

Solid State Lighting:

**Applying Today's Mature Technologies
for Maximum Effect**

March 12, 2014

Why This Presentation?

inefficient Unsure of
the concept



ugl
y



The History and Future of Lighting

Modern Incandescent 1915



A real game-changer with a couple
of weak points:



Inefficient, Limited Palette, and
Short Life

1983: The Palette Expands “Icing for the Cake”



The Icing Becomes the Cake



75 halogen floods



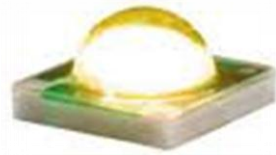
Introducing Efficiency
...with a couple of weak points:



Limited Dimming and Light Quality

LED / Solid State Lighting

A disruptive technology that fits
with food service.



Efficient and Long Life

Dimming and Light Quality

Extended Palette

LED Technical Considerations

- Heat sinks are critical!
 - heat lowers performance
 - too much heat quickly destroys the led
- Power supplies are critical!
 - constant voltage and current
- White LED will slowly color-shift to blue
 - Must compensate to retain warm white
- Electronics are tuned for specific LED chip
 - Whole unit replaced at end of life

Poised to change the World:

LED lighting is like the PC in 1995.

light output will rise dramatically
and price will fall dramatically.

Mature Technologies to Apply Now

Solid Choices

- High performance a-lamp
- Downlights
- And Floods



And... some “holy grail” lamps

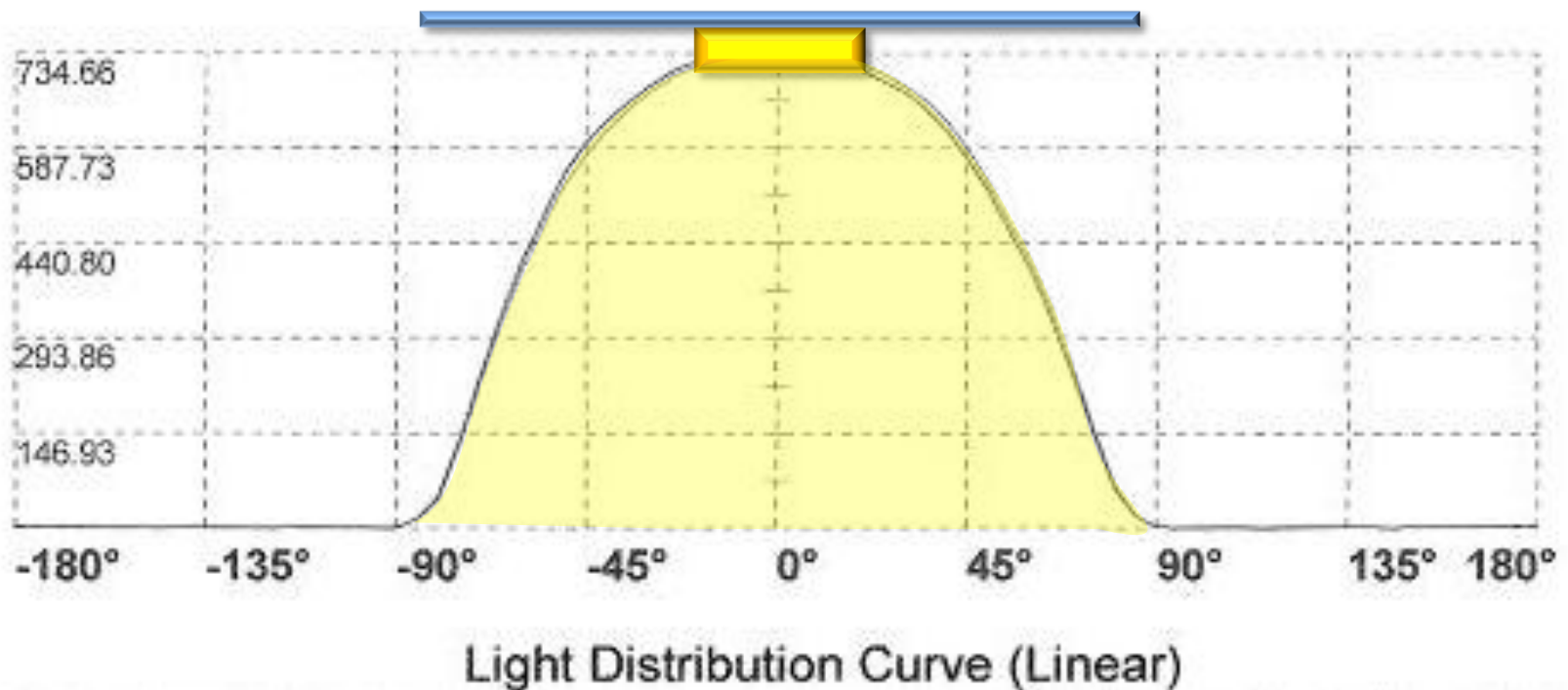
- High performance MR16
- Viable linear LED lamp and driver



