DOE SSL Market Introduction Workshop

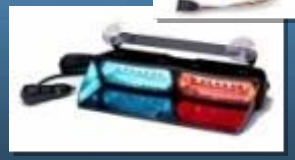
Alan J. Ruud, PE

July 10, 2008

© BetaLed 2008

LED's Ready for Prime Time: FACT or FICTION?

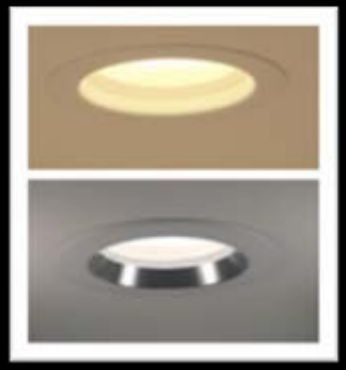
SSL Applications Accelerating



Architectural, Auto, Color Changing

Outdoor SSL

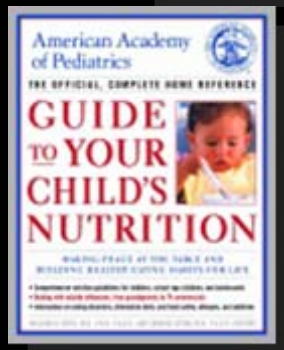
Last 12 months



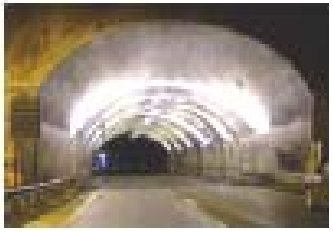
Indoor SSL

Last few months

CFL + FL: 15 tons of Hg/yr in US Landfills*



Outdoor LED Luminaires



