



## Designers Light Forum

### Community Friendly Lighting Bob Parks

March 13, 2018





Credit(s) earned on completion of this course will be reported to AIA CES for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.





## Learning Objectives

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At the end of the this course, participants will be able to:

1. Understand best practices for public lighting design that include improved visibility, visual comfort, and community outreach.
2. Explore ways to minimize the negative impact of public lighting on communities by minimizing glare, light trespass and skyglow.
3. Discover how innovative optical design, controls and proper spectrum can reduce the negative impact of public lighting on communities, human health and the environment.
4. Review examples of LED public lighting upgrades that have embraced the principles of community friendly lighting design.





# **Community Friendly Lighting Design Guide**

**Bob Parks, LC, MIES  
Executive Director  
Smart Outdoor Lighting Alliance**



# Public Lighting Goals

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- **Improve Visibility**
- **Driver/pedestrian safety**
- **Enhance Commerce/Mobility**
- **Reduce crime/enhance “feeling” of safety**
- **Deter litigation**
- **Minimize energy and maintenance costs**



# Unintended Consequences

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- **Glare**
- **Light Trespass**
- **Sky Glow**
- **Negative Ecological Impact**
- **Circadian Disruption**

# Glare





# Glare

- **Caused by light directed into eyes, not the target area**
- **IES defines light range of 60 – 90 degrees of nadir**
- **Defined as discomfort or disability**
- **Dramatically degrades visibility**
- **Requires increased overall lighting levels to compensate**
- **Often the byproduct of pursuing uniformity**
- **Always the result of poor lighting design decisions**
- **Disproportionately impacts seniors due to the physiology of the aging eye**



# Light Trespass



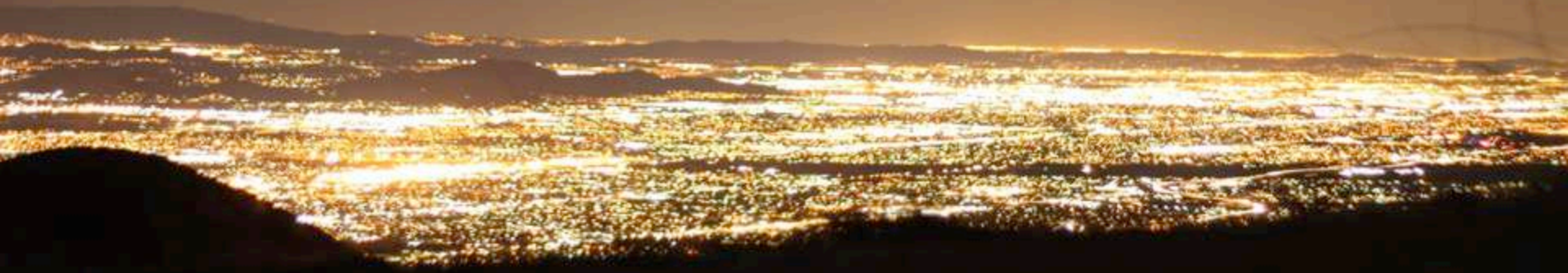
# Light Trespass



- **Created by light directed onto adjacent properties**
- **Caused by poor design, ignorance and insensitivity**
- **Most common public complaint by the public**
- **Subject of frequent lawsuits and violence**
- **#1 reason for most lighting ordinances**
- **Degrades quality of life & neighborhood character**
- **Property rights vs. “quiet enjoyment”**
- **Street lighting responsible for most light trespass**



# Sky Glow





# Sky Glow

- **The increase in night sky brightness**
- **Impacts astronomy, ecology and karma**
- **Produced by the scattering of light with moisture and particulate in the atmosphere**
- **Light +/- 10 degrees of horizon causes most**
- **Uplight and reflected light also contribute**
- **White LED can cause 300% or more sky glow than HPS**


# Impact of Light at Night

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- **Profound changes in all species:**
  - **Feeding**
  - **Predation**
  - **Reproduction**
  - **Migration**
  - **Survival**

# Lighting Quality

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- **Why has it been missing in public lighting?**
  - **Regarded as utilitarian**
  - **City & utility staff often lack lighting design training and experience**
  - **DOT's are typically an insular environment**
  - **Engaging professional help often difficult**
  - **Considered less prestigious than interior or architectural by lighting designers**
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- A photograph of a street at night. The scene is dimly lit, with a street lamp visible on the right side. The foreground shows a concrete sidewalk and a grassy area. In the background, there are some buildings and a dark car. The overall atmosphere is quiet and somewhat somber due to the low light levels.