down
lights



Downlights make sense because
LEDs are a horizontal-plane
projection source



And you can put a bit heat sink
above the ceiling





Exhaust
Hoods

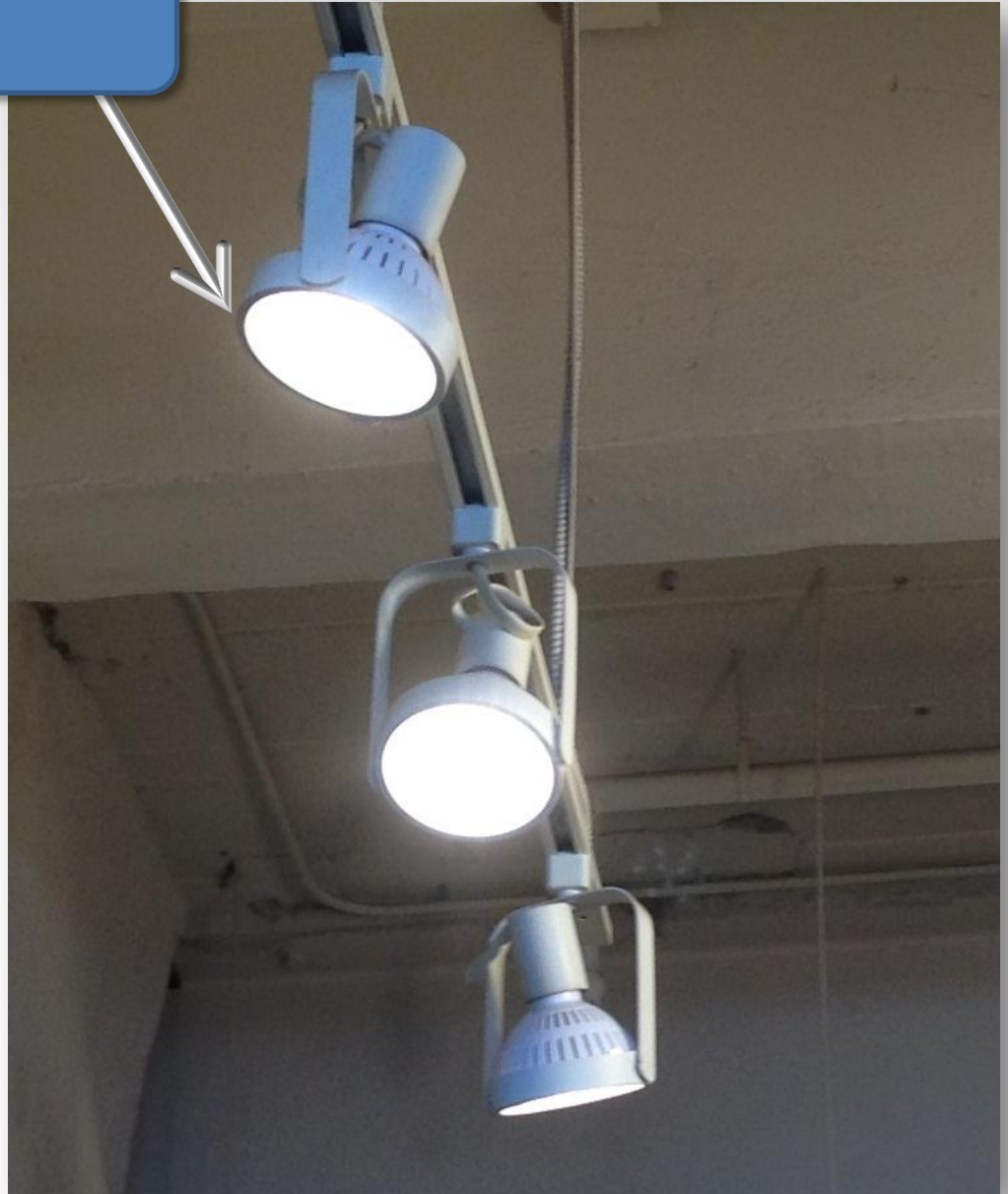


parking lot
lights

The price of SSL street/parking lot fixtures has dropped 10-fold

And the DOE has produced a good application guide

Flood lights



Floodlights make sense because they have more surface area for heat sinks than smaller lamps

75 halogen floods



