



# SCN Efficiency Work Group Meeting

LED PRESENTATION



# History Lesson

- ▶ Light Sources
  - ▶ Incandescent 16 lm/w 2700K
  - ▶ Mercury Vapor 35-65 lm/w 3700K (coated)
  - ▶ HPS/MH 75-125 lm/w 2200K/4000K
- ▶ Internal reflectors for distribution
- ▶ High internal losses,
  - ▶ 55%-60% gets out of the fixture
  - ▶ Hot spotting below the fixture
  - ▶ Max distance on center 75' or so

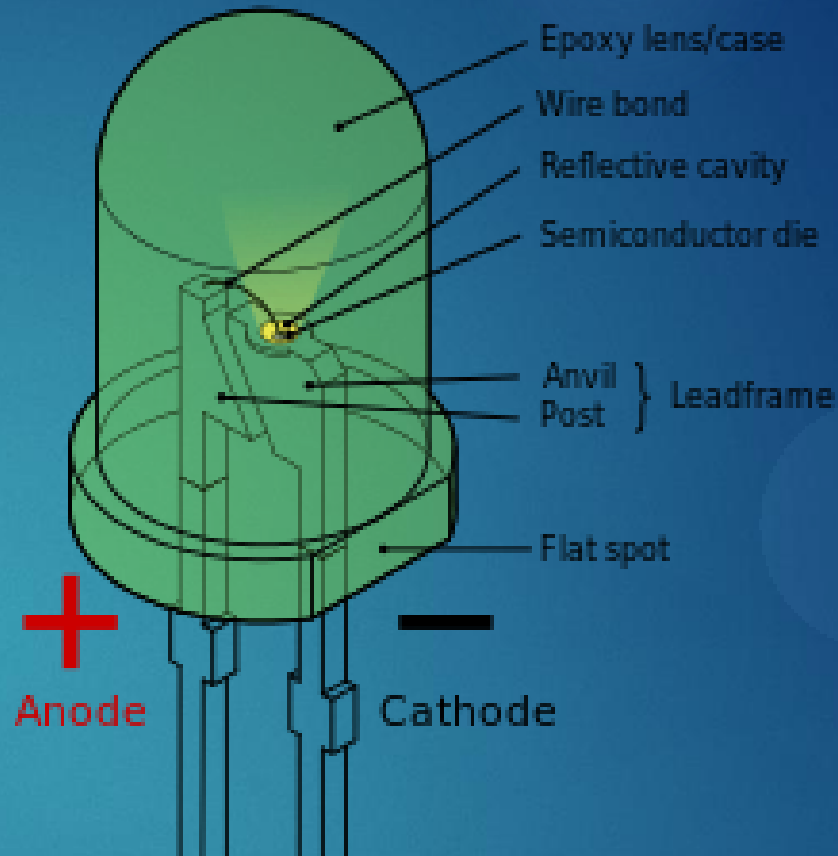
Technology	CRI
Incandescent	100
Metal Halide	70 - 90
LED	70 - 75
High Pressure Sodium	21

# Why LED'S?

- ▶ Light quality
  - ▶ Dark Sky Compliant – Full cut off fixture
  - ▶ Control over distribution patterns
  - ▶ CRI – Color Rendering Index
- ▶ Public Safety
- ▶ Reduced Maintenance
- ▶ Energy Savings