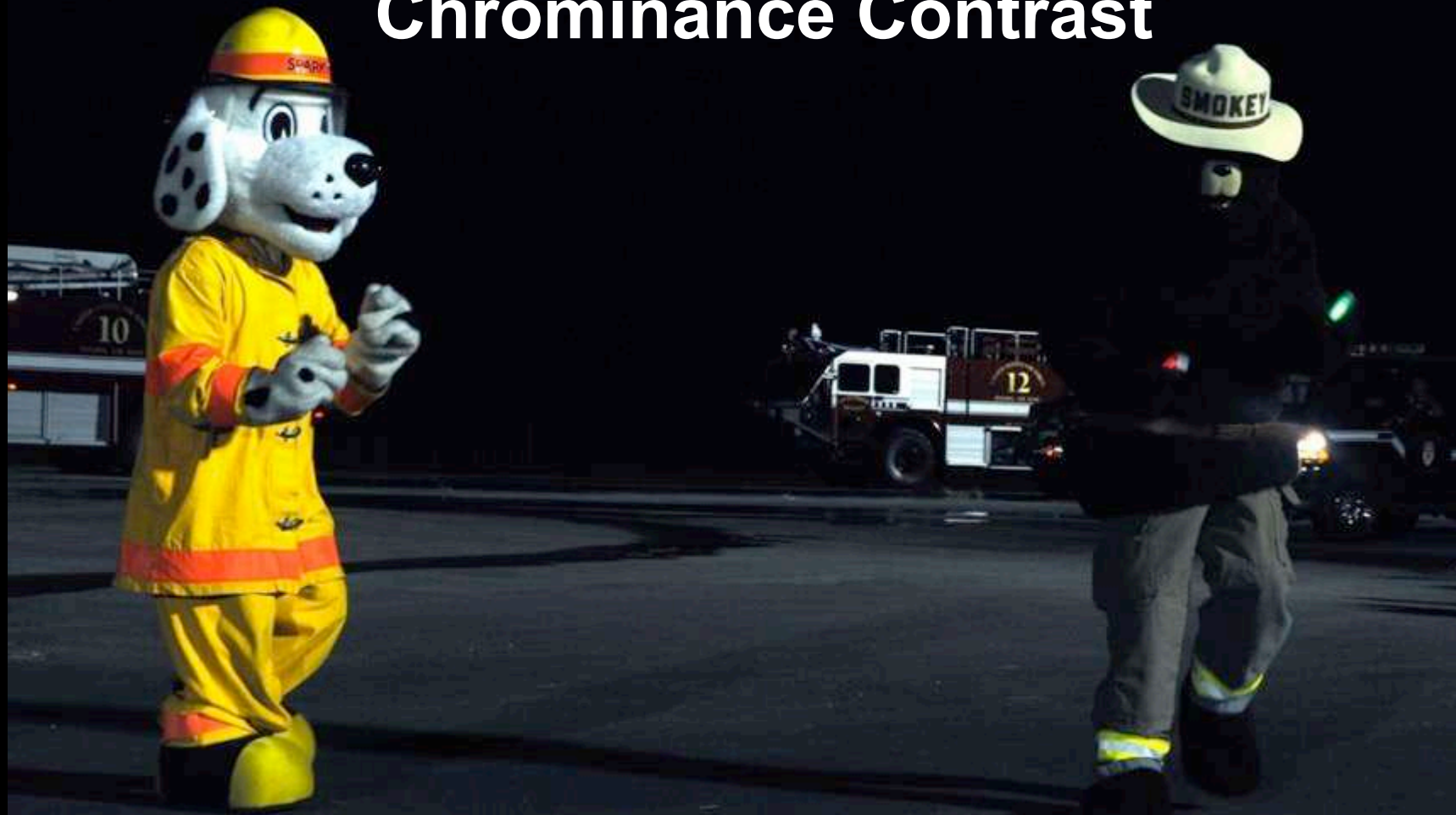
# Positive Luminance Contrast



# Negative Luminance Contrast



# Chrominance Contrast





# Municipal Lighting Choices

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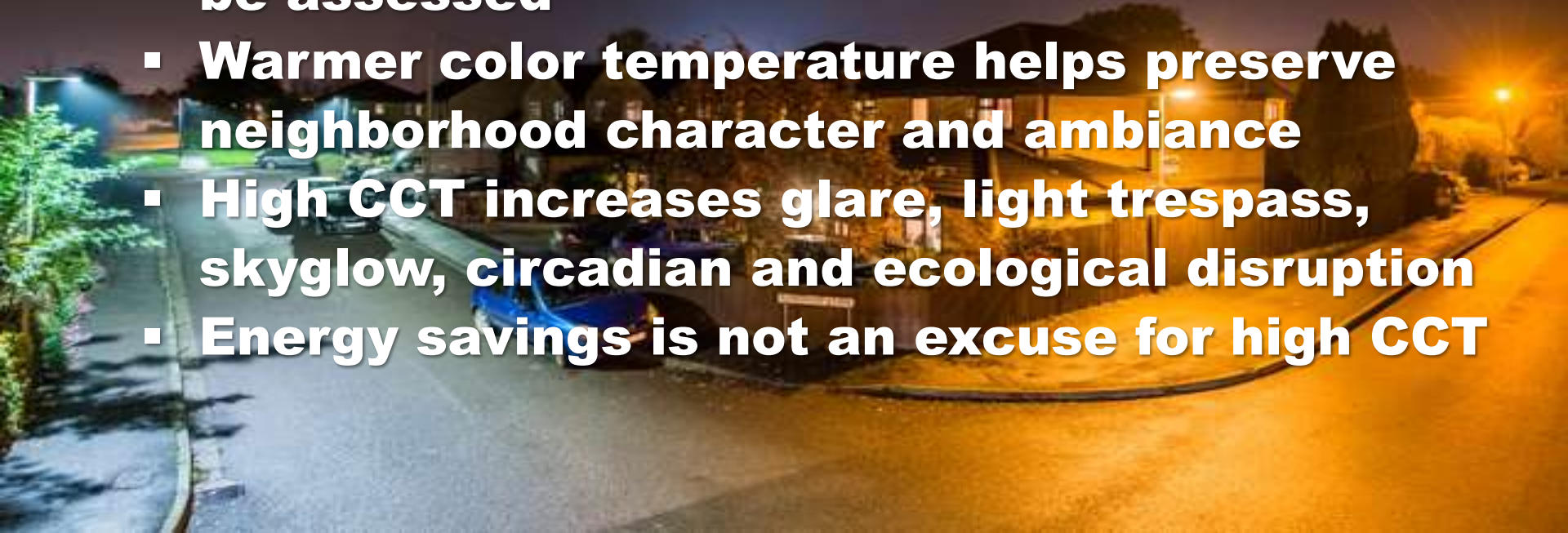
- **Lighting Levels**
  - **Luminance in excess of the RP-8 minimums is unwarranted and wasteful using LED**
  - **Higher lighting levels do not reduce crime**
  - **Over-lighting high crime areas stigmatizes neighborhoods**
  - **Increased lighting levels do not necessarily increase visibility**



# Municipal Lighting Choices

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- **Color**
  - **Color is a community preference that should be assessed**
  - **Warmer color temperature helps preserve neighborhood character and ambiance**
  - **High CCT increases glare, light trespass, skyglow, circadian and ecological disruption**
  - **Energy savings is not an excuse for high CCT**







# Municipal Lighting Choices

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- **Visual Comfort**
  - **Using appropriate BUG rated fixture reduces adverse impact and improves visual comfort**
  - **Uniformity doesn't trump glare/light trespass**
  - **Point source LED without diffusion reduces visual comfort, especially for pedestrians**
    - **Plenty of fixtures with improved visual comfort available now**

# Improved Visual Comfort



# Improved Visual Comfort





# Municipal Lighting Choices

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- **Controls**
  - **Not installing controls now is short sighted**
  - **Use of controls can save 50% more energy/\$\$\$**
  - **Constant lumen output saves ~15% alone while increasing fixture lifespan**
  - **Payback period  $\leq$  to that of fixtures alone**
  - **Adding later increases labor costs**

