

Converting Your City to LED Streetlights

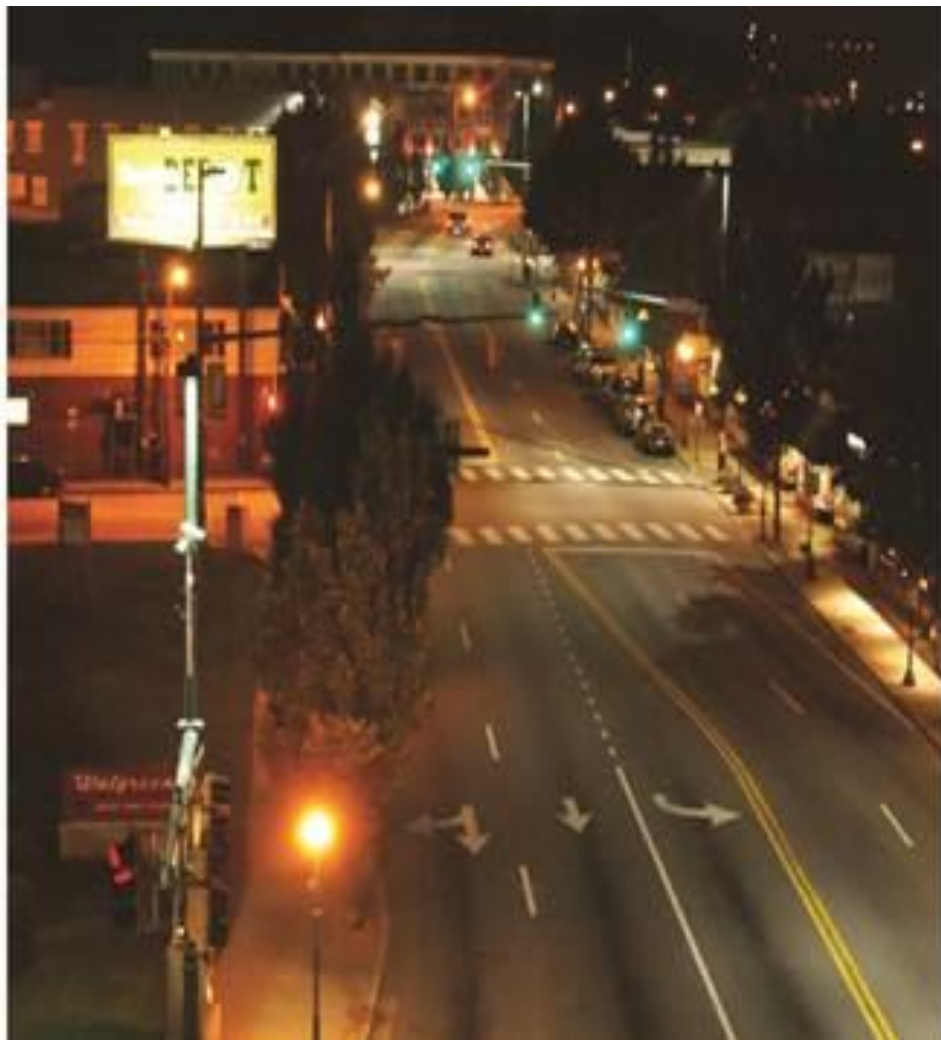
Mark Hartman
Chief Sustainability Officer
CITY OF PHOENIX



Research: Improved visibility / vision impaired Reduced crime



Recent price/performance = never a better time



Research: Avoid blue range of color temperature (CCT) to reduce city-glow



Light Bulb

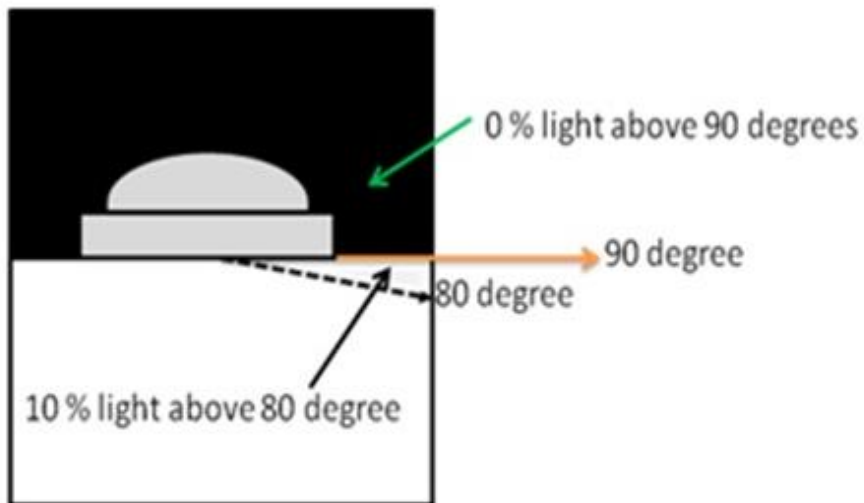


Atmosphere	Warm		Neutral	Cool	Natural	Daylight
Kelvin	2700K	3000K	3500K	4100K	5000K	6500K
Atmosphere	Soft, Comfortable, Relaxing		Efficient, Balanced	Clean, Efficient	Bright, Simulates Outdoors	Crisp, Refreshing, Energetic

