



GovEnergy
www.govenergy.gov

The Premier Energy Training Workshop
and Trade Show for Federal Agencies

A River of Energy Solutions

LED Future is Bright

GovEnergy GE LED 2011.ppt by Michael.J.Smith@GE.com

Replacement Method Considerations



Replacement
Lamps
LEDs in the
shape of
traditional
lamps



Integrated
Fixtures
LEDs
permanently
built into
fixture



Replaceable
Modules
LEDs
designed into
removable
module

Various OEMs using Modules

amerlux
GLOBAL LIGHTING SOLUTIONS

EDISON PRICE
LIGHTING
because light matters.

elite
LIGHTING U.S.A.

RENOVA

PREMIER LIGHTING LTD.

COOPER Lighting

Journéé
LED Technology. Simplified.


SPECIALTY LIGHTING
INDUSTRIES, INC.

lucent®


FOCAL POINT®

JANMAR
Energy Efficiency...
with the look of incandescent

GLighting
GROSS LUMENELLE

BARBICAN
Architectural Products Ltd.

lightmark

Spectrum Lighting

XtraLight
MANUFACTURING

dmf
LIGHT

Solera

FAHRENHEIT
LIGHTING

LIGMAN
LIGHTING USA

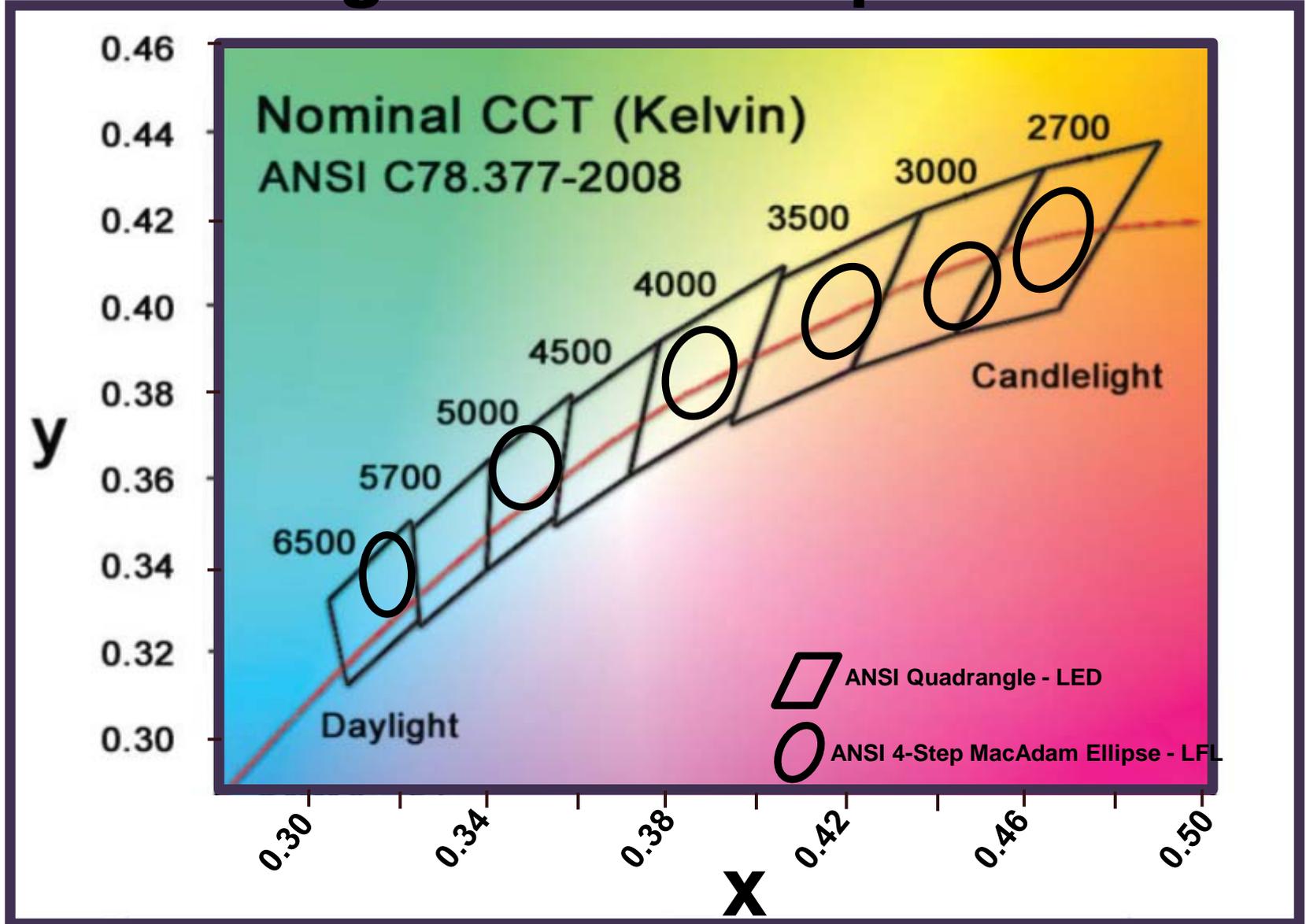
Modular International Inc.