75 SSL floods



MR16 Spots



Source: <http://www.soraa.com/>

LED MR16 spotlights are replicating
a “point source” in a tight space.

These lamps present major technical
challenges, but a few manufacturers
have figured it out!

"A" Lamps



An SSL replacement for a
60 watt A-lamp has to be
omni-directional, affordable
and idiot proof





30:1

5:1









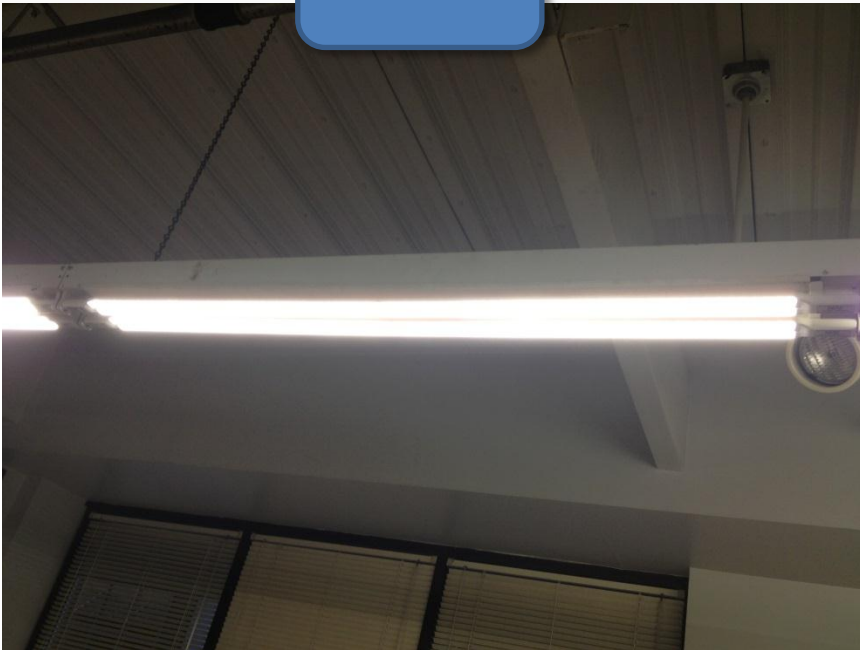
LED Replacement for Fluorescent Tubes? Almost there!

VS.



