

## Suggested energy code solutions for commercial buildings

The compliant solutions listed below are suggested based on total installed cost, simplicity of design, and basic functional needs for the space. These solutions represent one of multiple compliant options to meet lighting and receptacle control requirements. NYCECC 2016 is effective as of October 2016 and applies to buildings in New York City.

Diagram key:

● = New construction

⚙ = Lighting retrofit<sup>1</sup>

⚙ = New construction and retrofit<sup>1</sup>

|                                 |                             | Atrium      | Classroom, Lecture Hall, Training Room | Conference, Break Room | Corridor <sup>2</sup> | Guestroom <sup>3</sup> | Lobby | Open Office (>200 sq. ft.) | Parking Garage <sup>4</sup> | Private Office (<200 sq. ft.) | Restaurant/Cafeteria, Retail | Restroom | Stairwell <sup>2</sup> | Storage Room   | Warehouse and Library Stacks <sup>5</sup> | Facade/Landscape | Other Exterior <sup>6</sup> |   |
|---------------------------------|-----------------------------|-------------|--|------------------------|-----------------------|------------------------|-------|----------------------------|-----------------------------|-------------------------------|------------------------------|----------|------------------------|----------------|---|------------------|-----------------------------|---|
| <b>Manual Control</b>           | Switch                      |             | ⚙                                      | ⚙                      |                       | ⚙                      |       |                            |                             | ⚙                             |                              | ⚙        |                        | ⚙              |   |                  |                             |   |
|                                 | Dimmer or scene control     | ⚙           |  |                        | ⚙                     |                        | ⚙     | ⚙                          |                             |                               | ⚙                            |          | ⚙                      |                | ⚙   |                  |                             |   |
| <b>Automatic ON/OFF Control</b> | Timeclock                   | ⚙           |  |                        |                       |                        |       |                            | ⚙                           |                               | ⚙                            |          |                        |                | ⚙   | ⚙                | ⚙                           |   |
|                                 | Occupancy sensor            |             | ⚙                                      | ⚙                      | ⚙                     | ⚙                      | ⚙     | ⚙                          | ⚙                           | ⚙                             |                              | ⚙        | ⚙                      | ⚙              | ⚙   |                  |                             |   |
|                                 | Settings                    | Full ON     |  |                        |                       | ⚙                      |       | ⚙                          |                             | ⚙                             |                              |          | ⚙                      | ⚙              |   | ⚙                | ⚙                           | ⚙ |
|                                 |                             | Partial ON  | ⚙                                      |                        |                       |                        |       |                            | ⚙                           |                               | ⚙                            |          |                        |                |   |                  |                             |   |
|                                 |                             | Manual ON   |  | ⚙                      | ⚙                     |                        | ⚙     |                            |                             |                               | ⚙                            |          |                        |                | ⚙   |                  |                             |   |
|                                 |                             | Full OFF    | ⚙                                      | ⚙                      | ⚙                     |                        | ⚙     | ⚙                          | ⚙                           | ⚙                             | ⚙                            | ⚙        | ⚙                      |                | ⚙   | ⚙                | ⚙                           | ⚙ |
|                                 |                             | Partial OFF |  |                        |                       | ⚙ <sup>7</sup>         |       |                            |                             |                               |                              |          |                        | ⚙ <sup>7</sup> |   | ⚙                |                             | ⚙ |
| <b>Other</b>                    | Daylight responsive control | ⚙           | ⚙ <sup>8</sup>                         | ⚙                      | ⚙                     |                        | ⚙     | ⚙ <sup>8</sup>             |                             | ⚙ <sup>8</sup>                | ⚙ <sup>9</sup>               | ⚙        | ⚙                      | ⚙              | ⚙   |                  |                             |   |
|                                 | Receptacle control          |             |  |                        |                       |                        |       |                            |                             |                               |                              |          |                        |                |   |                  |                             |   |
|                                 | Demand response             |             |  |                        |                       |                        |       |                            |                             |                               |                              |          |                        |                |   |                  |                             |   |

1 All retrofits altering more than 20% of the connected load must comply with the full new construction code.

2 To comply with some life safety code requirements for egress illumination, automatic full OFF is not suggested. For non-egress areas, the occupancy sensor should turn the lights to full OFF and a switching control may be used.

