

Remaining Barriers to LED Street Lighting



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Introduction / Scope

- This talk is based on experience working with public agencies via the MSSLC and Outdoor Lighting Accelerator
- All situations have unique elements, but there are significant areas of commonality too
- The discussion equally applies to publicly-owned area lights
- Barriers continue to evolve
- In addition to remaining barriers, some that have receded as major impediments are noted



Barrier – Legacy systems and associated infrastructure

- Presently number one in my opinion
- “Infrastructure” includes both equipment and existing tariffs
- Utility and municipal motivations may not precisely align
- Particularly relevant for public lighting systems, because
 - Usually unmetered
 - Often mixed ownership, involving multiple decision-makers
 - Utilities own 60-70% of street lighting inventory in U.S.
 - Sometimes more than one utility present in a given metro area
 - Often the utility owns some components, the city others, and not consistently
 - Often the system has evolved over time without sufficient documentation, and no one knows exactly what they own
 - Often a great range of ages in equipment and designs in use across a given system
 - Budget limitations and process restrict a public agency’s abilities
 - Many agencies have limited in-house knowledge of lighting



Barrier – Legacy systems cont'd

- In contrast, privately-owned lights involve a single decision
 - Likely to have existing staff for handling exterior lighting
 - Fewer uncertainties:
 - They know what they own
 - Tend to be more consistent in design and vintage
 - Metered
 - Fairly simple calculation
 - May encounter resistance to change from the status quo but relatively easy to remedy
 - Other barriers more relevant



Photo: GE

Barrier – Glare and lighting quality

- Increased efficiency that yields more light from a given surface area means higher luminance if viewed directly
- Higher CCT also tends to carry a perception of higher brightness
- Coupled with better directionality of the distribution relative to incumbent products, being in the main beam of LEDs can lead to discomfort or even disabling glare
- Is leading to some complaints by residents, and more



Davis Will Spend \$350,000 To Replace LED Lights After Neighbor Complaints

October 21, 2014 10:11 PM By Nick Janes

Filed Under: City Council, Davis, Light-emitting diode



Barrier – Rising concerns among the public

Credit: Pat Shannahan/The Arizona Republic



- Potential health impacts of blue λ
 - Circadian rhythm disruption
 - Melatonin suppression
- Sky glow
 - Night sky visibility
- Related environmental issues of artificial light at night
 - Migratory confusion
 - Seasonal markers (perceived daylength)
- Issues have entered the mainstream
 - Phoenix cancelled its RFP for 90,000+ street lights
 - Tons of journal articles and white papers
 - The nature of concerns lends themselves to fear-based exploitation
- DOE has initiated a small effort to investigate the overall expected quantitative impacts from conversion, taking into account SPD, lumen output, distribution and potentially other factors