High Quality LED installations exist TODAY

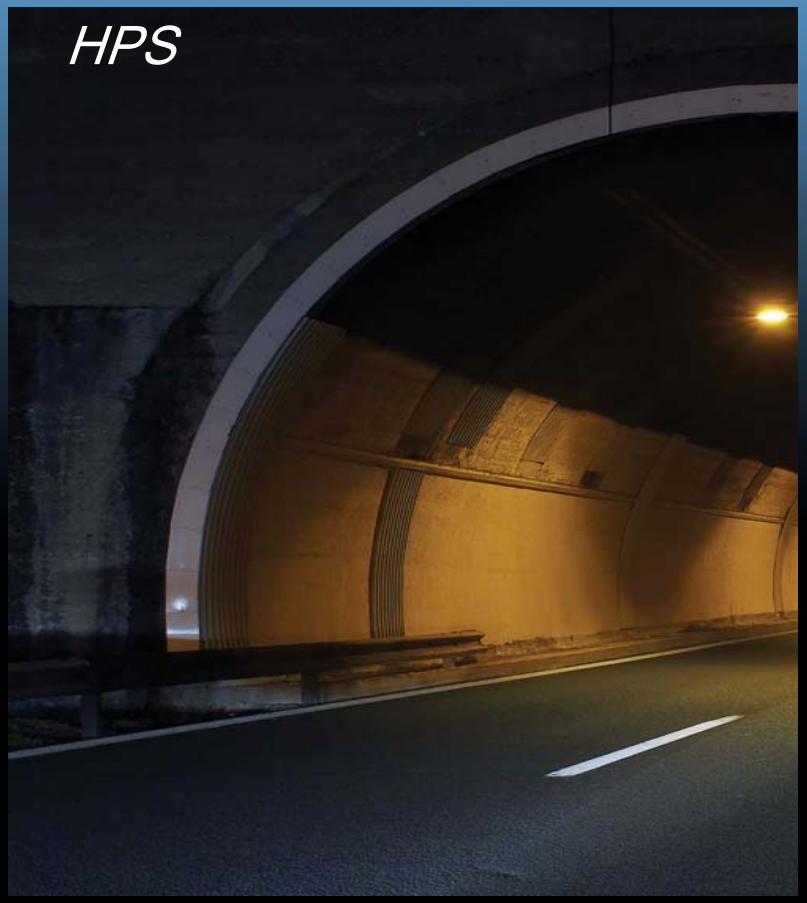
Parking Structures

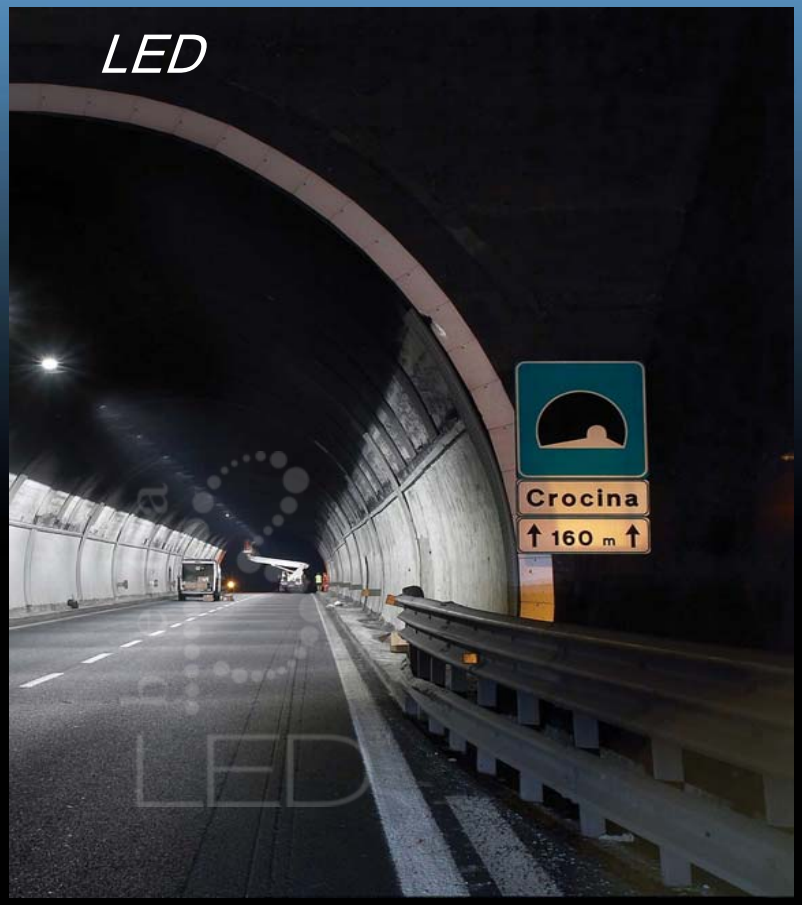
LED and HPS: side-by-side

White Light Benefits

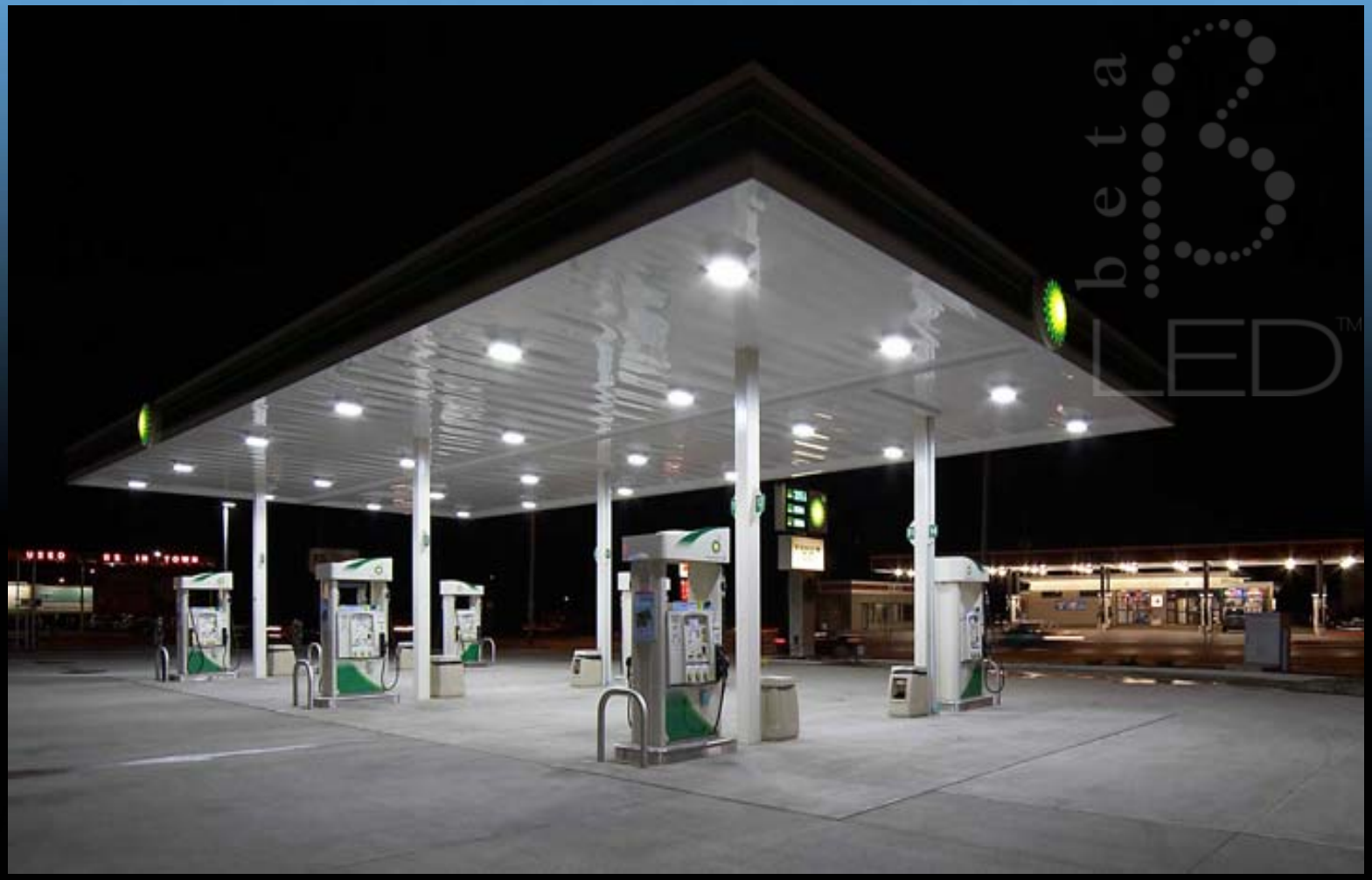
City of Oakland, California

Crocina Tunnel, Arezzo, Italy



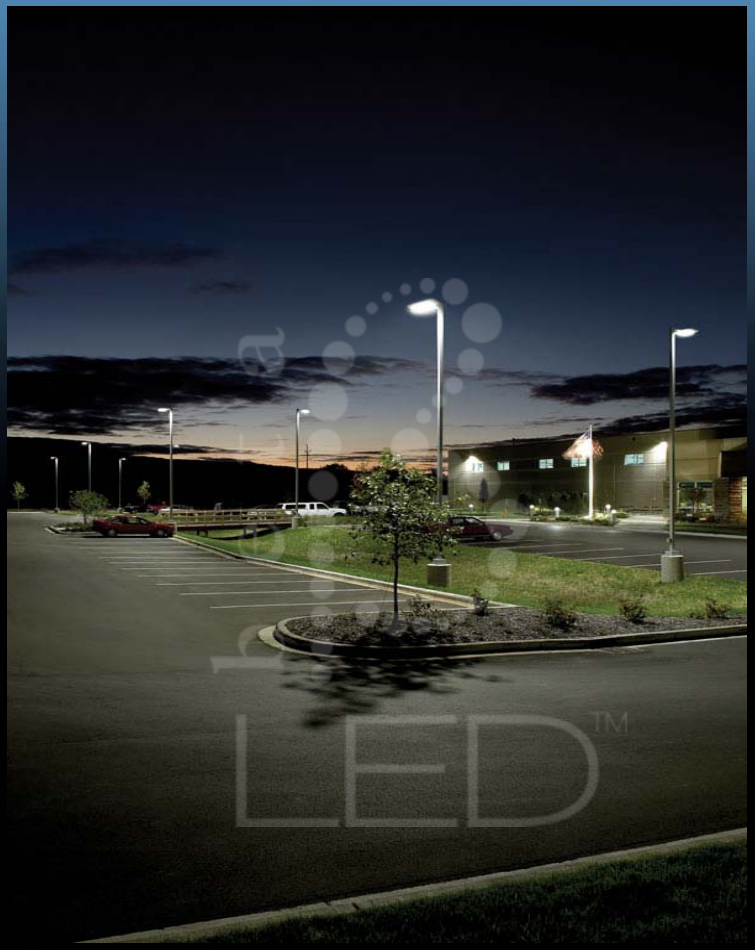


Better Day BP Station, Racine, Wisconsin



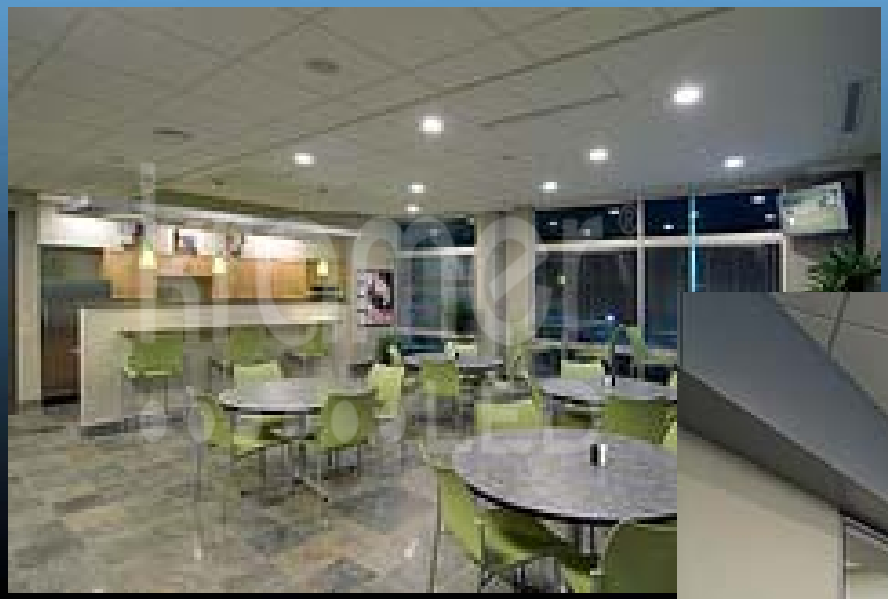
Better Day BP Store Front, Racine, Wisconsin

Sentry Equipment, Oconomowoc, WI