Quality of Light & Performance

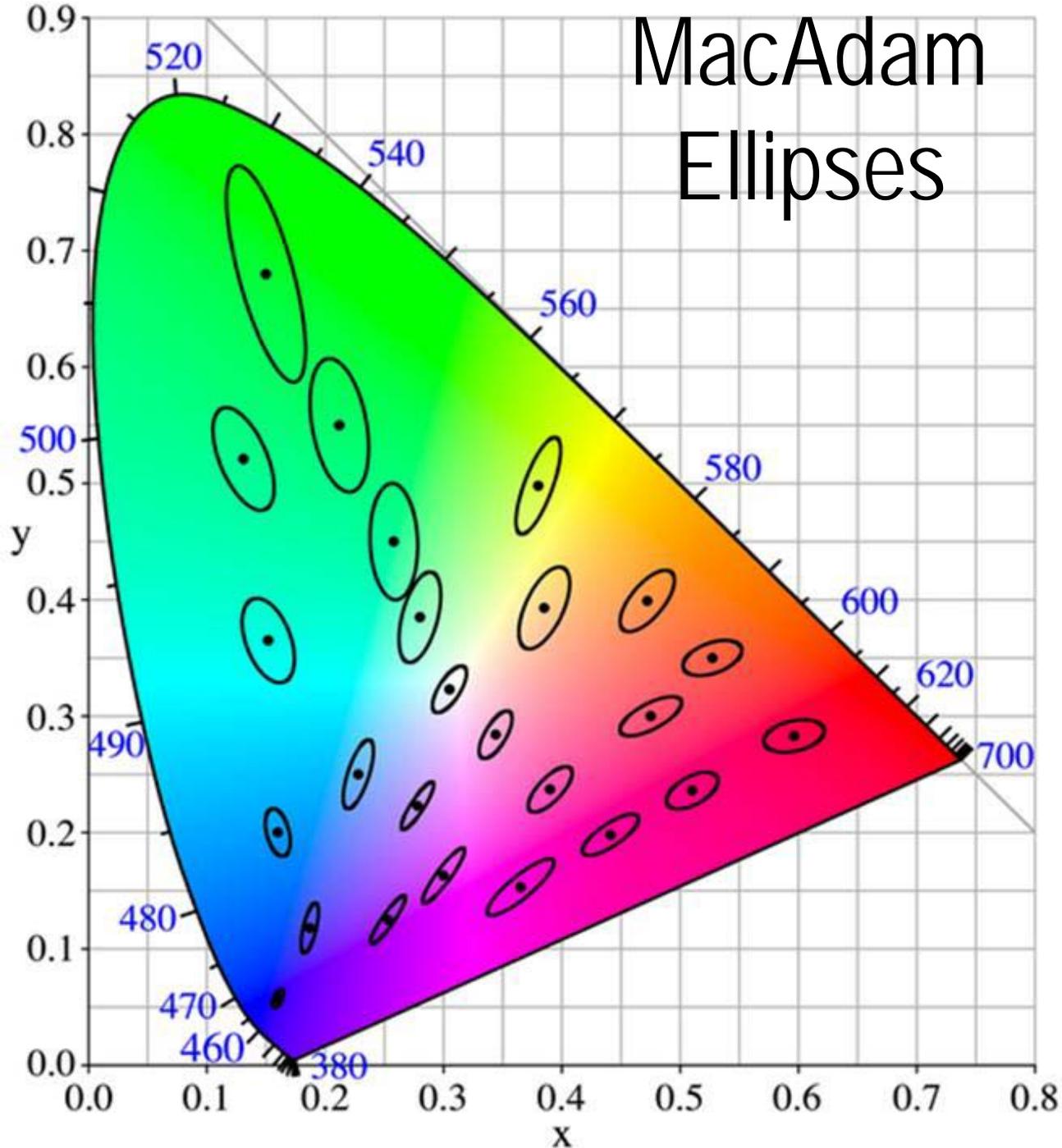


- Multiple Lumen Pkgs 1000, 1500, 2000, and 3000 lms
- Low Wattage 15W, 23W, 30W, 46W
- Multiple CCTs 2700K, 3000K, or 4000K
- CRI Options Standard 80 & Ultra 90 – 3000K
- Color Consistency Standard 4-Step, Ultra 2-Step
- Clean Optics 15°, 25°, 36°, and 60°
- High Efficiency 60-65 l/w
- Dimming Compatibility 0-10V, phase, DALI
- Long Life 50,000 hrs
- Tool-less Installation Module & Optic
- Upgradable Design Same form as efficiencies improve

