# Dark Skies
## Strategies for reducing light pollution in Portland

City Council Session
September 17, 2020

Bureau of Planning and Sustainability
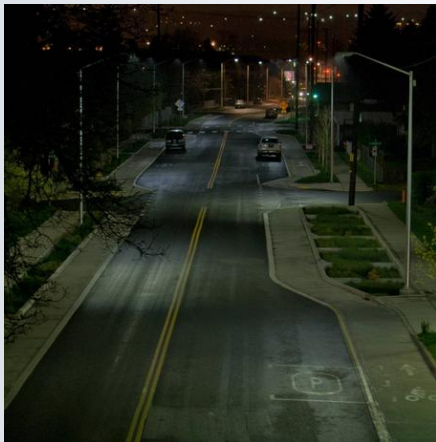Innovation. Collaboration. Practical Solutions.

# Introduction

- Project background

- Definition of light pollution

- Negative impacts from light pollution

- Best practices for reducing light pollution

- Recommendations

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# Introduction

- Outdoor lighting is an important element of urban areas at night.



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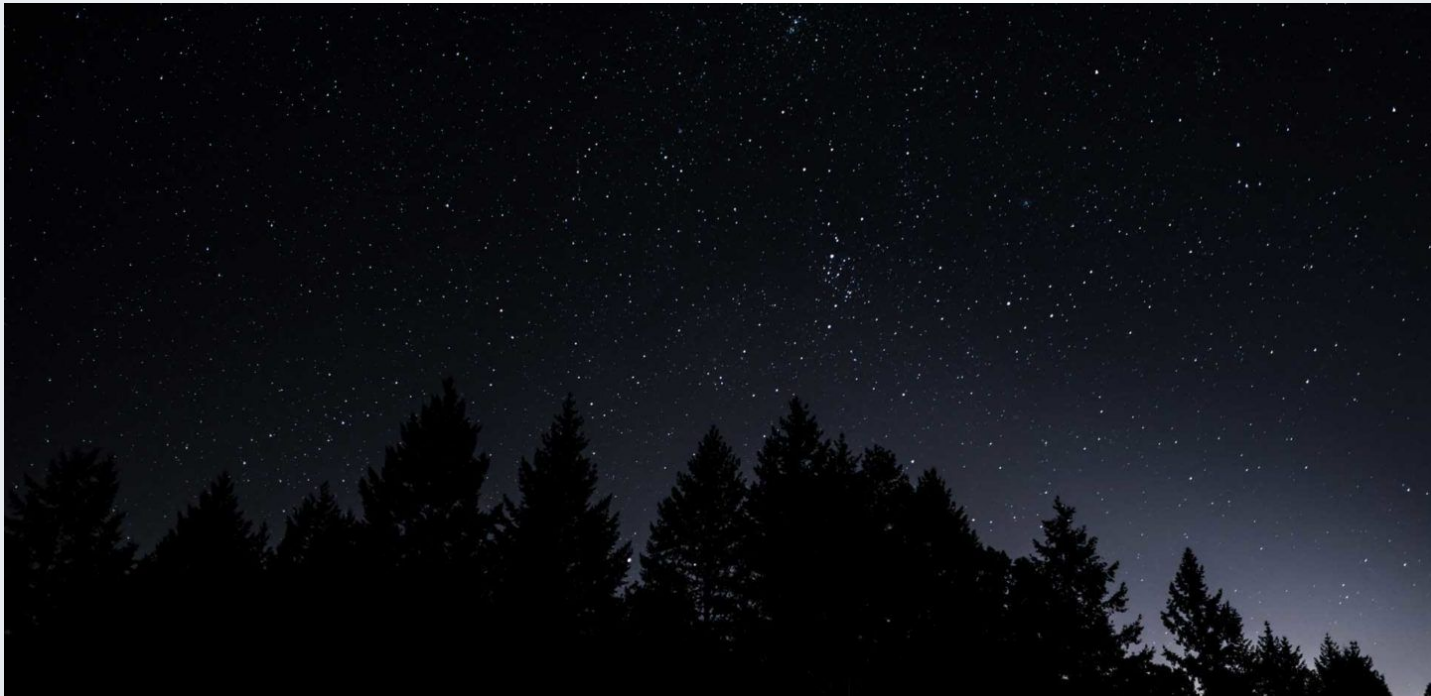Innovation. Collaboration. Practical Solutions.

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# Introduction



- Poorly designed and poorly shielded outdoor lighting produces light pollution.
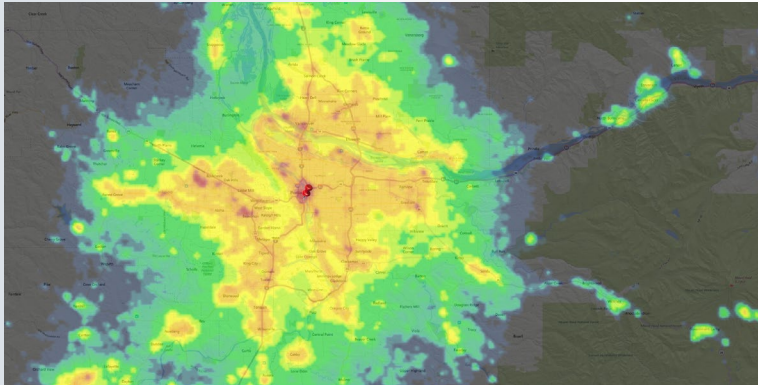
# Introduction

- Light pollution has negative impacts on humans and wildlife and impairs our ability to see the night sky.