Fayetteville Street, Raleigh, North Carolina

Interior Applications are Here!



Interior Applications are Here!

Comparison Chart

TRADITIONAL LAMP SOURCES						LED				
Lamp Source	Aperture	Optical Efficiency	Initial Delivered Lumens	Life (Hours)	System Watts	Number of MCs	Initial Delivered Lumens	Life Hours - L70	System Watts	Energy Savings %
250 Quartz	6-inch	70.6%	3,424	2,000	250	12	4,000	50,000	99	60%
70 MH ED17	6-inch	49.3%	2,662	16,000	94	9	2,475	100,000+	48	49%
2-26 PLT	6-inch	56.6%	1,935	12,000	55	6	1,650	100,000+	33	40% 23%*
100 A19	4-inch	41.8%	652	750	100	3	825	100,000+	17	83%
50 MR16	4-inch	90.0%	826	3,000	59	3	825	100,000+	17	71%

Fact or Fiction?

FACT

LED's are ready.

Evaluation of LED fixtures to each other, and to traditional sources:

SIMPLE and PREDICTABLE

It is INCUMBENT upon everyone:

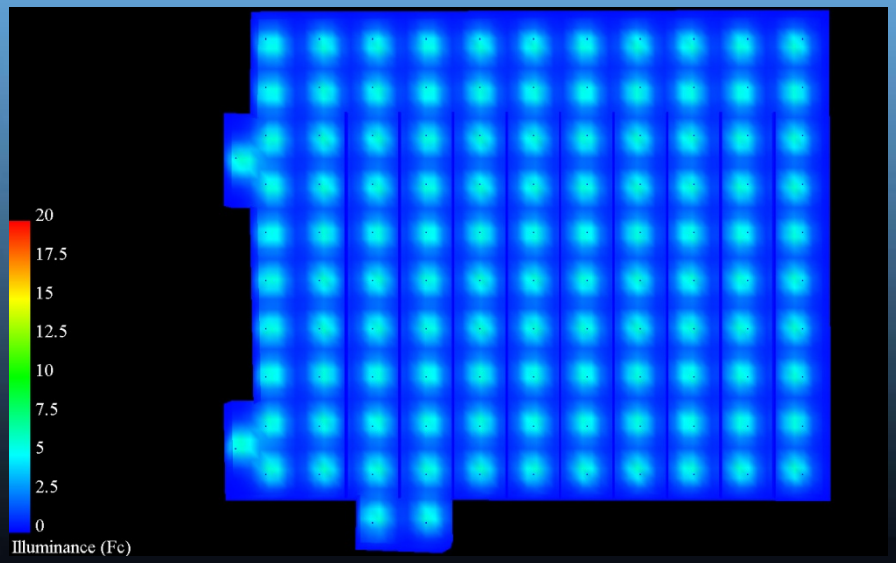
- Don’t settle for a luminaire that does not perform to your standards

- Lighting results with LED’s is totally predictable if you have right information.

