

Code Compliance for High-Efficacy Lighting in Florida Homes

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Research Purpose and Goal:

This research proposes to investigate how well builders are following the Code's mandatory requirement on high-efficacy lighting. The requirement for high-efficacy lighting is an important aspect of the Florida Building Code because of great economics given the low-cost of this measure with high energy-savings potential. And if builders are not complying with this requirement, what are the barriers to implementation – is it simply education, cost, or are there other issues?

Definition of the Problem:

The Florida Building Code has a prescriptive requirement in section 404.1 for a minimum of 75 percent of the lamps in permanently installed lighting fixtures to be high-efficacy lamps. However, the extent to which this provision is enforced is unclear especially since it is easy for homeowners to replace lamps with less efficient models. In newer homes, the inclusion of accent lighting for aesthetic reasons is on the rise. High-efficacy lamps for less-typical lighting may be more challenging to find and more costly than for traditional-type lighting.

Background:

In a 171 home monitoring study in Central Florida conducted fourteen years ago, FSEC found an average of 29 light fixtures in the households and a connected potential lighting load of 1.5 kW. The average fixture power was 60 watts. Lighting energy use estimates ranged from a low of 1,220 kWh to a high of 1,950 kWh per year (Parker 2002). A more recent FSEC study found similar energy use in existing homes, with incandescents still the dominant bulb type (Parker et al. 2016). Figure 1 portrays the impact of a 95% bulb change-out from incandescents to CFLs at one site, where the lighting retrofit reduced energy use by more than 50% or about 4 kWh per day.

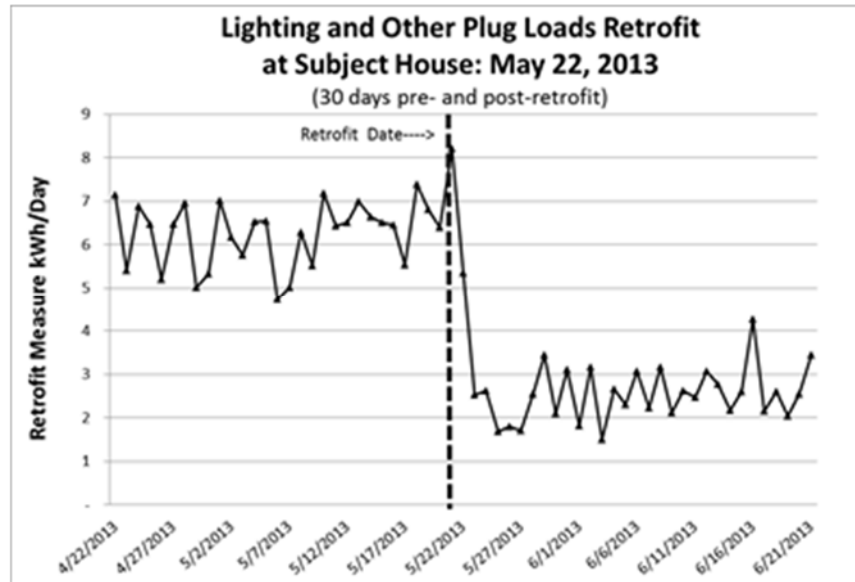


Figure 1. Site showing hourly lighting and other plug loads energy use, pre- and post- lighting retrofit.

Approach to the research:

This project is comprised of two tasks. The scope for Task 1 is to conduct a post-occupancy, pre-occupancy lighting audit of 40 Florida homes built under the 2014 Florida Building Code. The evaluation will document the number of lamp and fixtures, lamp type and wattage, and the percent of permanently installed lighting fixtures high-efficacy lamps at each site. Sites will be visited before the builder sells the home to avoid capturing any post-sale occupant lighting alteration prior to the audit. Homes will be randomly selected and no more than two homes constructed by the same builder will be audited.

A second task to this project will apply if the audit findings suggest the Code’s lighting requirement is often not being met. Task 2 will include attending a few local home builder association meetings to present and discuss the general findings (anonymously) to in attempt to ascertain why some builders may be failing to meet the requirement.

Expected Outcome and Impact on The Code:

Research questions that expect to be answered include:

1. How much efficient lighting in terms of lamp count and wattage are new homes receiving?
2. Are at least 75% of permanently installed lighting fixtures to be high-efficacy lamps? (What percentage of homes comply with the lighting requirement?)
3. If required levels of high-efficacy lamps are not being installed, what are the barriers?

Answers to research questions will provide useful data in evaluating how lighting might be addressed in future versions of the Florida Building Code. Results could potentially provide

suggestions on how to encourage better builder Code compliance on high-efficacy lighting and be used in builder education programs.

Budget:

\$30,000

References:

- Parker, D. 2002. "Research Highlights from a Large Scale Residential Monitoring Study in a Hot Climate." In *Proceedings of International Symposium on Highly Efficient Use of Energy and Reduction of its Environmental Impact*, 108-116. Osaka, Japan: Japan Society for the Promotion of Science Research for the Future Program.
- Parker, D., K. Sutherland, D. Chasar, J. Montemurno, B. Amos, J. Kono. 2016. "Phased Retrofits in Existing Homes in Florida Phase I: Shallow and Deep Retrofits (February 2016)", Florida Solar Energy Center, Cocoa, FL., Rpt: FSEC-CR-2018-16.