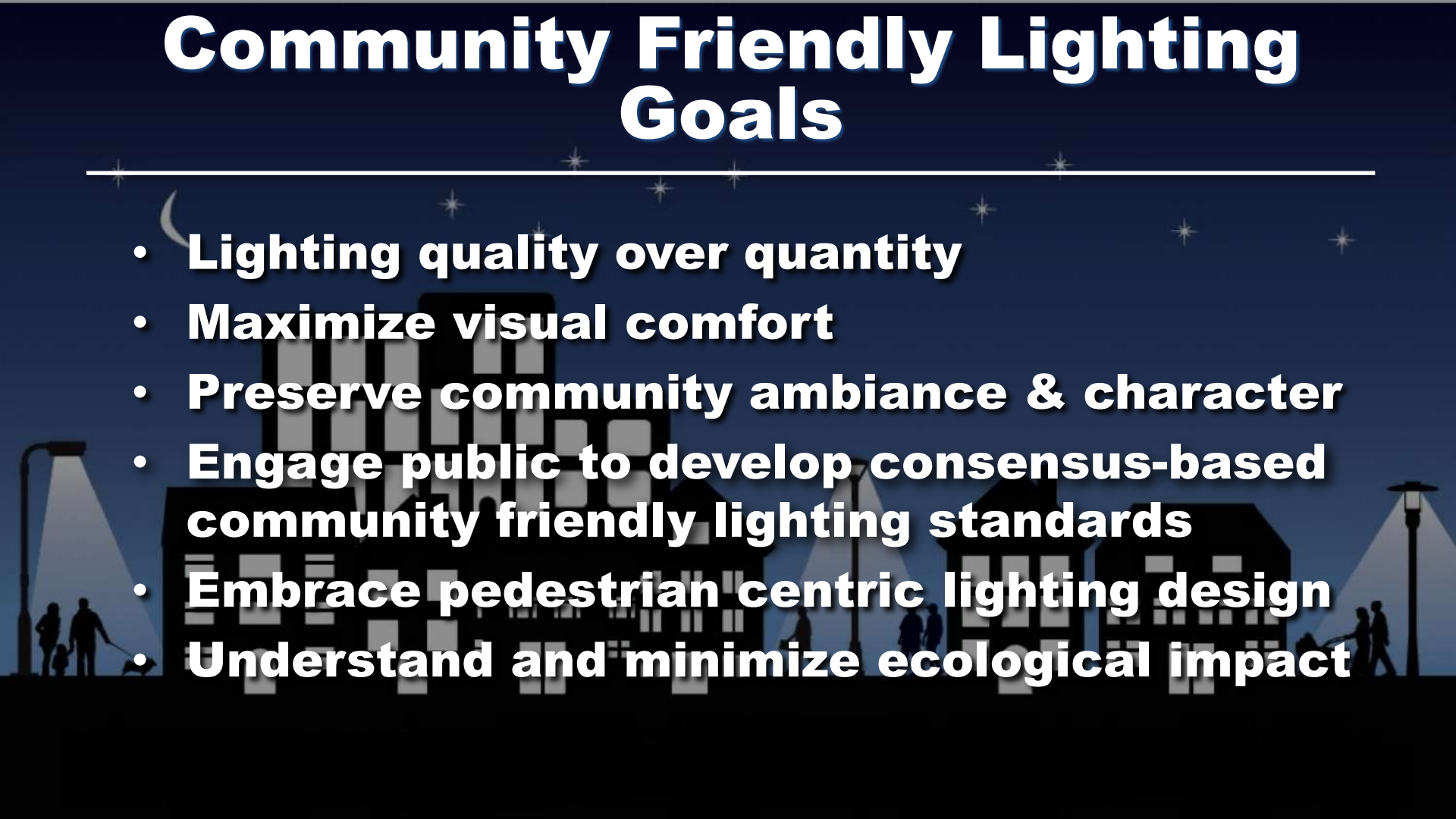
# Public Outreach

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- **DOTs need to engage experts for planning**
- **Pilot test all options: fixtures/CCT/controls**
- **Solicit public preferences with surveys/tours**
- **Use professionals to create “neutral” questions**
- **Engage broad demographic sampling**
- **Use social media, web and print advertising, and mail to engage widest population diversity**
- **Hold frequent town hall public meetings**
- **Base final design decisions on the data results**

# Community Friendly Lighting Goals

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- **Lighting quality over quantity**
  - **Maximize visual comfort**
  - **Preserve community ambiance & character**
  - **Engage public to develop consensus-based community friendly lighting standards**
  - **Embrace pedestrian centric lighting design**
  - **Understand and minimize ecological impact**
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- The background features a dark blue night sky with a crescent moon and several small white stars. Below the sky, there are silhouettes of city buildings and streetlights. On the left, a streetlight illuminates a path where a person is walking a dog. On the right, another streetlight illuminates a path where a person is walking. The overall scene is a stylized representation of a city at night.



# Community Friendly Lighting Best Practices

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- **Choose fixtures with improved visual comfort**
- **Smart controls to maximize savings/flexibility**
- **Vary lighting intensity to match traffic volume**
- **Use BUG 0-1 to reduce glare, uplight, & light trespass**
- **Find CFL certified fixtures and devices on the SOLA website: [SOLA.Lighting/CFLcertified](http://SOLA.Lighting/CFLcertified)**






This concludes The American Institute  
of Architects Continuing Education  
Systems Course



# ***Thank you, Questions?***

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A silhouette illustration of a city skyline at night. The buildings are dark with some windows lit up. In the foreground, there are silhouettes of people walking, a person pushing a stroller, and a person walking a dog. Streetlights are shown with their beams of light illuminating the ground. The background is a dark blue night sky with a crescent moon and several stars.

**Community Friendly Lighting Program**