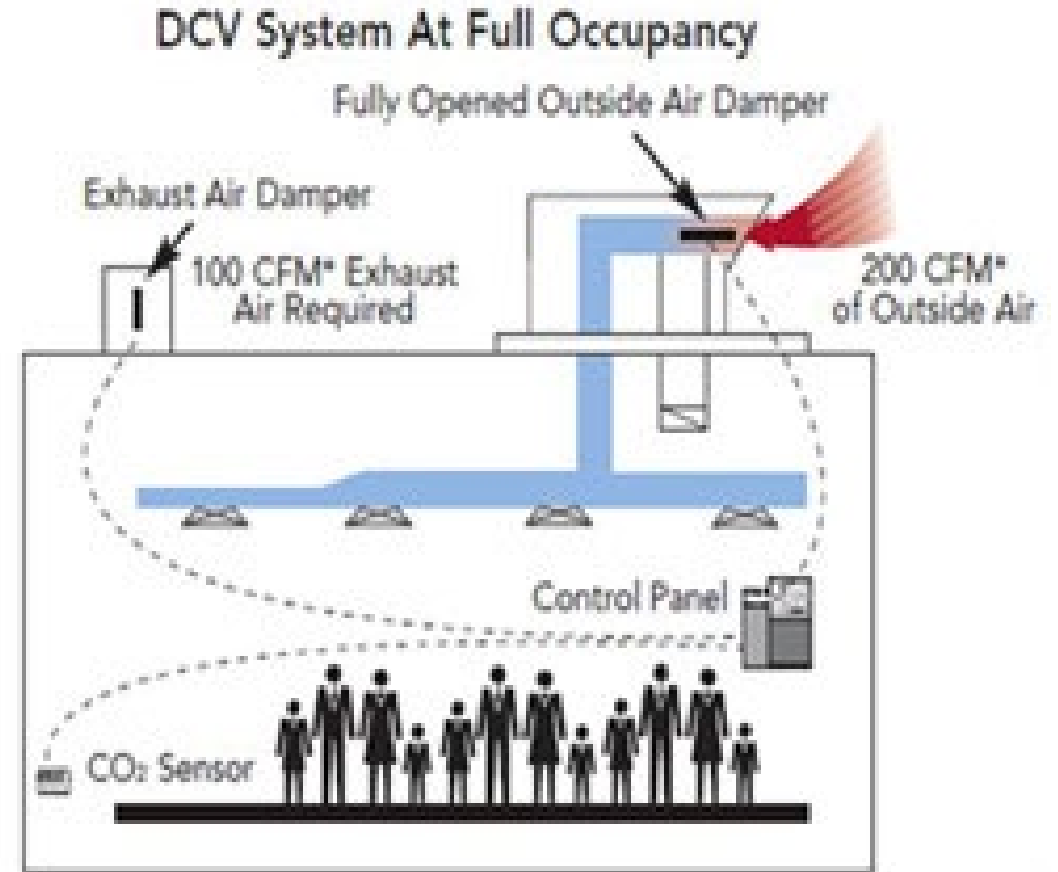




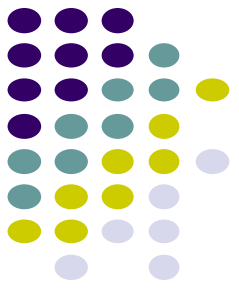
# 3

## Demand Control Ventilation – C403.7.1

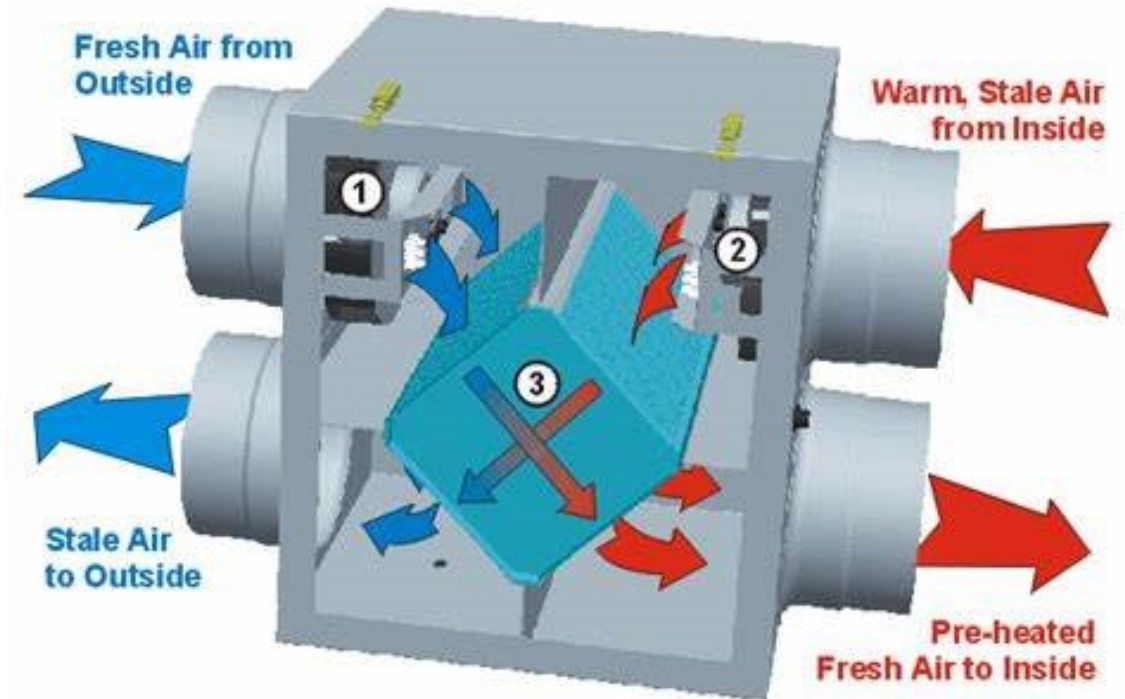
- Required for spaces larger than 500 sf and with an average occupant load of 15 people or greater per 1,000 sf of floor area
- Exceptions include systems supplied with an energy recovery ventilation system

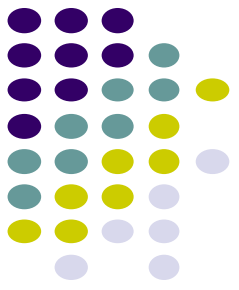


# Energy Recovery Systems – C403.7.4



- Non-transient dwelling units
  - Exceptions:
    - Dwelling units not more than 500 sf
    - Enthalpy recovering ratio at heating design condition
- Spaces other than non-transient dwellings
  - Required where supply airflow rate of fan system exceeds values specified in Tables C403.7.4.2(1) and (2)
  - Exceptions include enthalpy recovering ratio at heating design condition





## 4 Automatic HVAC System Controls in Hotel Guestrooms – C403.7.6

- Group R-1 buildings containing more than 50 guestrooms
  - Temperature setpoint control on each HVAC system that are capable of and configured with three modes of temperature control
    - Rented but unoccupied
    - Unrented and unoccupied