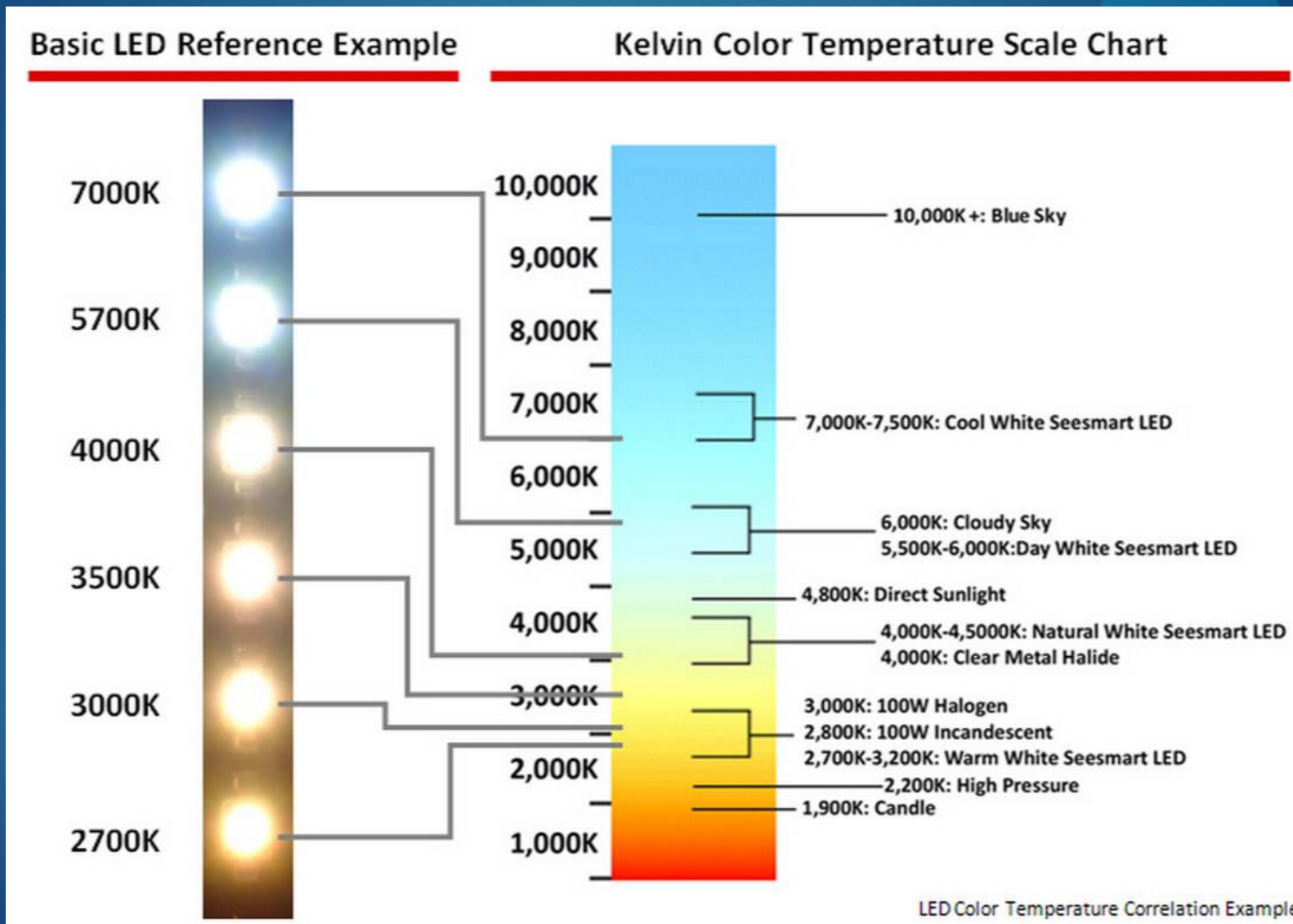
# What is an LED

- ▶ Semiconductor
  - ▶ First made around 1962
  - ▶ Indicator lights
- ▶ Longest lasting source of light
- ▶ Blue LED'S for the most part used for lighting applications
  - ▶ Phosphorus used to warm light as low as 2700K





