By Cara Buckley
Visuals by Danielle Amy

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One recent night in July, Denny Robinson, a project manager for the City of Pittsburgh, stood on a street corner in the North Side, lit up by newly installed streetlights, fiddling with his phone.

"Let's dim it down to 24 percent," Mr. Robinson said, sliding his thumb across the phone's screen. Four nearby streetlights softened to a gentle glow, eliciting oohs and aahs from a small group of onlookers gathered to behold the wonders of municipal mood lighting. Pittsburgh is replacing most of its streetlights — more than 33,000 inefficient high-pressure sodium lamps — with LED versions that are projected to save about $942,000 a year in energy costs while tackling light pollution.

The old lights cast an orange glow that bathed the heavens and anything nearby in what Flore Marion, the city's assistant director of sustainability and resilience, described as "horror-movie" lighting.

The new lights are directed downward and emit warmer light than many LEDs. Compared with the old orange lights, the new lights appear brighter when fully turned up, but shields can be added to the fixtures to curb what is known as "light trespass."
Mr. Robinson said he also plans to dim the new lights between 11 p.m. and 4 a.m., which will save energy and money, and, according to the city, cause less harm to migratory birds, urban wildlife and humans.

Thanks to urbanization and electrification, light pollution is growing globally by nearly 10 percent a year, according to a 2023 study. Many areas are overlit, which wastes energy, obfuscates starry skies and messes with the circadian rhythms of plants, wildlife and people. Pittsburgh officials had long planned to swap out the city's old streetlights, but for years they didn't have the budget to adopt the types of LED streetlights that other cities were beginning to install.

That turned out to be a good thing. The first generation of LED streetlights led to lower costs and energy savings, but also heightened exposure to glare and harmful blue light.

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In 2016, the American Medical Association warned that blue-rich LED streetlights suppressed melatonin and contributed to sleeplessness, poor daytime functioning and obesity, while also disorienting birds, insects, turtles and fish species that need darkness at night. Some research suggests that bright city lights worsen air pollution by hindering nighttime chemical reactions that clean the air.

The City of Pittsburgh included new streetlights in its 2021 budget, and not long afterward passed an ordinance that follows guidelines from DarkSky International, a nonprofit organization focused on fighting light pollution. One feature of the new lights that complies with DarkSky International's recommendations is a relatively warmer hue. Nighttime LED lighting around warehouses and in prison yards often emits bright, cold blue-rich light that can have a color temperature of 5500 Kelvin and up. DarkSky International recommends streetlights with warmer tones and a maximum color temperature of 3,000 Kelvin. Pittsburgh's new lights are 2700 Kelvin.

"We leapfrogged the LED blue-light phase," Ms. Marion said.

According to the city, the new lights will last at least four times longer than the ones they're replacing, saving the city nearly $500,000 in maintenance costs annually. Because it's using less electricity to run the lights, the city estimates it will prevent 12,000 metric tons of carbon dioxide emissions each year.

"It's practical and pragmatic, because of its simplicity and its impact," said Grant Ervin, Pittsburgh's former chief resilience officer.

One of the biggest proponents of Pittsburgh's dark-sky lighting ordinance is Diane Turnshek, who teaches astronomy at Carnegie Mellon University and the University of Pittsburgh.

Ms. Turnshek, 70, who grew up in New England, remembers easily seeing the Milky Way as a child. Over time, she grew dismayed at the fact that her astronomy students couldn't readily see dazzling starry skies, and that light pollution often wasn't considered an environmental concern. She was determined to raise awareness about the problem and ways to address it, and worked with the city of Pittsburgh to pass the ordinance.

"It's such an easy fix," Ms. Turnshek said. "You turn them off. You use them appropriately. You don't use them when you don't need them. Change is instantaneous and saves you money."

The prospect of dimmer streetlights is often met with public resistance because of the belief that artificial lights increase nighttime safety.

But while people may feel safer with more light at night, that doesn't necessarily correlate with crime statistics, said John Barentine, a consultant and former director of public policy for DarkSky International.

American cities and towns often vastly exceed recommended levels of illumination, creating glare that can be blinding, he said. Lower-income neighborhoods with more people of color often had brighter lights than more affluent, white neighborhoods, he said.

"We're arguing in favor of public safety by preserving and enhancing nighttime visibility through better lighting design," Mr. Barentine said. "We're actually doing people a favor by bringing the light levels down, because we're helping the eye to operate most efficiently under nighttime conditions. We're aiding vision, rather than taking something away."

Still, there are limits to the benefits. Avalon Owens, a research fellow at the Rowland Institute at Harvard University, said that even warm, dim artificial light was usually too bright for most nocturnal insects, which have eyes that are thousands of times more sensitive than those of humans and are most active a few hours after dusk. Motion activated lighting was also preferable, she said.

But shielding lights from natural areas did reduce some negative impacts on insects and the species that rely on them, Ms. Owens said. LEDs also use less power, generating fewer greenhouse-gas emissions, and climate change is one of the biggest threats to biodiversity.

1. Diane Turnshek was one of the biggest champions for the Dark Sky Ordinances and worked with Pittsburgh to pass theirs. The Allegheny Observatory is one of the best spots in Pittsburgh to view the night sky.]

“It’s a matter of minimizing harm,” Ms. Owens said.

The City of Pittsburgh also has about 3,450 LED streetlights with color-temperatures of 4000 Kelvin that will be swapped out for the new, warmer versions. The $15 million project is expected to be completed in 2027.

Other places that comply with Dark Sky lighting guidelines include Flagstaff, Ariz., and Jackson Hole Airport, Wyo., Mr. Barentine said, adding that Pittsburgh’s Dark Sky ordinance was notable for a city of its size.

One afternoon in early July, Chad Ott, an installer, was high up in a bucket truck, swapping out a streetlight on the city’s North Side. He’s found all traces of wildlife in the old lamps, including mouse nests, old beehives and, once, a startled squirrel.

Later that night, Barb and Shawn Jackson, who live nearby, assessed the new streetlights. They liked the safety aspect, they said, because children biked around at night, but they felt the lights were brighter than the old ones, a concern echoed by some on Reddit. Jacob Williams, a press officer for the City of Pittsburgh, said residents could petition the city to dim the lights and request shields for the new fixtures.

Ms. Turnshek, for her part, plans to continue advocating for sites she considers too brightly lit, such as bridges. The hope, she said, is that more cities will follow, and more residents will see the advantages of curbing light pollution and embracing the night.

“I would like to teach people that darkness has value,” she said. “That it’s not just the absence of light.”