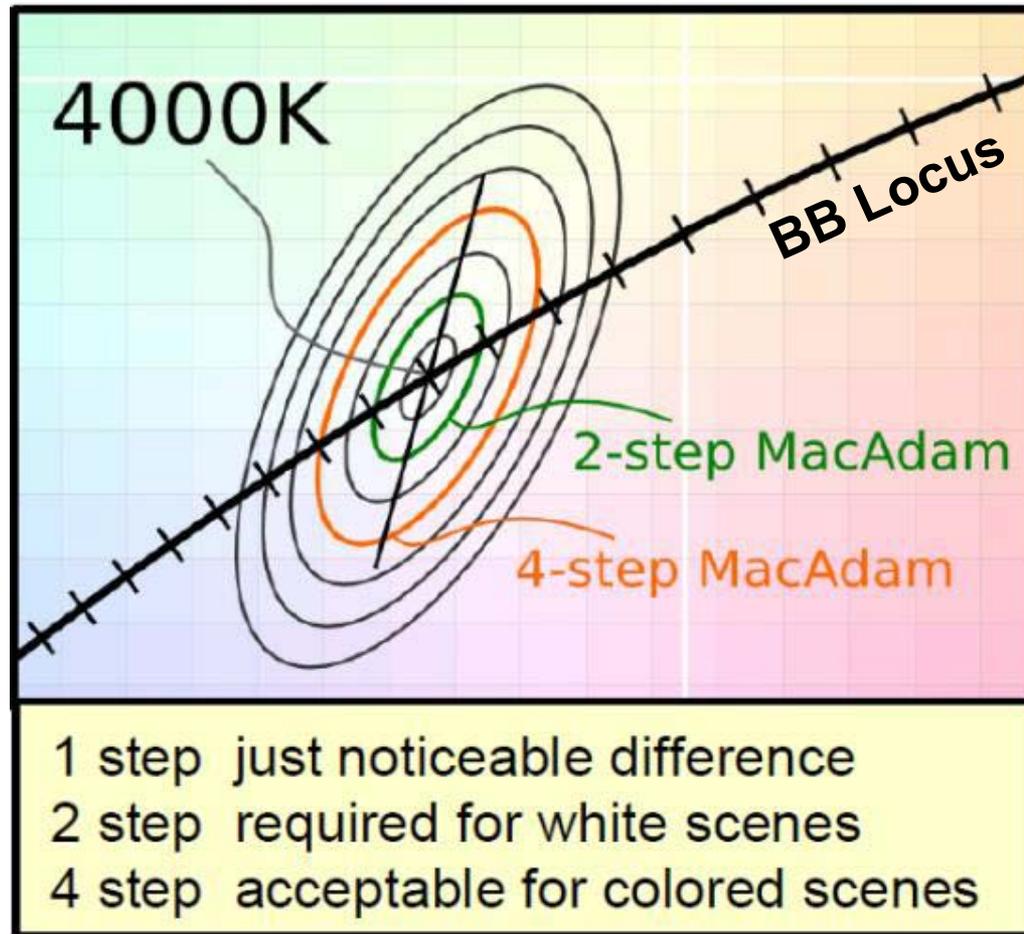
LED Binning vs LFL 4-step



MacAdam Ellipses



MacAdam Oval Approximations