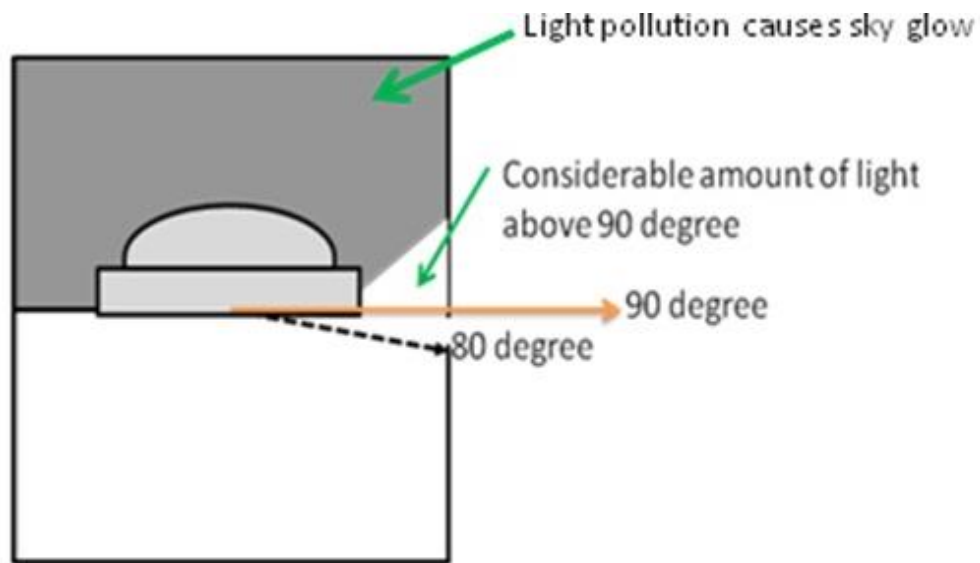


Phoenix Streetlight
LED Standard 4000K

Research: Choose a fully shielded fixture to be “Dark-Sky Friendly”



