

The Night Sky is Vanishing — And Our Sleep May Never Be the Same

By Paige Towers • July 7, 2016 at 7:04pm

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The dark sky is in need of saving.

According to a new comprehensive

created by the Light Pollution Science and Technology Institute in Italy (ISTIL) and published in more than 99 percent of the population of the mainland U.S. now resides in areas that are classified as light polluted. And it's getting worse: New York City is one of many cities across the U.S. that's in the process of transitioning its streetlights to ecoefficient, but brighter LED bulbs — one of the biggest culprits of light pollution. This means that while most of us are unable to see a pure night sky because that inky expanse studded by stars, planets and the bright fog of galaxies has been beaten back by our electric lighting, future generations may never know the beauty of looking up and seeing an ocean of stars from their doorstep unless we change direction.

<http://vanwinkles.com/lightpollutionisobstructingtheviewofatrulydarksky> 1/9

atlas of world light pollution

Science Advances,

But the problem goes beyond the celestial: Light pollution has a negative impact on life as we know it — including our sleep.

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The transition to an artificial light filled world happened quickly. The use of gas street lamps increased throughout the 19th century as towns and cities expanded into rural areas, and electric lighting became commonplace in homes and businesses in the U.S. by around 1930. Currently, the

U.S. Energy Administration estimates that in 2015, about 404 billion kilowatt hours were used for lighting both in the U.S. residential and commercial sectors. Light pollution spread at an incredible rate.

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U.S. Energy

Information Administration

One of the biggest culprits today is incredibly common. Fabio Falchi, one of the researchers of the ISTIL report and the author of "The World Atlas of Light Pollution,"

Falchi has been studying light pollution for 20 years and believes that the biggest enemy of natural night skies isn't just the widespread use of electric lighting, but specifically LEDs. Now used in

many street lamps, LEDs are regarded as the most efficient lighting source. New York City is in the process of replacing its 250,000 streetlights with LEDs, as are

Washington, D.C., Eugene, OR, Austin, TX and many other cities. But bulb efficiency translates to street lamps that shine brighter and spread their glow further than previous models, thus creating clouds of hazy light that hang over cities and muddy the sky for hundreds of miles in each direction.

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The hazy light is starting to spread everywhere. According to the ISTIL, more than 80 percent of the world's population lives under lightpolluted skies. The worst offender awards go to South Korea and Italy, while countries like Canada and Australia fare a little better — but not by much. Per the International DarkSky Association

(IDA), a nonprofit organization dedicated to protecting our night skies, earth only has a few spots left where the night sky is unaffected by the jealous glow of our electric lights, including areas of

Africa, South America and southeast Asia. If this continues, our natural view of the stars is in jeopardy.

Science Advances

Electric lighting is one of the great feats of modern civilization: streetlamps guide our way home and help ward off crime; electric bulbs allow businesses to stay open late or run through the night. But for all the ways artificial light allows us to be safer and more productive, it has scarred the night sky. One only has to gaze at these night images from ISTIL's atlas to understand the effects. From afar, the map of the U.S. looks as though it is inflamed, infected by some sort of quicklyspreading bacteria. This probably wasn't how Benjamin Franklin envisioned it.

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The everbrightening world impacts our internal rhythms as much as it does our view of the night sky. A 2016 study from the American Academy of Neurology, for instance, showed that extensive city lighting not only led to less sleep for urban residents, but also an increase in people's likelihood to develop sleep disorders. In fact, people living in highlit areas were more likely to report feeling dissatisfied with their sleep quantity or quality, as well as report feeling fatigued during the day. Additionally, compared to folks in dimmer locales, those highlit individuals were more likely to sleep less than six hours per night.

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study

Like plants and animals, humans evolved with a consistent lightdark cycle, but because of the increasingly bright sky our biological body clocks are getting screwy. We run on a roughly 24hour cycle that's governed by the sun. Morning light is full of highintensity bluelight, which triggers our body to turn off its production of the sleepinducing hormone melatonin, and tells it to start waking up. As natural rays lessen throughout the day, our energy levels steadily fall. Once evening rolls around, blue wavelengths scatter, giving

way to warmer ones that encourage our bodies to produce melatonin and prepare for sleep.

Artificial light messes with this natural order. According to a 2009 study

published in *Environmental Health Perspectives*, our body's production of melatonin — the hormone our body secretes when it's time to sleep — is suppressed when artificial light (or any light for that matter) hits our eyes. Insomnia, disrupted sleep and other such issues follow. A 2016 joint study

from Stanford University and NASA reported similar findings: people exposed to high levels of outdoor nighttime light experienced symptoms consistent with circadian rhythm sleep disorder, including delayed bedtimes and wake times as well as short, unsatisfying rest.

Many other studies confirm the damning presence of bright lights. But perhaps the most pointed is a 2016 American Medical Association report

on the effects of LED light on humans and the environment. In it the authors state “[...] some evidence supports a longterm increase in the risk for cancer, diabetes, disease and obesity from chronic sleep disruption or shiftwork and associated with exposure to brighter light sources in the evening or night.”

Light pollution, of course, affects more than our sleep. Reckless use of lighting disrupts nature: , for instance, have a difficult time finding a dark beach on which to lay their eggs; what's more, since they look to the moon to find their way to the ocean, sea turtle hatchlings are thrown off by artificial light and millions don't make it. Also, millions of migrating birds each year from wandering off course or because their seasonal schedules are confused by artificial light. There are certainly more issues: scientists are just beginning to study the biological impact of all this unnatural light.

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sea turtles

die

Fortunately, awareness is spreading. The IDA, for instance, has created an awardsystem to denote areas where dark skies are preserved (goldcertified areas are unblemished by light) as well as a list of communities

that have shown the most dedication to preserving the night sky.

According to the IDA's chart

, the best way towns and cities can lessen their share of the light pollution is through the use

of acceptable lighting fixtures that only shine as brightly as necessary, point downwards and minimize the emission of the blue light, the latter of which is public enemy number one when it comes to stalling our melatonin production.

The ISTIL states similar guidelines, urging an increased awareness of light, all of which amount to this: we should be more aware of flipping the switches, the way one might be more conscious of lawnwatering during a drought.

But, the growing issue requires more than a few forward thinking citizens and cities. “[The] EPA should intervene to strongly reduce this pollution,” says Falchi. “Firm policies are needed.” He says that this is especially urgent now, as we transition toward LED technology. “We have to limit the blue content of the light, not use cool white LEDs but [instead] warm white or PC amber LEDs, even if they are, for now, a little less energy efficient.”

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Unsurprisingly, most U.S. urban areas have a long ways to go in preserving the night sky. It will require work and policy. But the rewards are considerable. As are the impacts to both sleep — and the human spirit.

“Not having the possibility to see what is literally the greatest wonder of Nature, a star filled pristine night sky, is a cultural loss of unforeseeable consequences,” says Falchi. “These are the first human generations not experiencing the inspiration of a starry sky, inspiration that drove philosophy, religions, science, literature, arts since the dawn of civilization.”

And if there are no stars to see, then what do we reach for?