We installed at FSTC Lab

SSL

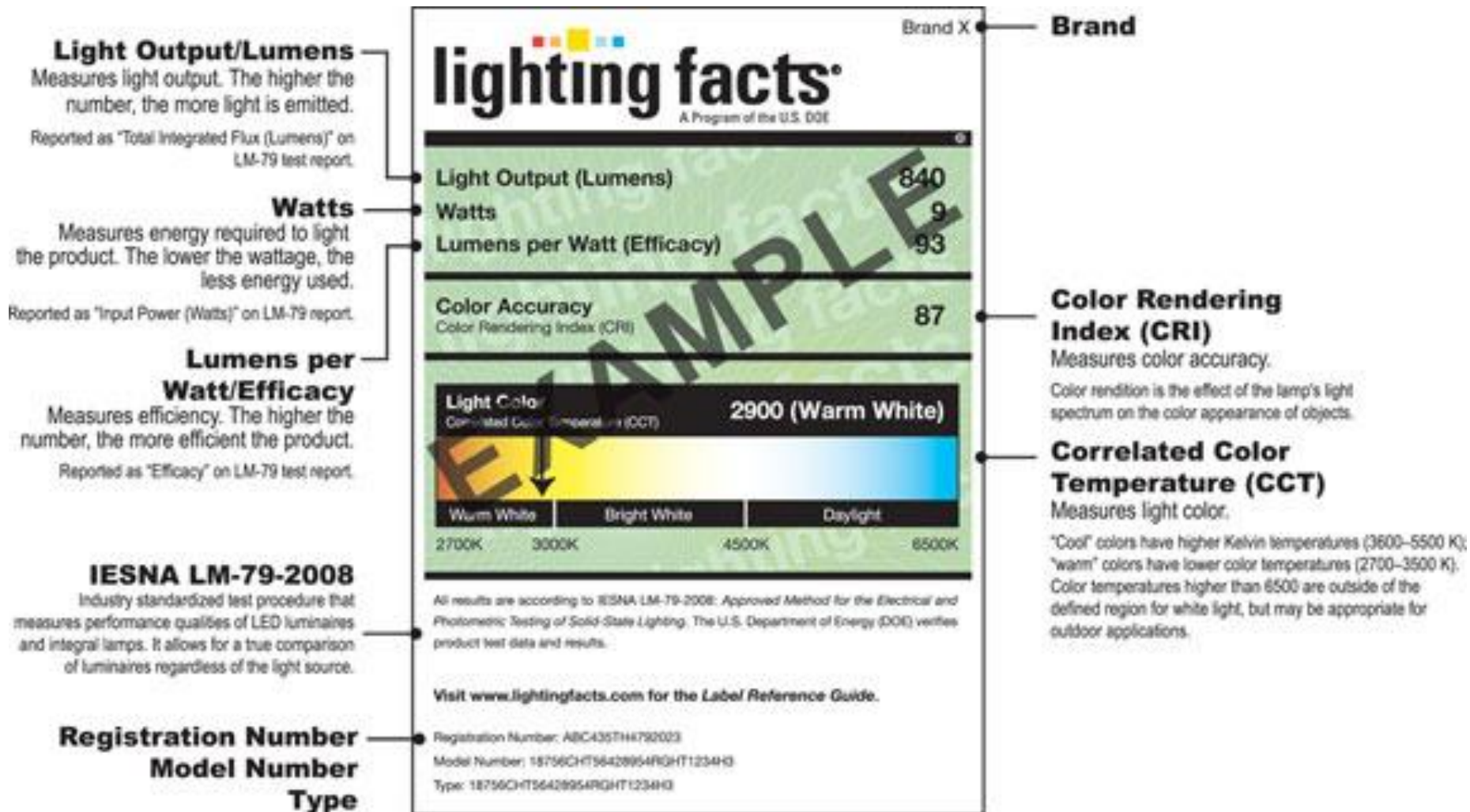


T8 fluorescent



Locating the Best Products

The Lighting Facts Label



Outdoor and Commercial



www.designlights.org/

Residential and Light Commercial



www.energystar.gov/lighting

Try out a few lamps before
you buy a truckload.

If your LED lighting design stinks...

It will stink for 10 years!

Control Outdoor Lighting

Parking Lot and Exterior

Turn off parking lot lights, soffit lights, menu boards, decorative lights, and roof lights whenever possible.

Do not leave exterior lighting on during the day!







Time Clocks and Photocells

Simple, low cost, but need regular maintenance!