# Background





- Portland has moderate levels of light pollution.

- Portland is a growing city.

- Smart City policies and regulations can reduce the light pollution as the city grows.

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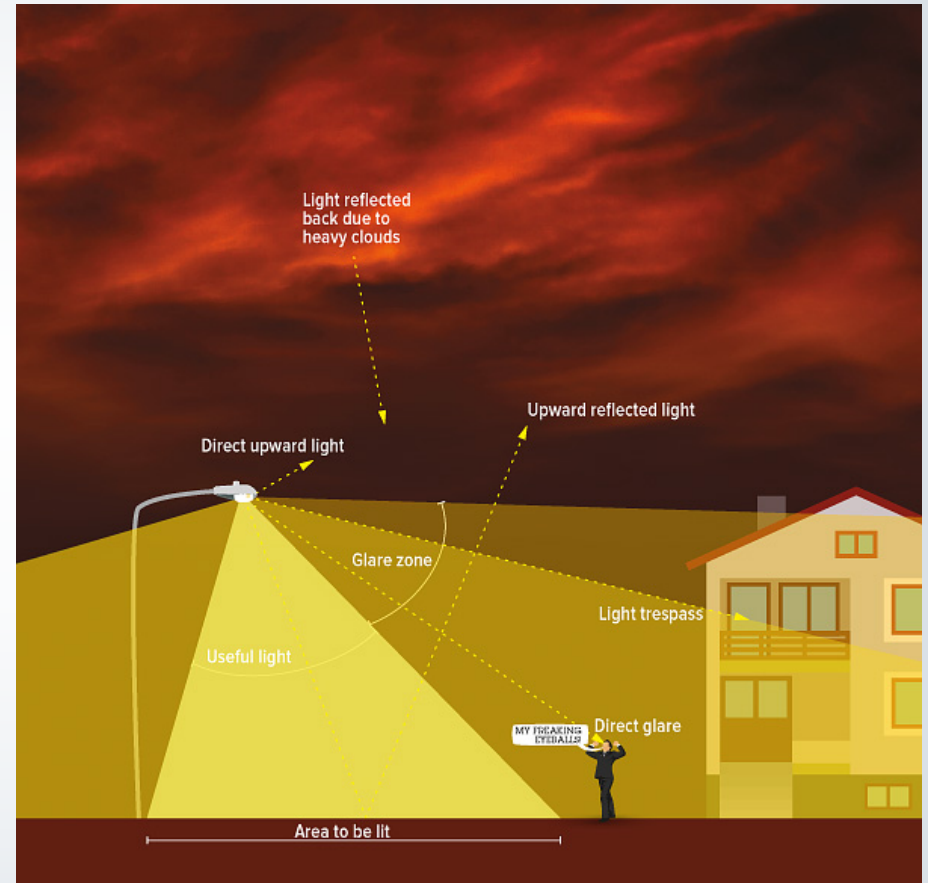Innovation. Collaboration. Practical Solutions.

# Existing City Policy



- Urban Bird Treaty City
- Climate Action Plan
- 2035 Comprehensive Plan
- Central City 2035 Plan
- Green Building Policy

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# What is light pollution?

- The inappropriate or excessive use of artificial light.

- Components of light pollution:
  - ➢ Glare
  - ➢ Skyglow
  - ➢ Light trespass
  - ➢ Over-illumination
  - ➢ Color

# Negative impacts

1. Human health and safety
2. Wildlife and ecosystem health and safety
3. Energy and carbon
4. Night sky viewing

# Human Health and Safety

- Lighting affects human health in the form of **impaired sleep quantity and quality.**

- Blue-rich white light **suppresses melatonin.**

- Bright light causes glare and can reduce the **safety of pedestrians and drivers at night.**

# Wildlife Health and Safety

- Light emitted upwards results in **birds colliding with buildings.**

- Research demonstrates widespread and **deleterious impacts on animals and ecosystems.**

  - ➤ Mammals
  - ➤ Amphibians
  - ➤ Bats
  - ➤ Fish
  - ➤ Turtles

  - ➤ Marine invertebrates
  - ➤ Primates
  - ➤ Insects
  - ➤ Trees
  - ➤ Plants

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# Energy and Carbon



- Increases Portland's carbon footprint and contributes to climate change.