    - Occupied
  - Ventilation controls
    - Automatically turn off ventilation and exhaust fans within 30 minutes of occupants leaving the guestroom

Networked guestroom control system



# 5

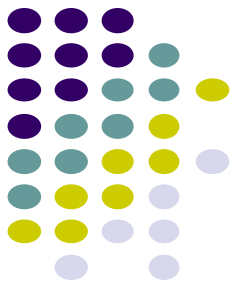
# Reduced Lighting Power Allowances C405.3.2



- Interior lighting power allowance
  - Measured in watts per sq. ft.
  - Sometimes referred to as lighting power density (LPD)
  - It serves as a yardstick by which the total connected interior lighting power is measured to determine whether a building is within limits for interior lighting power

TABLE C405.3.2(1)  
INTERIOR LIGHTING POWER ALLOWANCES:  
BUILDING AREA METHOD

BUILDING AREA TYPE	LPD (watts/ft <sup>2</sup> )
Automotive facility	0.75
Convention center	0.64
Courthouse	0.79
Dining: bar lounge/leisure	0.80
Dining: cafeteria/fast food	0.76
Dining: family	0.71
Dormitory <sup>a, b</sup>	0.53
Exercise center	0.72
Fire station <sup>a</sup>	0.56
Gymnasium	0.76
Health care clinic	0.81
Hospital <sup>a</sup>	0.96
Hotel/Motel <sup>a, b</sup>	0.56
Library	0.83
Manufacturing facility	0.82
Motion picture theater	0.44
Multiple-family <sup>c</sup>	0.45
Museum	0.55
Office	0.64