3 Automatic shutoff is required for all installed luminaires and switched receptacles.

4 Timeclock ensures the lights are ON when typically occupied. Occupancy sensor controls lights when typically unoccupied.

5 When typically occupied, the occupancy sensor provides partial OFF functionality. When typically unoccupied, the sensor provides full OFF functionality.

6 Astronomical timeclock shall ensure all lights are OFF during daylight hours. Lights should be scheduled to partial OFF during night hours. See section C405.2.5 for scheduling times.

7 Not a code requirement. Lutron recommends this solution for spaces designated as a path of egress.

8 These spaces require continuous daylight dimming to OFF.

9 Not required for sidelight daylight zones in ground-level occupancies.

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# NYCECC 2016: Application Summary

## Code requirement summary

|                                 | Minimum control type        | Description  | Code provision   |                         |
|---------------------------------|-----------------------------|--|--|-------------------------|
| <b>Manual Control</b>           | Switch                      | Lighting shall be capable of turning ON and OFF. There shall be at least one manual device for control of the lighting within a space. See code for spaces that allow remote location of control.  | C405.2.2.3   |                         |
|                                 | Dimmer or scene control     | Lighting shall be capable of being reduced by at least 50% of maximum lighting power. There shall be a manual device allowing an occupant to reduce lighting by at least 50% of maximum lighting power within a space. See code for spaces that allow remote location of control. Automatic daylight control may be used instead of manual control.  | C405.2.2.2   |                         |
| <b>Automatic ON/OFF Control</b> | Timeclock                   | <b>Interior:</b> Scheduled control, based on time-of-day, turns lighting ON or OFF based on typical occupancy. Occupancy sensors also comply as an alternate to using a timeclock.<br><b>Exterior:</b> Scheduled control, based on time-of-day and sunrise/sunset (requires astronomical timeclock), turns lighting ON or OFF based on typical occupancy and daylight.                     | C405.2.2<br>C405.2.5   |                         |
|                                 | Occupancy sensor            | Automatic control turns lighting ON upon occupancy or OFF after a vacancy of 20 minutes or less.   | C405.2.1   |                         |
|                                 | Settings                    | Full ON  | When initiated by a timeclock or occupancy sensor, lighting is automatically turned ON to maximum lighting power.                | C405.2.1.1<br>Exception |
|                                 |                             | Partial ON   | When initiated by a timeclock or occupancy sensor, lighting is automatically turned ON to 50% or less of maximum lighting power. | C405.2.1                |
|                                 |                             | Manual ON  | Lighting is turned ON manually by an occupant.   | C405.2.1.1              |
|                                 |                             | Full OFF   | When initiated by a timeclock or occupancy sensor, lighting is automatically turned OFF.   | C405.2.1                |
| Partial OFF                     |                             | When initiated by a timeclock or occupancy sensor, lighting is automatically reduced by at least 50% of maximum lighting power (30% for parking garages). Automatic full OFF also complies.  | C405.2<br>Exception  |                         |
| <b>Other</b>                    | Daylight responsive control | <b>Interior:</b> A sensor which adjusts lighting in response to available daylight is required for sidelight and skylight zones. Some spaces, including offices and classrooms require dimming. See the "Daylight Zone Requirements" diagrams for more information.<br><b>Exterior:</b> A photosensor can be used as an alternate to the dawn/dusk operation of an astronomical timeclock. | C405.2.3<br>C405.2.5   |                         |
|                                 | Receptacle control          | Receptacle control is not required by this energy code.  | N/A  |                         |
|                                 | Demand response             | Demand response is not required by this energy code.   | N/A  |                         |

For areas being used as a path of egress or fixtures being used for emergency, verify compliance with your local authority having jurisdiction. Acceptance (functional) testing is required for all new construction applications to ensure that control hardware and software are calibrated, programmed and functioning properly (Code provision 130.4).