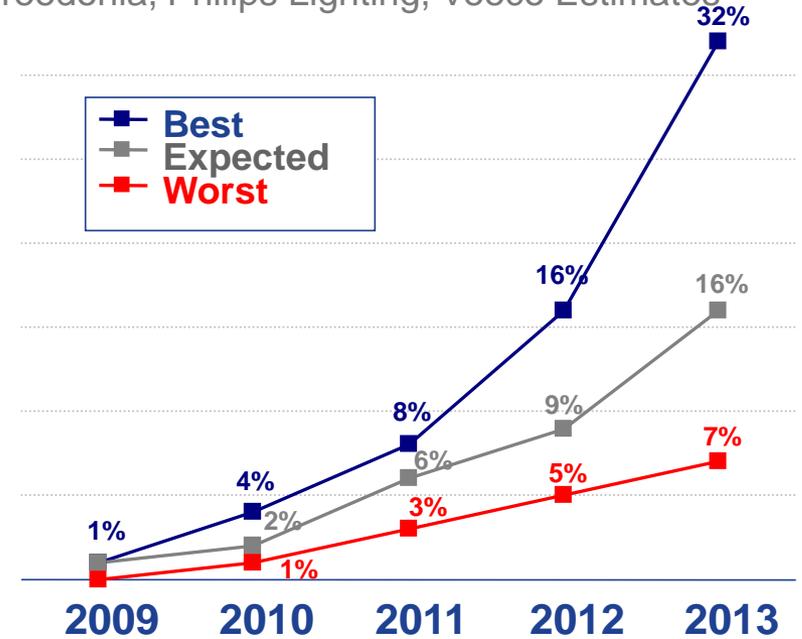
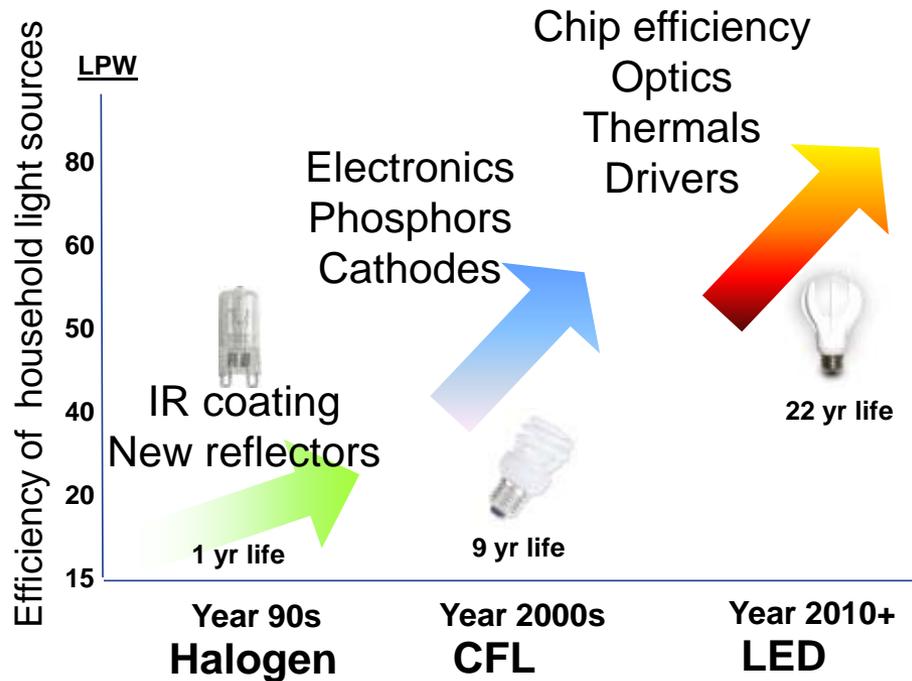
As an rule-of-thumb, each step is approximately 100 Kelvins