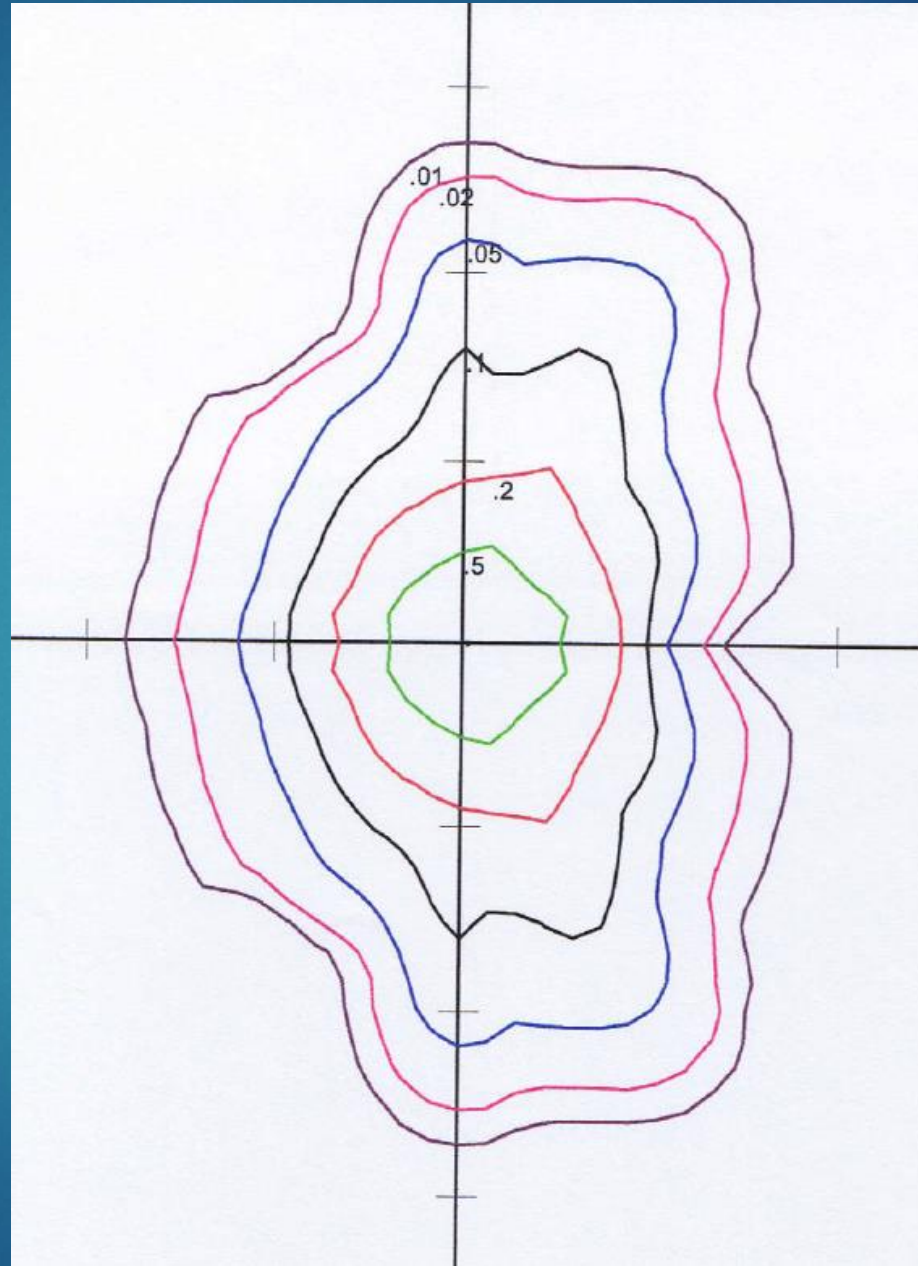
# Color Temperature



LED Color Temperature Correlation Example

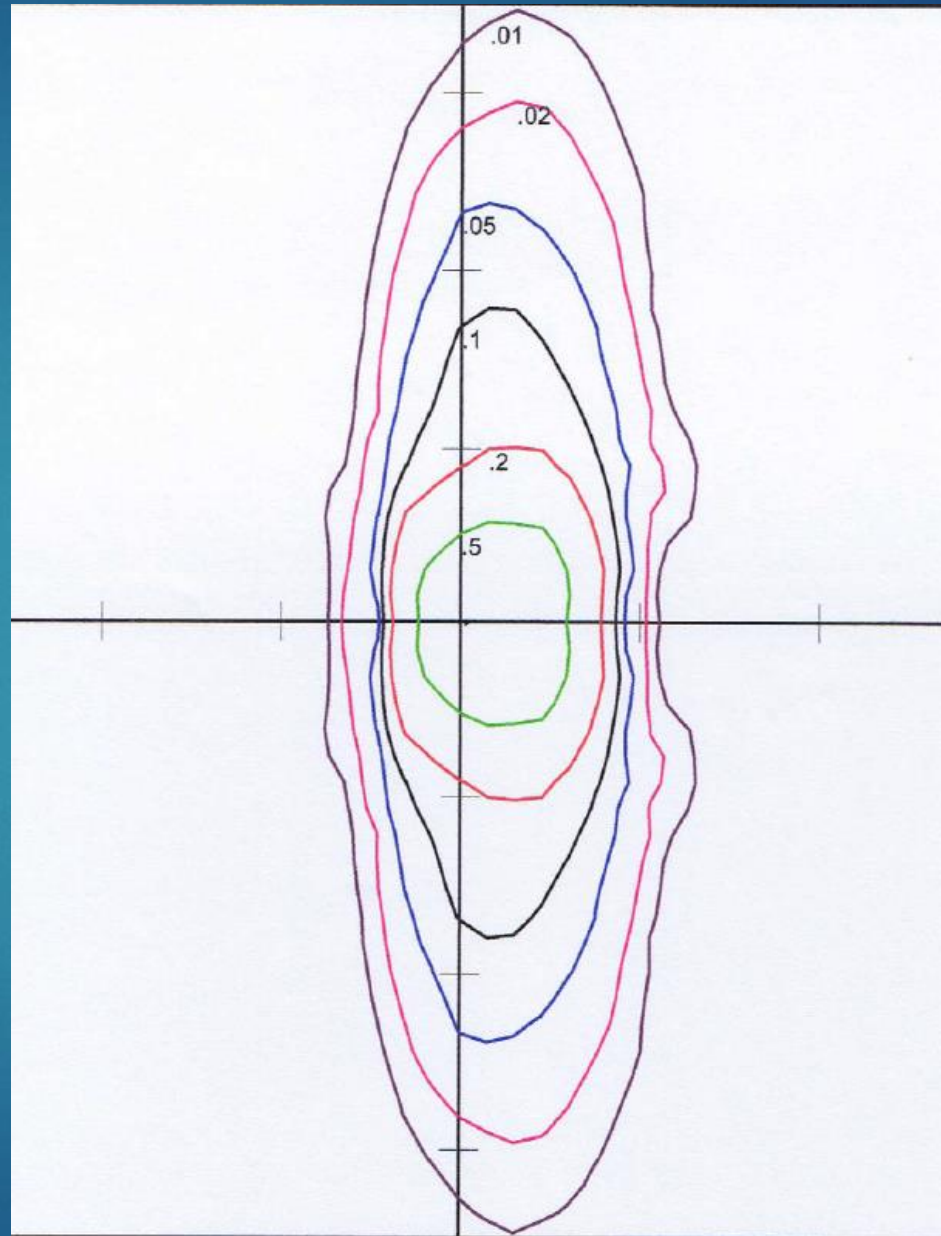
# Photometrics

- ▶ 70W HPS



# Photometrics

- ▶ 25W GE LED





Before





After



# Wattage Translations to LED

HPS Fixture Wattage	Equivalent LED Fixture Wattage Range
50 – 70W	17 – 22W
100W	35 – 44W
150W	55 – 70W
200W	73 – 87W
250W	90 – 101W
400W	139W +

# General Trends

- ▶ Cities and Towns Converting to LED
- ▶ Mostly on the East and West Coast
  - ▶ Power is expensive, \$.12-\$.18+/ kwhr
- ▶ Many Projects using a Full Turn Key Model