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# Night Sky Viewing

- Light pollution **prevents us from seeing stars.**

*"In a primal sense, we've lost our connection to nighttime skies, the tapestries into which our ancestors wove their star-studded stories, timed the planting and harvesting of crops, and deduced the physical laws governing the cosmos."*

*--Nadia Drake,*
*National Geographic Magazine*

# LIGHT TO PROTECT THE NIGHT
## Five Principles for Responsible Outdoor Lighting

**IES** Illuminating ENGINEERING SOCIETY

**IDA**

**USEFUL**

**ALL LIGHT SHOULD HAVE A CLEAR PURPOSE**

Before installing or replacing a light, determine if light is needed. Consider how the use of light will impact the area, including wildlife and the environment. Consider using reflective paints or self-luminous markers for signs, curbs, and steps to reduce the need for permanently installed outdoor lighting.

**TARGETED**

**LIGHT SHOULD BE DIRECTED ONLY TO WHERE NEEDED**

Use shielding and careful aiming to target the direction of the light beam so that it points downward and does not spill beyond where it is needed.

**LOW LIGHT LEVELS**

**LIGHT SHOULD BE NO BRIGHTER THAN NECESSARY**

Use the lowest light level required. Be mindful of surface conditions as some surfaces may reflect more light into the night sky than intended.

**CONTROLLED**

**LIGHT SHOULD BE USED ONLY WHEN IT IS USEFUL**

Use controls such as timers or motion detectors to ensure that light is available when it is needed, dimmed when possible, and turned off when not needed.

**COLOR**

**USE WARMER COLOR LIGHTS WHERE POSSIBLE**

Limit the amount of shorter wavelength (blue-violet) light to the least amount needed.

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# Recommendations

- Establish a comprehensive set of regulations for outdoor lighting.

- Address streetlight through shielding and reducing the color temperature (i.e. the amount of blue-rich white light).

- Promote and incentivize participation in an organized Lights Out program.

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| Strategy 1: Addressing light pollution associated with new and existing development on private and publicly owned property | | | | |
|---|---|---|---|---|
| | Action | Lead Organization | Recommended Timeline and Estimated FTE | Priority |
| 1.1 | Establish in the Portland City Code, a comprehensive set of regulations for outdoor lighting associated with new construction and remodeling projects. Carry out this action by either:<br><br>Option 1. Amend Title 33, Planning and Zoning, to consolidate and expand existing exterior lighting regulations, OR<br><br>Option 2: Create a new City Code title specific to outdoor lighting.<br><br>Use the IDA/IES Model Lighting Ordinance and other municipal ordinances as references to inform development of outdoor lighting regulations for Portland, but at a minimum add regulations for all outdoor lighting, including streetlights if Option 2 is chosen, that:<br><br>• Limit total light output;<br>• Require that exterior lighting be directed only where needed and not shine horizontally, upward, or onto adjacent properties;<br>• Require that exterior light fixtures be shielded and diffused with a Backlight-Uplight-Glare rating of B0, U0 and G0;<br>• Limit the color temperature of outdoor lighting so that it does not exceed 3000 Kelvin, with lower temperature (2200K – 2700K) specified for environmentally sensitive areas and parks. Continue to research impacts of blue-rich white light on people with sensitive receptors and other disabilities and adjust the temperature recommendations as necessary;<br>• Require lighting control devices that allow dimming of interior and exterior lights when full output is not needed;<br>• Require that rooftop and other exterior architectural lighting be directed downward;<br>• Prohibit spotlights that direct lighting into the sky.<br><br>(see Appendix A for a comparison of outdoor lighting ordinances.) | BPS | within 2 to 5 years<br><br>Option 1:<br>1-1.5 FTE for 1.5 years<br><br>Option 2:<br>2 FTE for 2+ years | High |

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# Feedback on the Recommendations

- Staff received over 200 comments on the Public Review draft.

- 99% of the comments mention "support" or "strong support" for the recommendations.

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# Equity Focus Group

- Focus group to discuss the Dark Skies findings and recommendations.

- Hoped to learn from the lived experiences of Portlanders who are members of BIPOC communities.

- Wanted to understand how people experience outdoor lighting in their communities.

# Equity Focus Group Findings

- *"I suffer from insomnia and I've had to put up blackout curtains to block out the light at night."*

- *"I live in a townhome community that has LED lighting along sidewalks and paths. I appreciate having the exterior lights for safety, but I feel like there is a tradeoff."*

- *"I had no idea that I even had a voice in requesting shielding."*

- *"Lights cause pollution, light causes global warming and other problems. So how do we get away from polluting the atmosphere but still feel safe at night?"*

- *"Many East Portland neighborhoods are devoid of trees. We need more trees."*

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# Equity Focus Group

- Feedback from equity focus group supports the recommendations to:

  - Develop and implement a comprehensive set of regulations for outdoor lighting.

  - Fully fund a streetlight shield program that proactively addresses light trespass from streetlights.

  - Design and fully fund a public education and outreach campaign to encourage property owners to retrofit their existing outdoor lighting.

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# Invited Guest: Portland Audubon

# Questions ?