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# Building + Lighting Controls

By Erin Brown

September 4, 2002 | No Comments

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1. Lighting consumes what percentage of electricity used in commercial buildings?

- a) 10%
- b) 20%
- c) 30%
- d) 40%

2. How much money would be saved a year by replacing regular EXIT signs with Energy Star-labeled EXIT signs?

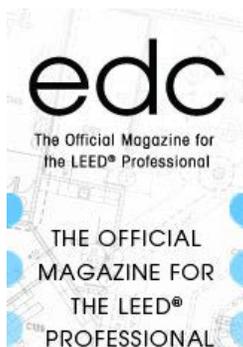
- a) Approximately \$2 per sign.
- b) Between \$5-\$10 per sign.
- c) Between \$15-\$20 per sign.
- d) Approximately \$30 per sign.

3. True or False? Poorly insulated windows can be responsible for up to 10% of all heating and cooling requirements by allowing excess solar radiation in the summer and losing heat in the winter.

4. True or False? Electronic ballasts are more energy efficient than magnetic ballasts without changing the quality of the fluorescent lighting system.

5. Which of the following design strategies can be used to effect building energy performance?

- a) Building shape and orientation.
- b) Passive solar design.
- c) The use of natural lighting.
- d) All of the above.



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6. An example of a renewable energy source is:

- a) A Fuel Cell.
- b) Photovoltaics.
- c) A and B.
- d) None of the above.

7. True or False? Compared to other lamps in the High Intensity Discharge (HID) Group, Metal Halide (MH) lamps are the most energy efficient.

8. Compared to on-off controls, dimming controls usually do the following:

- a) Increase energy savings.
- b) Better align lighting with human needs and extend lamp life.
- c) Won't coincide with natural light coming from outdoors.
- d) A and B.

9. Where and in what manner could dimming controls be used?

- a) A storage room.
- b) A cafeteria or break room.
- c) A mail room.

d) B and C.

10. True or False? Dimmable electronic fluorescent ballasts cost more than conventional electronic ballasts.

**ANSWERS:**

1. **d).** According to a report by cool-companies.org (a project of the for Energy & Climate Solutions) lighting consumes 40% of electricity in commercial buildings and is accountable for another 10% for the cost of cooling the heat it produces.

2. **c).** \$15-\$20 a year. Exit signs burn 24-hours a day, every day. The electricity used can take its toll, especially with multiple entrances and many floors. The EPA has Energy Star-labeled EXIT signs that uses five watts less per face less than traditional EXIT signs. Additionally, the Energy-Star labeled EXIT signs last longer and require a lower labor and maintenance cost in the future.

3. **FALSE.** Poorly insulated windows can be responsible for about 25% of all heating and cooling requirements. High efficiency windows can be used as a daylighting tool, which will allow for excellent transmission of visible light, but also low thermal conduction.

4. **TRUE.** Electronic ballasts are the transformers of the fluorescent lighting system, providing the current and voltage to run it. The new electronic ballasts are beneficial in two ways. Not only do the electronic ballasts run more energy-efficiently, they also operate on a higher frequency than magnetic ballasts, eliminating the flicker and hum that can strain people's eyes and ears (actually improving the quality of the fluorescent light system).

5. **d).** All of the listed techniques can be employed to aid in energy efficiency. Additionally, studies have shown that providing natural lighting has a positive impact on workers' productivity and well being.

6. **c).** Alternative energy sources such as photovoltaics and fuel cells are now available in new products and applications. Renewable energy sources provide a great symbol of emerging technologies for the future.

7. **FALSE.** Among HID lamps, metal halide lamps are not the most energy-efficient, but they produce the whitest light with the best color rendition, and are generally selected for that characteristic. Most HID lamps are slow to start and restart, and metal halide lamps are no exception.

8. **d).** Compared to on-off controls, dimming controls generally increase energy savings, better align lighting with human needs, and extend lamp life. Dimming controls are also useful for spaces that have more artificial (electric) lighting than is currently needed, and have the added benefit of dimming lights further when natural light from outside is available. Such systems can also be used to dim lights for other reasons, such as for presentations. Dimming fixtures by as much as 50% may be barely noticeable to building occupants, unless they are involved in tasks requiring visual acuity.

9. **d).** Dimming controls to compensate for daylighting are appropriate for virtually any type of facility where the lights operate much of the time (a storage room would not be a good application) and where a significant quantity of daylight is provided with windows and skylights. T-8 lamps and dimmable ballasts with separate control wiring should be considered for new construction, or for



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retrofit in spaces where existing ballasts are old and inefficient (especially if they were manufactured prior to 1978 and may contain PCBs). This dimming system can also be used to compensate for lamp lumen depreciation.

**10. TRUE.** Electrical lighting is increased or decreased in proportion to the amount of natural light present, resulting in a constant illumination level in the controlled space. The cost of dimmable electronic fluorescent ballasts compared to conventional electronic ballasts is about \$35 compared to \$25, however they will be the more economical choice in the long run.

## Links

- [LightingDesignLab.com](http://LightingDesignLab.com)
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Erin is the former editor of EDC Magazine.

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## EDC CROSSWORD



Welcome to *EDC's* crossword puzzle. This puzzle was created specifically for the green building industry by Myles Mellor; all the clues and answers relate to industry terms. [Click](#) to view the interactive version of the puzzle that appeared in print. Or if you prefer, you'll find a PDF link to this month's puzzle and solution.