

Lighting for the 21st Century Home and New Program Approaches

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The Case of the ENERGY STAR Residential Lighting Retrofit: One woman's tale

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The Backstory

Location: Dunwoody, GA

- 2800 Square feet single
- Approx. 20 rooms (closets incl.)
- 20 years old
- 4BR/2.5BA
- Electric bill: Averaging 2100 kWh @ 12.6¢/kWh

Goal: Lighting retrofit with Energy Star products



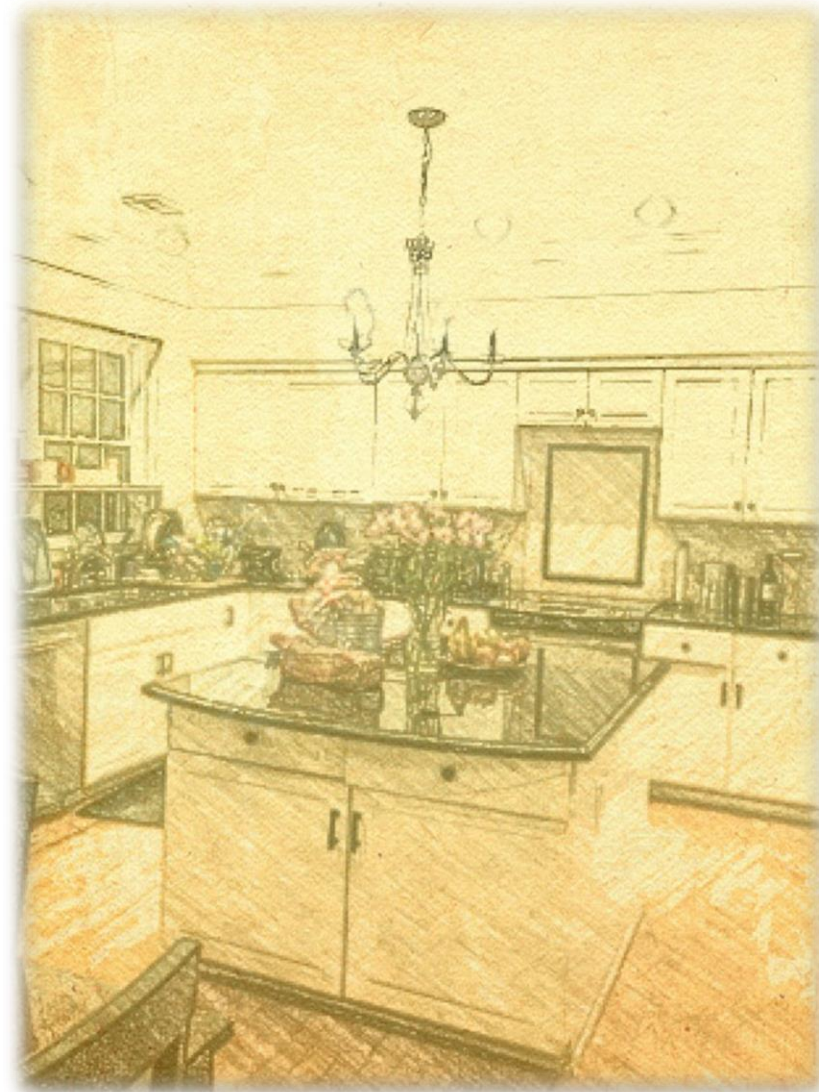
The Backstory continued

- Incandescent and CFLs
- Interior lighting approx. 4600W
- Insufficient light levels
 - Master bath
 - Master bedroom
 - Family room
- Burned out lamps



The Lighting Survey

- 32 downlights
- 4 Table lamps
- 4 Pendants
- 12 Ceiling Mount
- 1 Bath vanity
- 1 Ceiling fan light kit
- 80 Medium base sockets
- 23 Candelabra base sockets
- 3 Intermediate base sockets



