

SG GREEN



MCI permit number [MCI (P) 095/06/2019]

Pushing the Envelope



SINGAPORE
GREEN
BUILDING
COUNCIL

INSIDE:
**SGBC: INSPIRED BY NATURE,
POWERED BY COLLABORATION**

Pg 4

**SHINING A LIGHT ON
LIGHT POLLUTION**

Pg 28







SHINING A LIGHT ON LIGHT POLLUTION

Singapore is one of the world's most light-polluted areas but good lighting practices are able to help reduce excessive lighting but still keep things sufficiently lit

Shining A Light On Light Pollution



MISSING THE DARK

"The sun, the moon, and the stars would have disappeared long ago... had they happened to be within reach of predatory human hands" (Havelock Ellis).

The hour is approaching midnight. Digital billboards are flashing from every corner. Most of the lights are trying to sell something. Illuminated by millions of lightbulbs, one building is brighter than the other. Nights are getting brighter. Where are the stars?

DARK SIDE OF LIGHT

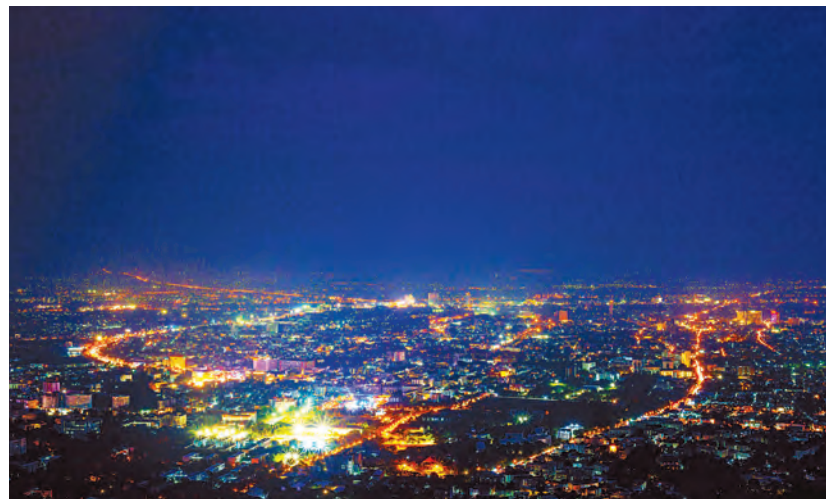
The light bulb is one of the most transformative and greatest inventions of all time. It has changed the way we live. Cutting out the darkness by flicking a switch, the light bulb allows us to extend the day and travel safely in the night. But the lightbulbs

come with a dark side. They have stolen the night and cause harm to the natural world. Incredible night transformation serves an important biological function. However, the excess light that we throw into the environment is endangering ecosystems and organisms whose life cycles depend on the darkness. And in a primal sense, by turning night into day, we are losing connection with a night sky. Light is essential, but in many places, light is used beyond necessity. Millions of people across the globe are losing a chance to be touched by cultural heritage and experience a shimmering river of stars. The loss is caused by light pollution.

WHAT IS LIGHT POLLUTION?

Light pollution, also known as photo pollution, is the excessive use of light produced by humans in the night environment. Its artificial sources

Shining A Light On Light Pollution



include street lamps, billboards, factories, residential properties and offices. According to the International Dark-Sky Association (IDA), light pollution comes in a variety of forms, including glare, glow, light clutter and light trespass. Glare is defined as an extremely bright light that reduces visual performance. Skyglow is that diffused glow and brightening of the sky; it is those poorly designed lighting systems that cause dome-like orange skyglow. Light clutter is a cluster of excessively bright streetlights that cause confusion and disorientation. Lastly, light trespass is unwanted street lighting that unintentionally illuminates homes and other properties. A light trespass problem occurs when an unshielded streetlight is directed skyward. The fact is that lighting wastefully spills into the night sky instead of illuminating the intended area.

SINGAPORE – THE CITY THAT NEVER SLEEPS

Despite the growth rate of 6 percent each year, the problem of light pollution is getting very little attention. Today, more than one-third of humanity live under the skyglow and can no longer see the Milky Way. According to research findings, Singapore has the highest level of light pollution in the world. Over the past decades of rapid economic growth, the use of artificial lighting has dramatically increased and the glare of lights drowns out the brightest stars. The younger generation might never get a chance to be bathed in the beautiful mystery of the night sky. However, the problem of light pollution is beyond stargazing. The excessive light at night is unnecessary and generates heat that pose severe climate challenges. As Singapore is striving to become an environmentally-friendly hub at the forefront of climate action, it is time to ask: “Does Singapore need so many lights?”