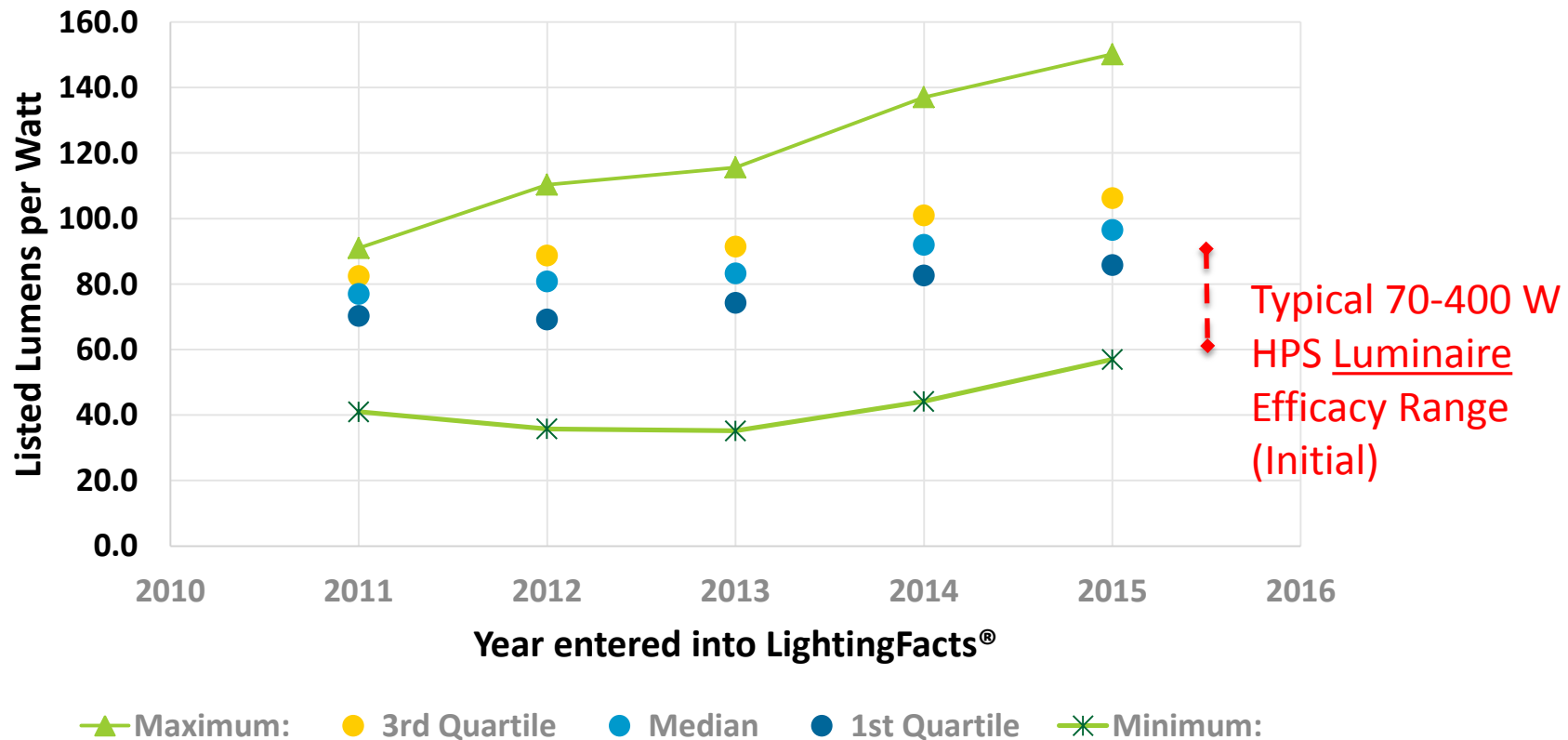
Fading Barriers

- Remaining unfamiliarity with LEDs and their costs
 - Whether to wait for controls still a common question
- Financing – numbers pencil out as long as savings can be credited and retained to repay the loan
 - Municipal bonds
 - ESCO financing
 - Manufacturer financing
 - Traditional financial institutions
- Concerns about lifetime and performance
 - Typical failure rates consistently averaging less than 1%
 - But, still less than a single life cycle of field experience and
 - Continuing to learn things about dirt depreciation
 - New issues continuing to arise from increasingly challenging applications, e.g., Yuma, Philadelphia International Airport

Fading Barriers – cont'd

- Energy and economic case versus the competition

LightingFacts® listed efficacy trends in Roadway/Area products by year entered*



*Based on 3,441 Roadway/Area products listed (Nov 5, 2015)

Going forward

- More large IOUs getting on board
 - Georgia Power
 - Duke Power Progress
 - Pacific Gas & Electric
- Municipalities and States taking initiative
 - Portland
 - Detroit
 - Washington State
 - Rhode Island
- REOs and other agencies becoming more actively involved
 - Delaware Valley Regional Planning Commission
 - Southeast Michigan Regional Energy Office
 - California Street Lighting Association

In summary

- Some barriers remain, some are dropping away as LEDs prove their advantages in the field, and other new ones are emerging
- None seem insurmountable but may delay some implementation in the near term
- We're still some distance away from achieving the full possibilities that LEDs bring to the table
- It's important to continue pursuing these in order for the technology to realize its full potential

Thank you

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