Procuring the goods



Procuring the goods



Replacement and retrofitting

Luminaire Type 1				Luminaire Type 2							
Room	Type	Technology	Base	Wattage	Socket QTY	Type	Technology	Base	Wattage	Socket QTY	Wattage
Kitchen	Downlights	Incandescent	Medium								
Kitchen	Adjustable - 3 h	Incandescent	Bi-pin								
Family Room	Ceiling fan light	Incandescent	Intermediate								
Living Room/Office	Downlights	Incandescent - BR	Medium								
Office/Den	Ceiling Mount	Inc/CFL	Medium								
Dining Room	Pendant	Incandescent	Candelabra								
Mud Room	Pendant	Incandescent	Candelabra								
Foyer/Stair	Pendant	Incandescent	Candelabra								
Powder Room	Wall Mount	Incandescent	Medium								
Master Bedroom	Ceiling Mount	Inc/CFL	Medium								
Master Bath	Downlights	Inc/BR	Medium								
Main Hall - Down		None									
Main Hall - Up	Downlights	Inc/BR	Medium								
Rachel's Room	Ceiling Mount	Inc/CFL	Medium								
Will & Tony's Room	Ceiling Mount	Incandescent	Medium								
Guestroom	Ceiling Mount	Incandescent	Medium								
Master Closet	Strips	Linear Fluorescent	--								
Upstairs Bath	Downlights	Inc/BR	Medium								
Attic	Keyless socket	Inc/CFL	Medium								
Rachel's Closet	Keyless socket	Inc/CFL	Medium								
Will & Tony's Clo	Ceiling adjusta	Halogen	GU-10								
Laundry	Ceiling Mount	Inc/CFL	Medium								
Foyer/Stair	Table	inc/cfl	Medium								
Master Bath	Ceiling Mount	Inc/CFL	Medium								

- Kitchen – downlights and pendant
- Family room – ceiling fan light kit
- Powder room – bath vanity
- Master Bath – downlights and new luminaire
- Upstairs Bath – downlights
- Various ceiling mount luminaires

Replacement and retrofitting

Most relamping completed:

- Using a step stool for low ceiling heights
- Using a small ladder for higher ceilings
- Without the use of tools

Insights:

- LED lamps noticeably heavier than incandescent
- Defective lamps encountered



Replacement and retrofitting

Installation of new luminaire:

- Junction box misalignment
- Hard to remove existing coverplate
- More time on ladder



The Financials



First Costs: \$280 pre-tax

- ✓ *LED candelabra: \$6.50/lamp in 3-pack*
- ✓ *LED BR30: \$10/lamp in 2-pack*
- ✓ *LED ceiling luminaire: \$20*
- ✓ *CFLs bare spiral: \$2/lamp in 4-pack*

Reduced lighting wattage by 1600W (35%)

Impact to utility bill – to be determined

Outcomes: The Expected and Unexpected

- 75% of sockets are medium base
- More than 80% of medium base sockets have horizontal orientation
- There is a market for LED ceiling mount luminaires with a brass finish
- Cost of Energy Star LED lamps still an obstacle
- CFLs chosen for non-dimmed sockets and luminaires with frosted glass
- Delayed retrofitting for rooms with minimal use, e.g. dining room, and hard to access areas, e.g. 2-story foyer

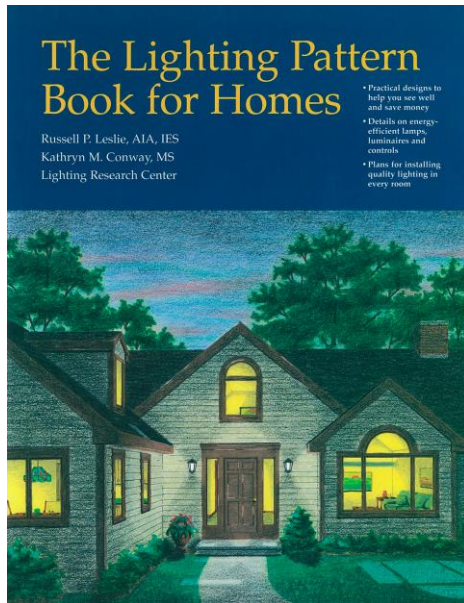


Outcomes: The Expected and Unexpected (more)

- Several lamps available at retail
 - Little variation in metrics, i.e. color temperature, CRI
- Multiple packs for lamps result in expensive lamps to store
- What to do with incumbent lamps that still work
- 2700K lamps look noticeably cooler than incandescent
- Dimmable LED lamps operated as expected on existing slider dimmer – no flicker or drop out



Helpful Resources for the Homeowner



[LRC Lighting Pattern Book](#)

- ENERGY STAR Website
- ENERGY STAR Twitter Chat Parties
- Electric Utility Websites
- Home Center displays and salespersons
- [Lighting for Tomorrow](#)
- Search Engines

Questions?

Thank you!