## Daylight zone requirements

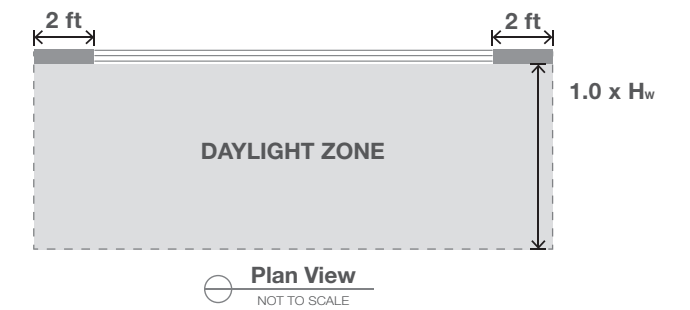
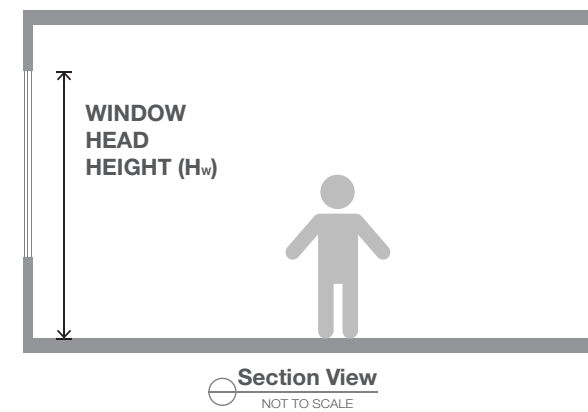
### Daylight zone requirements:

Sidelighted daylight zones must be controlled separately from toplighted zones. North, South, East, and West zones must also be controlled separately.

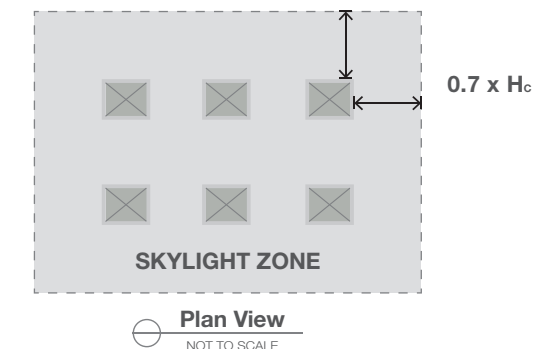
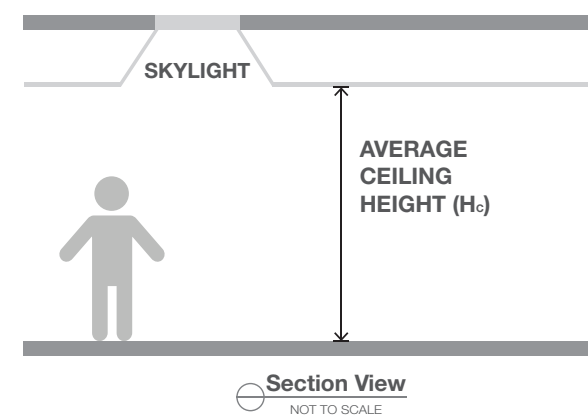
### Daylight exceptions:

Daylight control is not required when the total lighting power of a daylight zone is 150W or less, or when the total glazing area is 24 sq. ft. or less. Other exceptions exist, based on space type, neighboring obstructions, and glass transmittance.

### Sidelighting (Window)



### Toplighting (Skylight)



This document summarizes the lighting and receptacle control requirements for commercial buildings. It is for information purposes only. It is not meant to replace your state's or local jurisdiction's official energy code. Please refer to your local building energy code or authority having jurisdiction for your precise requirements. Only the authority having jurisdiction can guarantee code compliance.