Where is LED headed?

LED penetration for general lighting

Greener & longer life

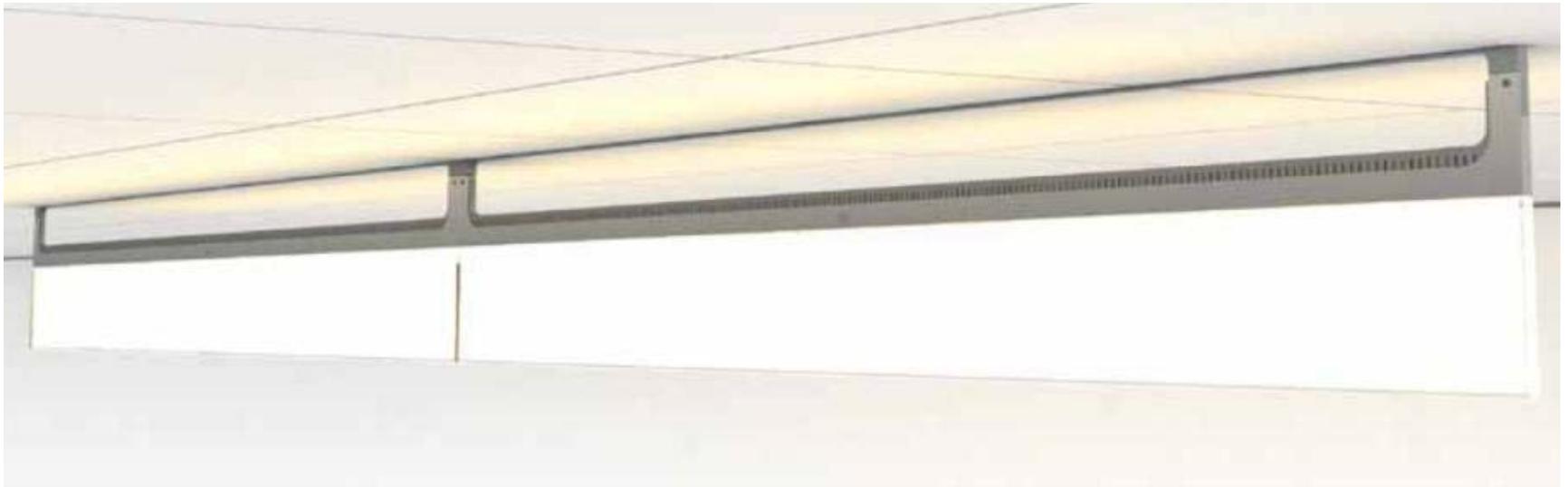
Source: Strategies unlimited, Strategy Analytics, Freedonia, Philips Lighting, Veeco Estimates



- Technology evolving
- Efficiency & performance improving
- Longer life

- LED chip capacity +400% from '10 - '14
- End users demand turnkey solutions
- Standards setting activity ramps

LED Edgelighting Fixtures



ENERGY STAR® qualified LED lamp website



Commercial Products:

[http://www.energystar.gov/index.cfm?fuseaction=ssl
.display_products_com_pdf](http://www.energystar.gov/index.cfm?fuseaction=ssl.display_products_com_pdf)

Residential Products:

[http://www.energystar.gov/index.cfm?fuseaction=ile
dl.display_products_excel](http://www.energystar.gov/index.cfm?fuseaction=ile dl.display_products_excel)