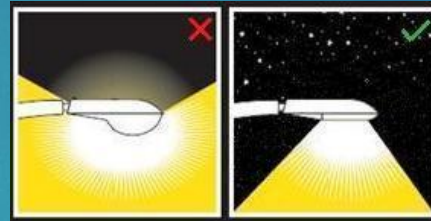
# Fixture Manufacturers

- ▶ GE
- ▶ CREE
- ▶ Leotek
- ▶ American Electric (AEL)
- ▶ Philips
- ▶ Cooper
  
- ▶ Decorative Fixtures
  - ▶ DLC equipment & 10 yr Warranty



# LED Major Points

- ▶ Dark Skies
- ▶ Light Trespass
- ▶ General Distribution of HID fixtures
- ▶ LED Efficiencies, 90-135 lm/w
- ▶ Ambient Temperature Requirements for Arizona
  - ▶ Few manufacturers meet current High Temp Requirements



# Maintenance

- ▶ HPS 18-22% regular maintenance over the course of a year
- ▶ LED > 1% regular maintenance per year
- ▶ Long Term
  - ▶ Tree Trimming
  - ▶ Cleaning, webs, insects, etc
- ▶ Day to day maintenance retracts to “real” events
  - ▶ Power outages, Knock downs, Wire theft, Capital work

# Controls

- ▶ What can they offer
  - ▶ Dimming
  - ▶ Remote Monitoring and Maintenance
  - ▶ Wire theft/ outage detection
- ▶ Costs, \$125-\$200 per pole
- ▶ Long Term Vision
  - ▶ Smart Cities
  - ▶ Parking
  - ▶ Traffic Control
  - ▶ WiFi

# What now?

## Options for getting it done

RFP

Sole Source

US Communities





# Full Turn Key (Cafeteria Plan)

- ▶ Audit – GIS of entire street light system
  - ▶ Reconcile audit data against Utility records
- ▶ Design
  - ▶ Product Agnostic: DLC, 10 yr warranty
  - ▶ Photometric Calculations/Runs
  - ▶ Samples and Field Testing
- ▶ Procurement
- ▶ Installation – Subcontracted out
- ▶ Commissioning

# Street Light Market

- ▶ Energy Service Companies (ESCO's)
  - ▶ Guaranteed Savings Contracts, Street Lighting already a guarantee
  - ▶ Cover Wide Variety of Measures, Street Lighting is just one
  - ▶ Typically Street Lighting the most lucrative, used for other weaker measures
- ▶ Smaller local Firms
  - ▶ Inexperienced design and market context
- ▶ Single Measure ESCO/Consultants
  - ▶ Focus Solely on Street Lighting

# Typical issues

- ▶ Audit results
- ▶ Faulty wiring
- ▶ Tripped contactors
- ▶ Blown fuses
- ▶ Faulty photocells



# Utility Rates

- ▶ Flat Rate per Month
  - ▶  $.\$/\text{KWHr} * \text{KWHr usage}$
  - ▶ KWHr based on actual in a month or yearly average
- ▶ Base Charge +  $.\$/\text{KWHr} * \text{KWHr usage}$ 
  - ▶ KWHr based on actual in a month or yearly average
- ▶ Meter Grade Controls
  - ▶ Meter for Actual Usage
    - ▶ Capture Savings from Dimming
    - ▶ Share Data with the Utility



# Financing

- ▶ Bonds
- ▶ Lease Purchase Financing
- ▶ On Bill
- ▶ Internal Funding
  
- ▶ Cost Benefit Analysis either way needed
  - ▶ Cost of Project
  - ▶ Paybacks
  - ▶ Itemized costs per pole format
    - ▶ Eliminates Change orders

# Summary

## Be clear in what you want

Have not done this before

Get it right the first time, Don't want to do it again

Get Great Advice, Pay a Reasonable Price

Connect to other Cities who have done this before

There is no right or wrong way

This is about what you want, It's your experience

Questions?