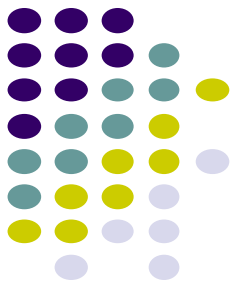


# Light Reduction Controls C405.2.3

- Where not provided with occupant sensor controls, general lighting shall be provided with one of the following light-reduction controls
  - Manual control that allows the occupant to reduce the connected lighting load by not less than 50% in a uniform illumination pattern with an intermediate step in addition to full on/off position; or
  - Continuous dimming control; or
  - Switching alternate luminaires or rows of luminaires to achieve a reduced output

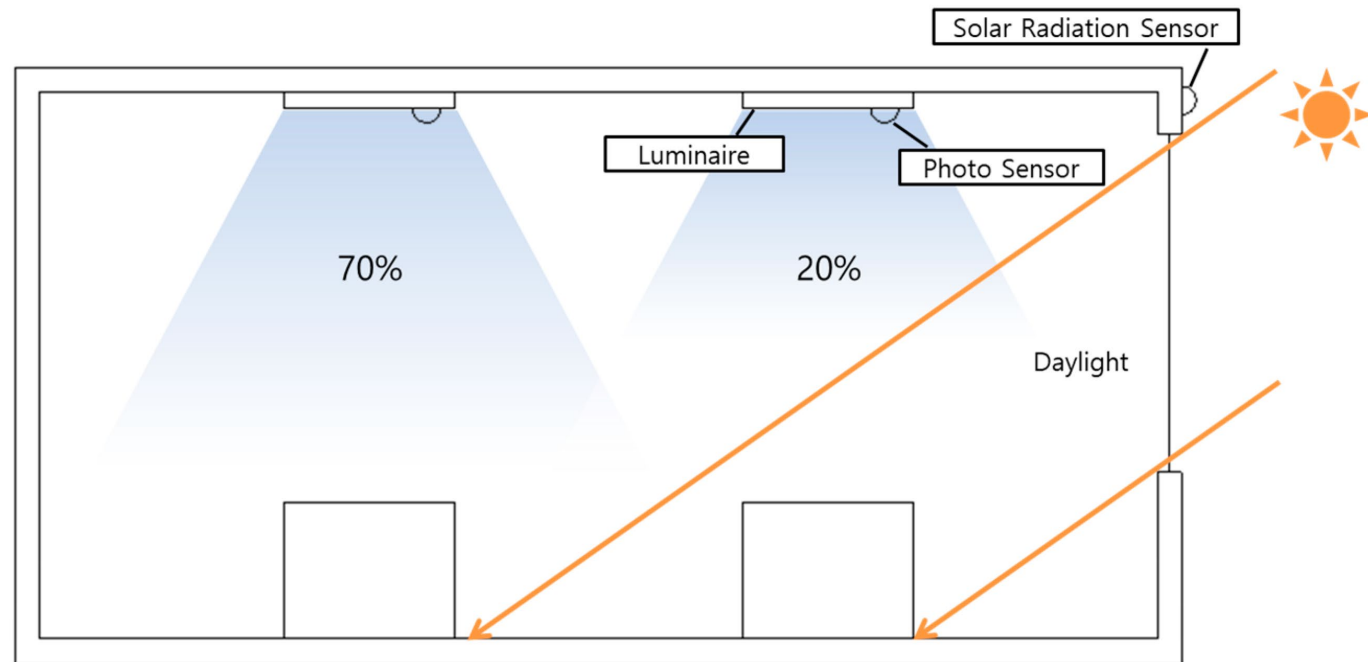


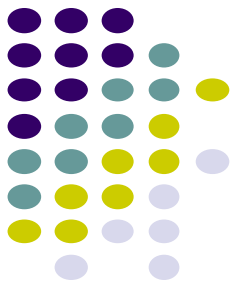




# Daylight-Responsive Controls C405.2.4

- Daylight-responsive controls shall be provided to control the general lighting within daylight zones in the following spaces:
  - Spaces with more than 150 watts of general lighting within primary sidelit daylight zones.
  - Spaces with more than 300 watts of general lighting within sidelit daylight zones.
  - Spaces with more than 150 watts of general lighting within toplit daylight zones.