Key To Specifications & Evaluation

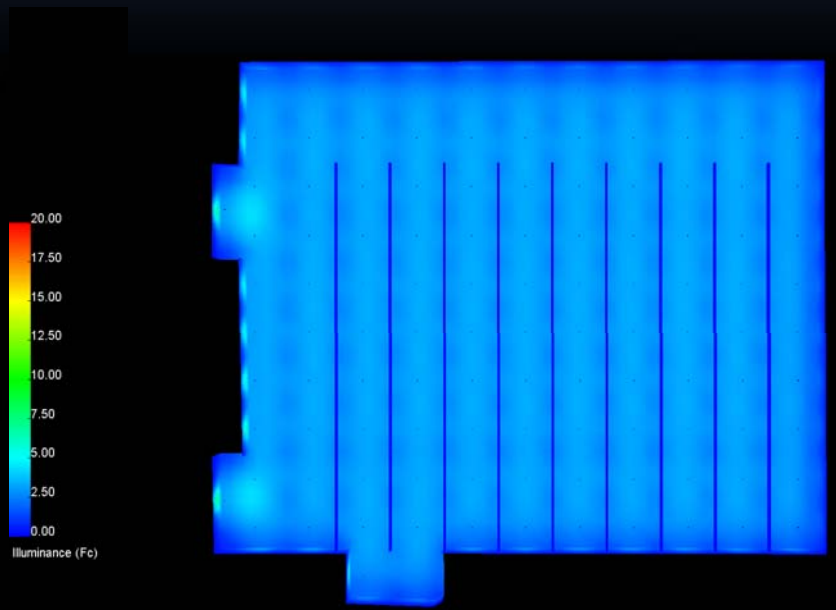
- Almost identical to what is compared today
  - Photometric performance (LM-79)
  - Energy consumption (efficacy)
  - Aesthetics
  - Warranty

Application Comparison



LED Solution A

AVG	2.70
MAX	12.5
MIN	0.2
MAX/MIN	63:1
LLF	0.7 (@ 50,000 Hrs. Use)
Power	78W



LED Solution B

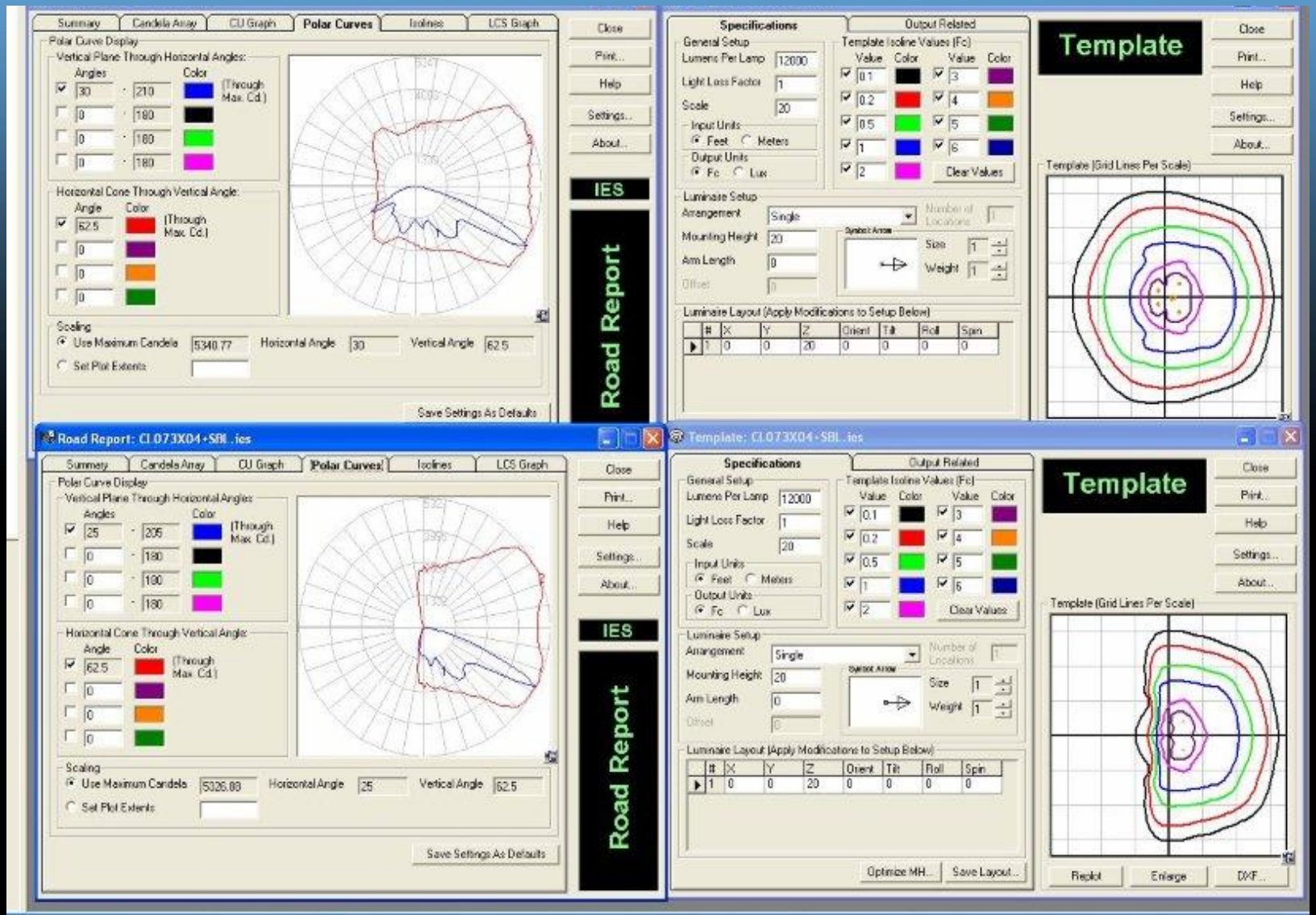
AVG	3.03
MAX	4.6
MIN	0.9
MAX/MIN	5:1
LLF	0.95 (@ 50,000 Hrs.Use)
Power	55W