Full cutoff lights



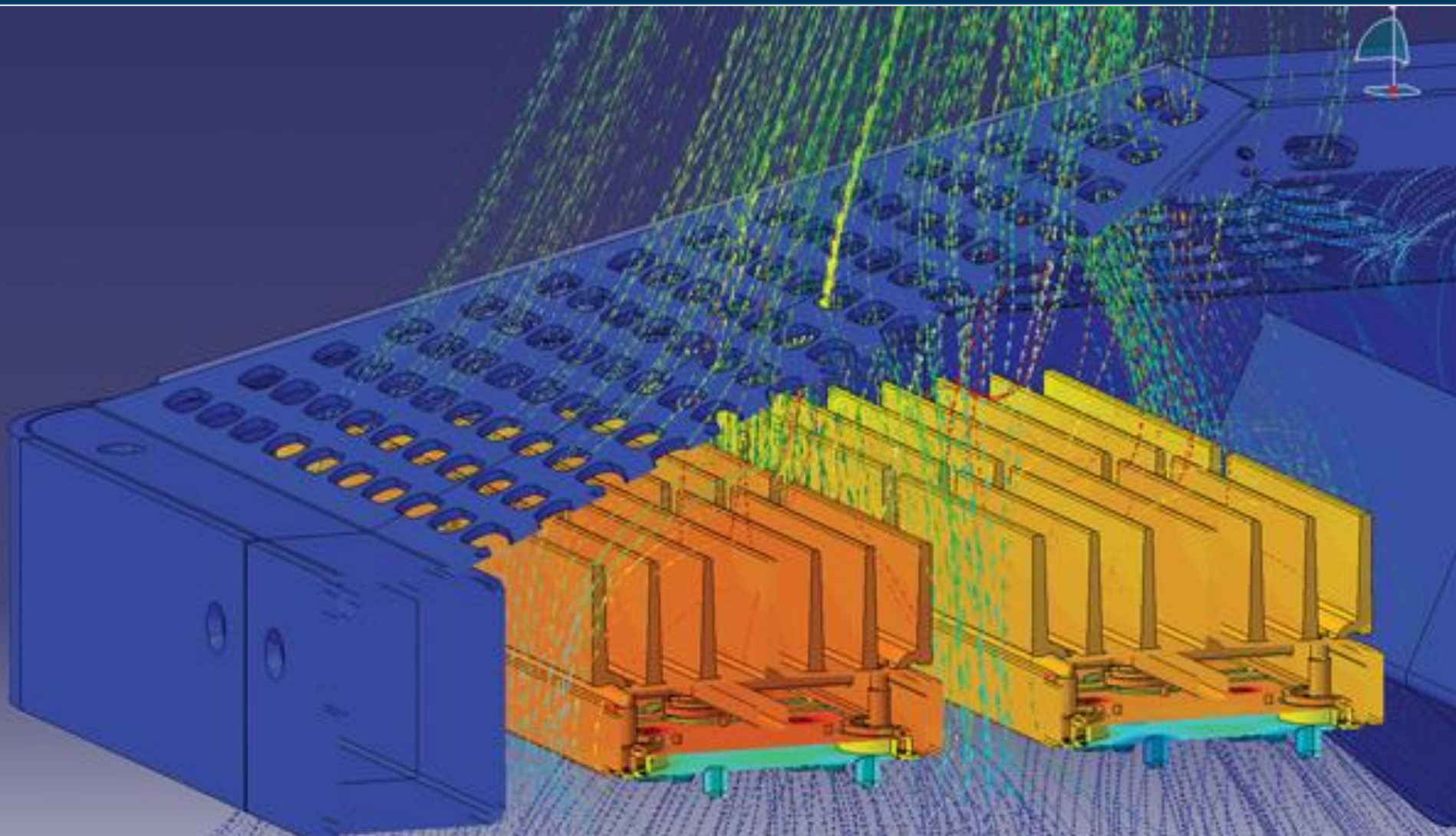
Non cutoff lights



Research: Choose a fully shielded fixture



Research: Heat Sink is important in hot climates Operate normally in 122F temperatures



Thermal simulation of heat-sink design



Currently may not be cost effective if infrastructure exists.

BUT it might be beneficial in remote locations where it is expensive to install new electricity source.

Example:

*Install Solar Light: \$10,000 per pole
versus \$3,500 for utility pole?*

(Ongoing energy costs not a significant factor at \$35/year).



HPS Maintenance cost:

- Fixture + labor cost to replace
- 5-year life = 20% replaced every year
- Lane closure inconvenience
- Costs of resident call-in of outages



LED = 90% drop in maintenance costs?



10-year+ warranties available

- Warranty = fixture provides > 70% light output
- Material cost might be \$250 versus labor \$50?
- Likelihood of supplier in business in 10 years?
- Warranty for equivalent or better fixture?

Note:

- If only a small number of current LEDs, may wish to replace all fixtures so easier to track warranty?



APS provides true credit:

- kWh savings = billed kWh savings
- APS also provides DSM incentives
- Utility benefits if light output declines over time

SRP's new rate does not fully recognize savings

- 0-75 system watts = 25 kWh/month
- 76-139 system watts = 50 kWh/month
- 140-208 system watts = 75 kWh/month
- 209-278 system watts = 100 kWh/month
- 279-348 system watts = 125 kWh/month

*****SRP has also said may only give credit if metered.**



Examples:

- Off-State Power Consumption < .5W
- 20-year life Photo Cell
- Minimum Power Factor of .90
- Surge Protection
- Capture GIS data for all installed lights
- Traffic Control
- Testing

Recycling:

- Accept proposals for cost saving from recycling

Other possible Value Add for LED Lights



- Wifi (Perhaps in downtown?)
- Cameras (loitering, car counting, car speeds)
- Parking Monitoring (or taxi queue length)
- Gunshot Monitoring
- Auto-Dimming
- Outage Detection
- Event Counting
- Temperature Sensors
- Dynamic Lighting Control



RFP solicited **Vendor & third party financed** options to be compared with **city-funded** options.

Business Case is viable when

- \$ Annual Energy Savings > repayments
- Warranty longer than payback
- Results in \$ savings every year
- Savings to general fund

Cash flow model showed \$800,000 savings per year for 15 years (on estimated pricing)



Possible Sources of Funds

- General Obligation Bonds
- “Green Bonds”
- Qualified Energy Conservation Bonds (QECBs)
- Vendor or Third Party

QUALIFIED ENERGY CONSERVATION BONDS (QECBS)

EPC
ENERGY PROGRAM CONSORTIUM
December 2014



Nothing contained in this issue paper should be construed or relied upon as legal advice. Instead, this issue paper is intended as a general introduction to the subject of the use of qualified energy conservation bonds to finance energy and mass transit projects, from which better informed requests for advice can be formulated.

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RFP closed June 11:

- Proposal evaluation has begun
- Separate evaluation for Financing & Value Adds
- Recommendation to Council in Sept/Oct

Key Action:

Bulk pricing in this RFP probably far better than what other municipalities could obtain on their own.

Good opportunity to bring this to your Councils.