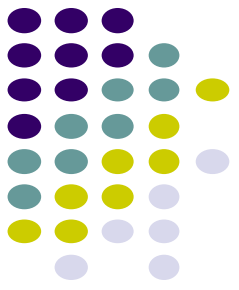




# Parking Garage Lighting Control C405.2.8

- Parking garage lighting shall be controlled by an occupant sensor or a time-switch control. Additional lighting controls shall be provided as follows:
  - Lighting power of each luminaire shall be automatically reduced by not less than 30 percent when there is no activity detected within a lighting zone for 20 minutes.
  - Lighting zones for this requirement shall be not larger than 3,600 sq. ft.

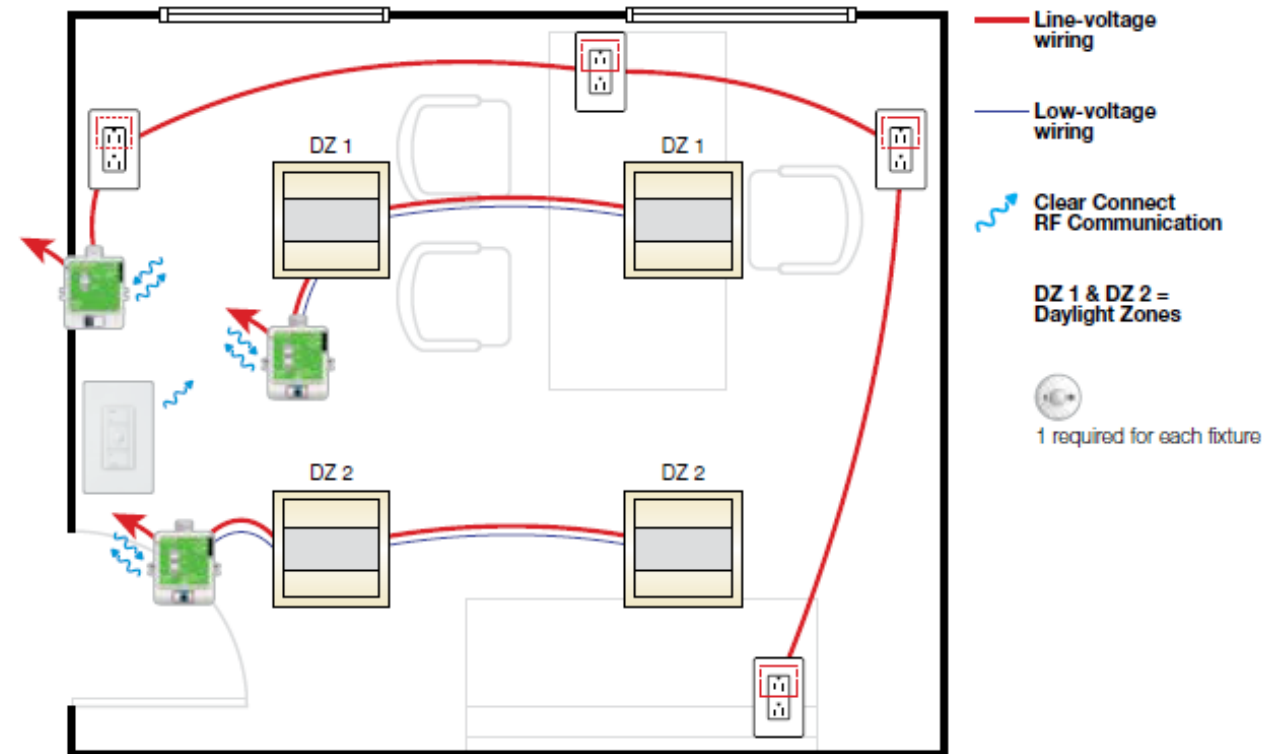


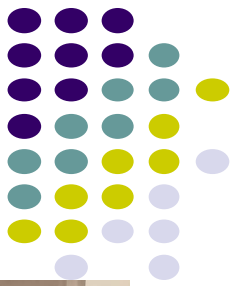


6

## Automatic Receptacle Control – C405.11

- At least 50% of all 125V, 15- and 20-amp receptacles located in:
  - Enclosed offices, conference rooms, breakrooms, classrooms and individual workstations provided with either:
    - Split controlled receptacles or
    - Controlled receptacle within 12 inches of each uncontrolled receptacle



