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Integrating LED's Into Utility Programs

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January 18, 2011



BENEFITS OF LED'S

- Operational Savings
 - LED's require significantly less energy than traditional light sources
- Durability and Maintenance
 - LED's have a long life and require little to no maintenance
- Light Quality
 - LED's provide a bright, uniform light throughout the area where it is needed
- Environmental Benefits
 - LED's contain no lead or mercury



LED'S AND UTILITY PROGRAMS

The Challenges

1. LED Technology Standards
 - ENERGY STAR® does not label products for commercial outdoor applications
2. Cost and Receiving Buy-In From Decision Makers
 - Higher up front capital cost than other lighting products
 - Calculating financial impacts
3. Lack of Education about LED Technology
 - Misconceptions about application areas, lack of knowledge of questions to ask vendors
4. Proven Results
 - Limited access to actual LED installations

TECHNOLOGY STANDARDS

- Product Testing

- LM-79

- Total Light Output (lumens) and Efficacy (lm/W)
 - Color (CCT, CRI)
 - Voltage and Wattage
 - Lumen Distribution

- LM-80

- Lumen maintenance (i.e. useful life)
 - L_{70} : Rated lifetime hours



TECHNOLOGY STANDARDS

Lighting Facts®	ENERGY STAR®	DesignLights™
<ul style="list-style-type: none">• Provides at-a-glance information labels about LED products• Easy to read format enables side-by-side comparisons• Manufacturers partner with the program to make a pledge to quality	<ul style="list-style-type: none">• Has established criteria for most applications• Labels products for certain applications<ul style="list-style-type: none">○ Labels available for most residential applications○ Limited labeling available for commercial applications	<ul style="list-style-type: none">• Utility-sponsored program that reviews LED product information• Products that meet criteria are listed with the DLC• Provides a list of products eligible for utility incentive programs

THE GREAT T8 DEBATE

Are LED linear replacement lamps ready for market?

- ENERGY STAR has set requirements
 - Few products meet the required efficacy
- DOE Caliper Reports
 - Tests similar products side-by-side
 - Most T8 products still out perform the LED linear replacement counterpart
- Light distribution issues
 - Cave-like effect
- Installation can be more costly than initially projected
 - If not done properly it can void a fixture's UL listing

**Complete T8 to LED fixture retrofits are a more viable replacement option*



Slide 6

JM2

most of the other slides relate back to the slide that outlines the challenges. This slide is very interesting, but I'm not sure how it fits in with that structure... it might make sense to move it to the beginning of the "proven results" section

Jordan Michel, 11/19/2010

OVERCOMING THE COST OF LED'S

- Higher upfront cost, but lower long term cost
 - Look at the true cost of multiple options after 5,10, and 15 years (life cycle analysis)
 - Include maintenance and labor
- Utility programs can offer a higher level of incentive for qualifying projects
 - Texas programs incentive levels typically cover 25-35% of the installed project cost

OVERCOMING THE COST OF LED'S

	LED	MH
Fixture Wattage	184	775
Number of Fixtures	69	57
Initial Cost per Fixture	\$970.00	\$650.00
Fixture Life (hours/years)	50,000 hr/10 yr	22,000 hr/5 yr
Lamp Life (hours/years)	N/A	22,000 hr/5 yr
Ballast Life (hours/years)	N/A	22,000 hr/5 yr
Annual kWh Consumption	50,733	185,406
Current Energy Cost (\$/kWh)	\$0.072	\$0.072
Energy Cost Inflation Rate	3%	3%
Fixture Cost Depreciation Rate	4.5%	1.0%
Lamp Replacement Cost w/Labor	N/A	\$125.00
Ballast Replacement Cost w/Labor	N/A	\$250.00
Total Initial Installed Cost	\$53,237.00	\$37,050.00
O&M Year 1	\$3,762.36	\$13,749.71
O&M Year 2	\$3,875.23	\$14,162.20
O&M Year 3	\$3,991.49	\$14,587.07
O&M Year 4	\$4,111.23	\$15,024.68
O&M Year 5	\$4,234.57	\$22,600.42
5 Year Cost:	\$73,211.88	\$117,174.07



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EDUCATION & AWARENESS

- Many tools are available
 - Department of Energy resources
 - ENERGY STAR Resources
- Utility programs are a great third party resource for information
 - Promote the most efficient and efficacious LED lighting solutions
 - Establish a network of service providers to assist customers with selecting quality products
 - Provide incentives to encourage the installation of qualified LED



RESULTS: LED PROJECT EXAMPLES

A parking garage in Irving, Texas did a one-for-one replacement of 53 metal halides to LEDs.

Savings: 7 kW
and 57,998 kWh



Before: 175 W Metal Halide



After: 78 W LED



STATE FAIR OF TEXAS

Big Tex was lit using two, 1,000W metal halide fixtures. Customized LED lighting reduced energy consumption by **57%**.

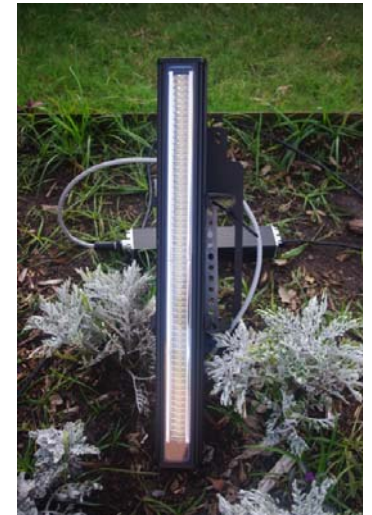


Before:
2000 W

After:
864 W

2 ft. Asymmetric = 86 W

1 ft. Spotlight = 58 W



CONVENIENCE STORE CHAIN

Local convenience store chain retrofitted 146 stores in North Texas. The average store will save an estimated 17,629 kWh per year.

*Project Total:
2,573,760 kWh*



HIGH SCHOOL PARKING LOT - BEFORE

Before picture:

(70) 400 W

Metal halide



HIGH SCHOOL PARKING LOT - AFTER

After picture:

(77) 94 W LED

Savings:
98,629 kWh



PILOT PROJECT – PARKING GARAGE

A national chain casino in Shreveport, LA is currently retrofitting their garage. The project consists of removing 1,874 150W high pressure sodium fixtures with 932 86W LED fixtures.

Estimated Savings:
153.7 kW
1,685,215 kWh



CONCLUSIONS

- Integrating LED's into utility programs drives higher quality products and services
 - Test parameters and criteria are in place to incentivize high performing LED products
 - Integrating financial assessment tools and appropriate incentives addresses the higher upfront cost
 - LED projects are successfully generating significant energy savings

QUESTIONS?

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