Optical Control

From wild light…

…to controlled light

Proper Optical Control = Performance

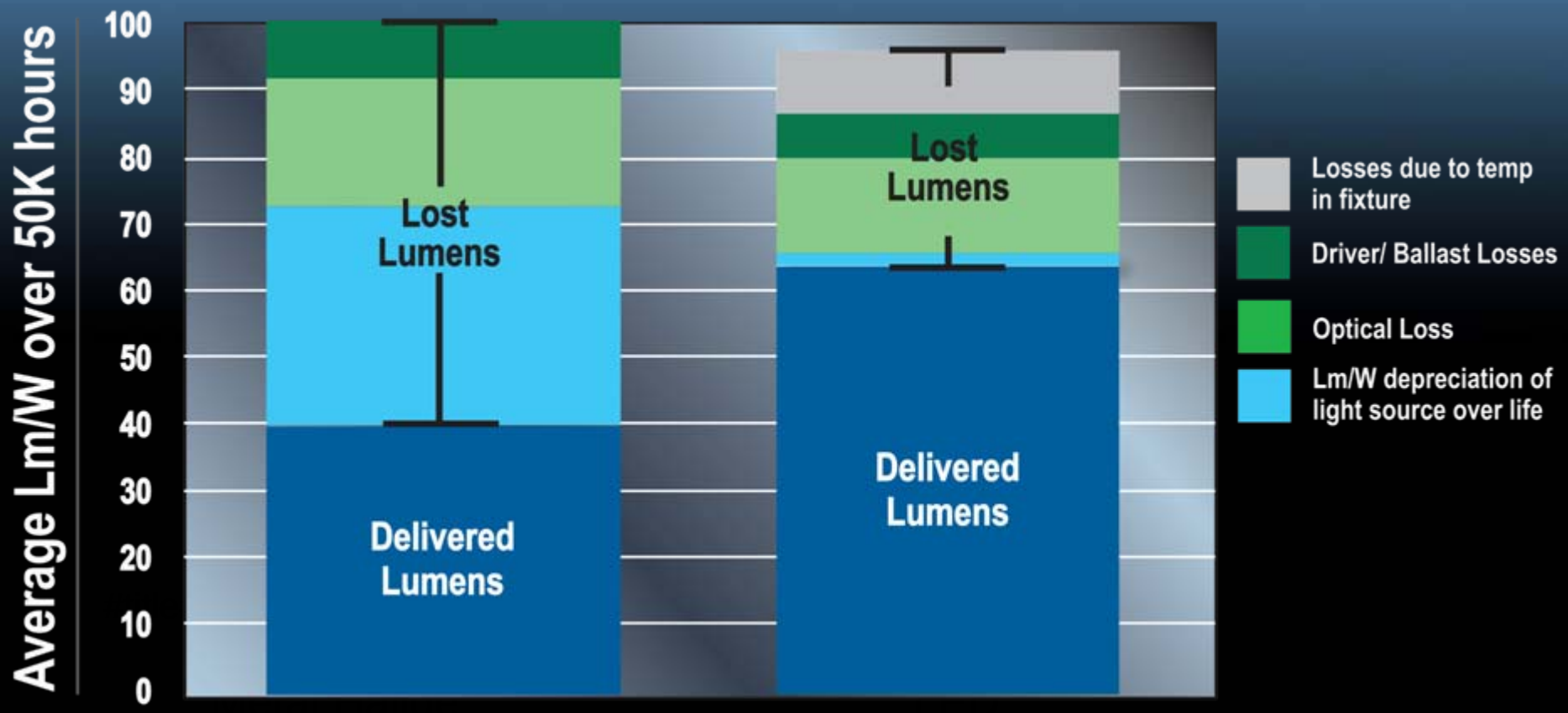


Key To Specifications & Evaluation

- Almost identical to what is compared today
  - Photometric performance (LM-79)
  - Energy consumption (efficacy)
  - Aesthetics
  - Warranty

Basic System Comparison

- 100 Lumen/Watt Metal Halide