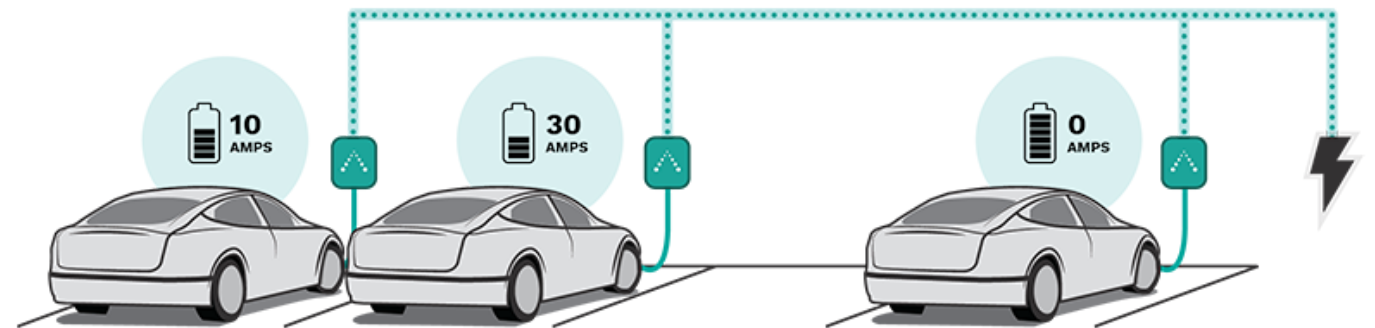


# 7

## Electric Vehicle Capable Charging – C405.13

### ● EV-capable for new multifamily & hotels

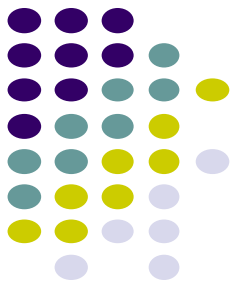
- 4%-installed and 20% EV-capable parking spaces shall provide accommodates for future EV charging (ALMS)
- For EV-capable, reserve electrical service panel space for future circuit breakers labeled “Future EV Charging”
- Install raceway from the electrical service panel to parking area, with junction box or outlet labeled “Future EV Charging”.



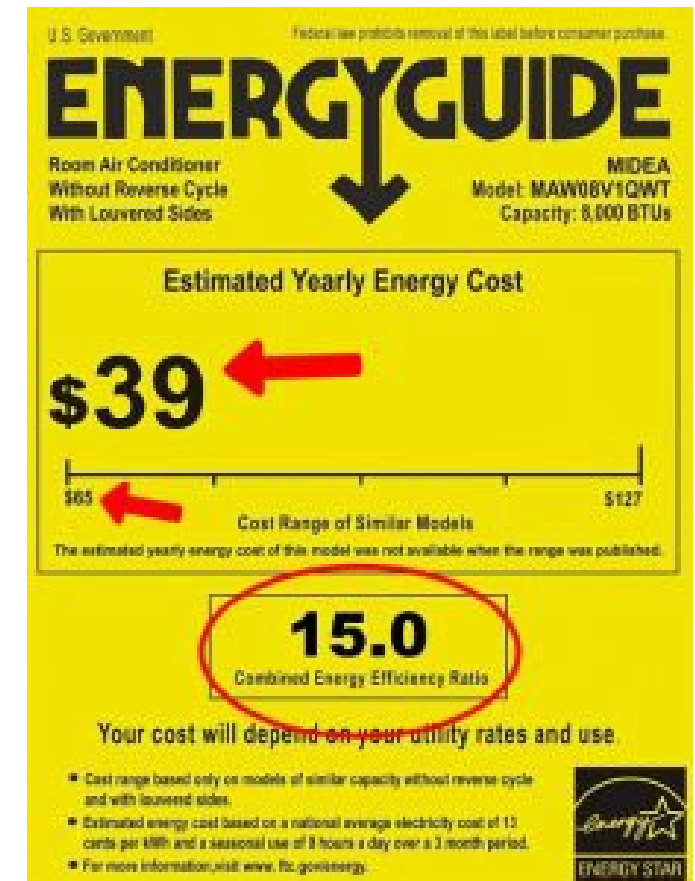
Source: EverCharge SmartPower

8

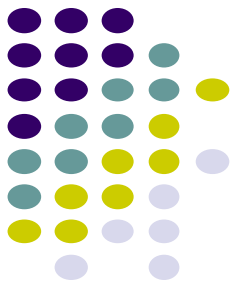
# Additional Efficiency Requirements C406 Prescription Compliance Path – 10 credits