- 97 Lumen/Watt LED



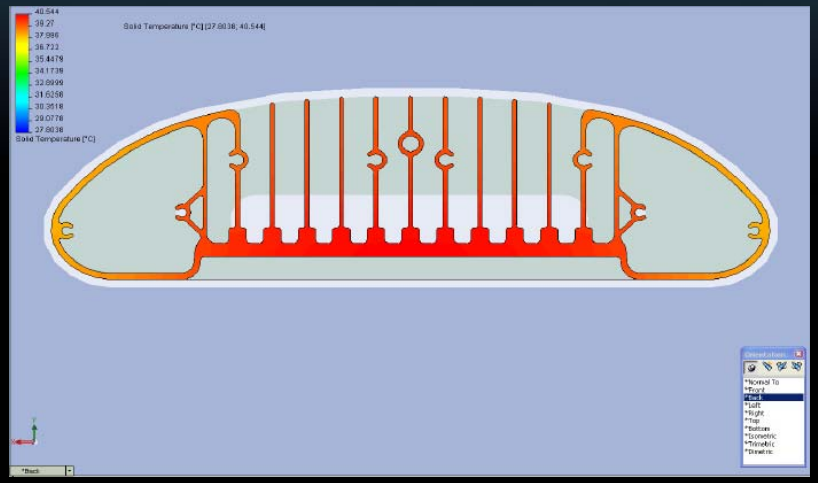
Change To Specifications & Evaluation

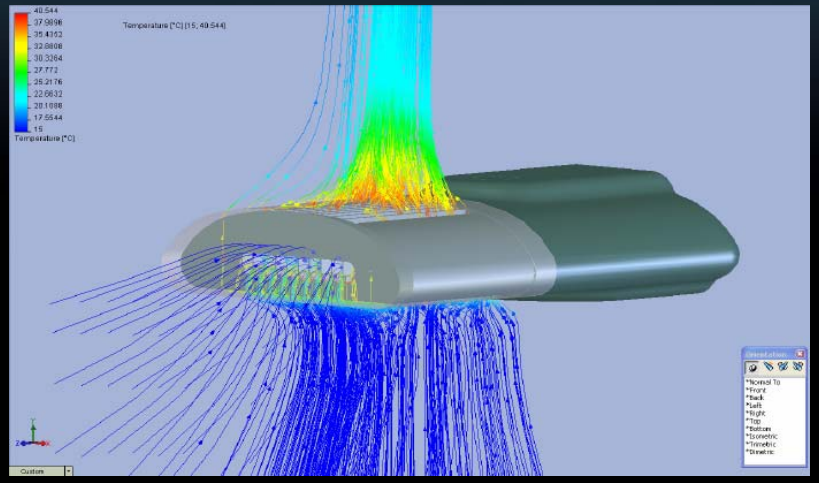
- Only change is “Life” / Light Loss Factor (LLF) ratings
  - Still predictable
  - No longer tied to the lamp, but to the Luminaire in the actual environment
  - LM-80 in combination with Energy Star will be standards to rely on to compare