1. More efficient HVAC equipment performance
2. Reduced lighting power
3. Enhanced lighting controls
4. On-site renewable energy
5. Dedicated outside air system
6. High efficiency service water-heating
7. Enhanced envelope performance
8. Reduced air infiltration
9. Energy monitoring system
10. Fault detection and diagnostics system
11. Efficient kitchen equipment



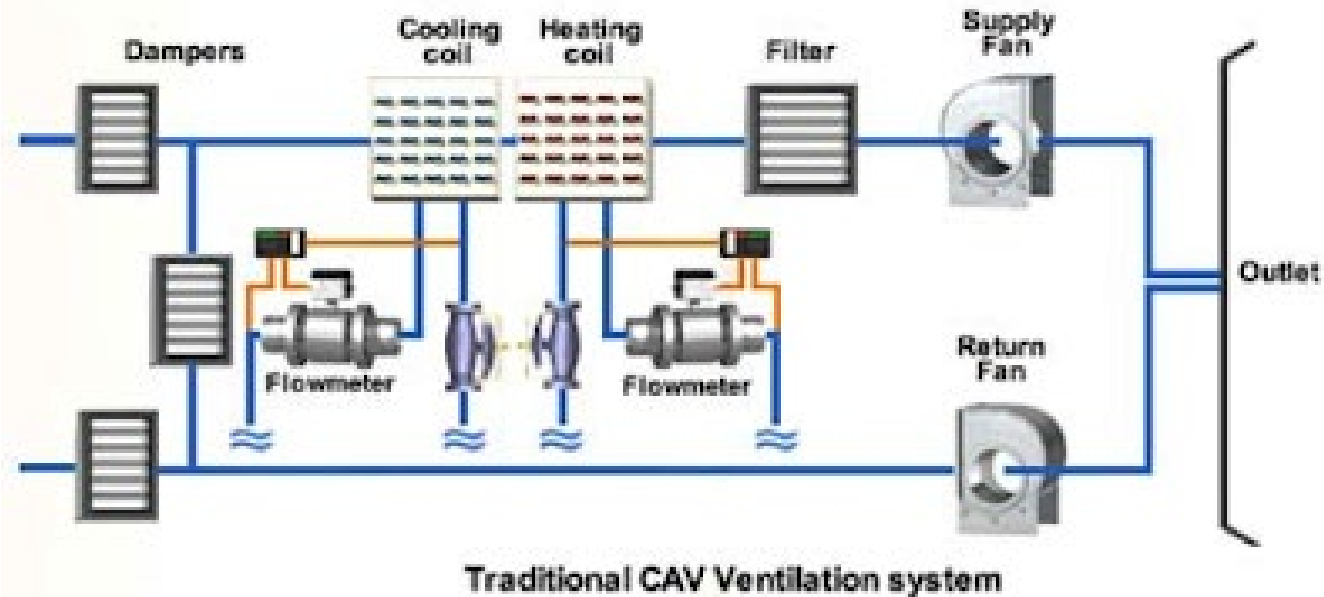


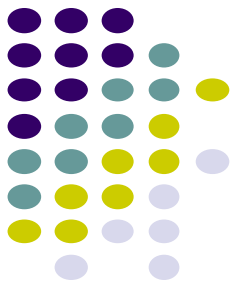


# 9

## Maintenance Information and System Commissioning - C408

- Mechanical systems, service water-heating and lighting control commissioning requirements
- Exceptions :
  - Total mechanical equipment capacity less than 180,000 Btu/h (15 tons) for cooling, 300,000 Btu/h (87.9 kW) for space-heating and 10,000 cfm for ventilation.
  - Service water-heating systems rated under 50,000 Btu/h.





# 10

## Solar-Ready Zones – CB103

- Minimum 40% of roof area free and clear of obstructions including mechanical equipment and vents
- Provide electrical pathway for conduit run from solar-ready zone to electrical service panel with reserved space for 2-pole circuit breaker(s)
- Capped roof penetration sleeve shall be provided on roofs with a slope of 1 in 12 or less



Credit: Carlisle Roof Foam



**Planning and Development**  
**Office of Environmental Initiatives**  
Anthony Floyd, FAIA, LEED BC+C, CEM  
afloyd@scottsdaleaz.gov  
480-312-4202