30 LED - 350mA CFD Analysis

15°C ambient, 30 LEDs with 350mA drive current Total power- 35 Watts

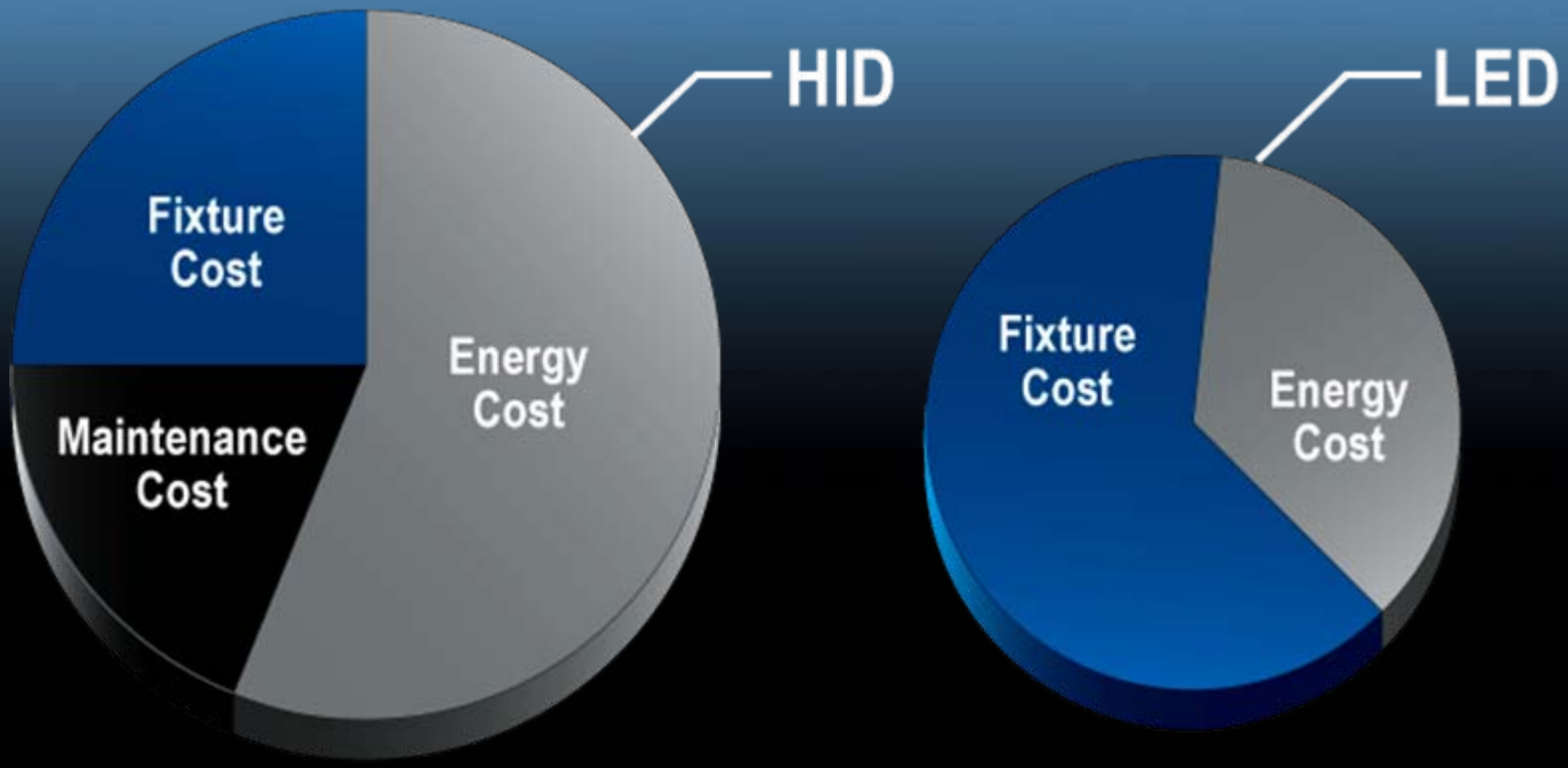
Solid Temp- 40.5- based on previous testing translates to Tj of approx 46°C





241K rated hours (56 yrs at 12 hrs/day)

Total Cost of Ownership



Final Thoughts

It is INCUMBENT upon everyone:

- LED's are the best solution to many lighting applications - TODAY
- Using LED's can be done with predicable results.
- - You can achieve better results

THANK YOU

DOE SSL Market Introduction Workshop

Alan J. Ruud, PE

July 10, 2008

Betaled.com

© BetaLed 2008