Shining A Light On Light Pollution



EFFECTS ON HUMAN HEALTH

From starry night to electric light, the invention of the light bulb has changed the human lifestyle by turning night into day. Over the past half century, a series of studies have shown how exposure to artificial lighting at night causes harm to human health. But before understanding the potential consequences, it is important to understand the mechanism of the circadian rhythm, driven by a 24-hour light-dark cycle. Overexposure to lighting at night results in the suppression of melatonin production, metabolic, and other psychological processes. Chronic disruption eventually causes serious health issues. The most common disorder is a circadian rhythm sleep disorder. Millions of shift workers experience forgetfulness, heart disease, diabetes, obesity, and other ailments. In 2007, the World Health Organization (WHO) found that shift work serves as a potential risk for cancer. Lastly, it is important to understand that the “missing sky factor” in urban areas creates a potential risk of psychological disorder, including depression, anxiety, and other illness. It is time to undertake the measures against light pollution and bring back the night sky.



Shining A Light On Light Pollution



LED PARADOX

People across the globe are moving away from fluorescent and incandescent lamps to cost-saving Light-Emitting Diodes (LED). LEDs are brighter, more durable, and consume lesser energy as compared to traditional light sources. However, the problem of light pollution continues to grow. According to a study by National Geographic, people tend to misuse the energy-saving alternative and over illuminate the environment that have never been lit up before. However, the problem is not with LED technology. In many cases, street lighting is used beyond necessity. Misdirected amount of light that bounces in the atmosphere creates a light cluster and skyglow. The outcome is growing light pollution, an unnecessarily lighted environment and an increase in electricity bills. By cutting down on unnecessary lighting, the world may once again start to see the Milky Way opening up above. Well-

designed lighting is essential for living and can help to reduce light pollution, as long as lower energy usage is not used to create additional lighting.

SOLUTION TO LIGHT POLLUTION

Although light pollution is becoming one of the most chronic pollutant situations that the world is facing today, it is one of the most accessible problems to resolve. With a good lighting policy in place that does not require a big budget, undertaking measures to curb light pollution can help to reduce energy wastage and contribute to environmental sustainability.

Cutting down on excessive lighting can help to reduce carbon emissions that light bulbs emit into the atmosphere. Here are some practical methods to fight light pollution:

- **Save energy:** Place motion sensors on outdoor lighting systems to reduce illumination level and use light only when needed.
- **Reduce heat:** Use a high-quality light source that produces less heat.
- **Minimise glare:** Use low-glare lighting systems with uniform illumination that allows dimming of the light source.
- **Shield the light to prevent escape:** Proper shielding using the installation of necessary fixtures into the lighting system can help to direct light downward onto its intended target.
- **Save the environment:** Minimise the spill of indoor lighting into the environment, as every little step counts and each step is a victory over light pollution.

According to the IDA, success in reducing light pollution can be achieved not only through understanding the technical elements of lighting but through environmental education programs. It is necessary to raise the awareness on the danger of unnatural light that can help to reduce light pollution and implement good lighting practices across the globe. ✓



By Alina Yanguchina
SG-Glass Pte Ltd



LES

LES IS MORE

 SINGAPORE INNOVATED
INTERNATIONALLY PATENTED
GLASS TECHNOLOGY

A LES BRIGHT FUTURE



Uniform
Light



Moon Shine
Effect



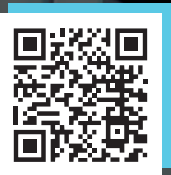
No
Heat



Print Light
on Glass



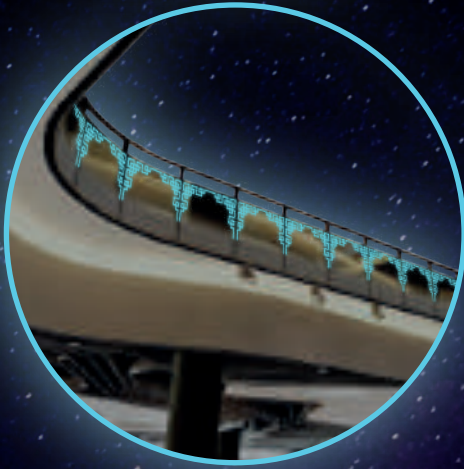
No
Glare





The Real Sky Light. LES Glass Canopy

Functional yet beautiful, performing day and night.



Less Is More With LES Glass Railing

Lighting the railing has never been easier with the integrated solution.



Like A Partition. Unlike Any Partition. LES Glass Partition.

Paint light on glass like never before.



Thinnest Lighted Mirror. LES Glass Mirror.

See the beauty of light printed on mirror.

LIGHT EMITTING SURFACES

An all-in-one glass lighting system that brings light to life with the print technology. LES is the product of SG Glass Pte Ltd, supported by A*Star and developed in joint collaboration with the technology of SG-Tech Pte Ltd. Certified by SGBC (Singapore Green Building Council), LES is high in energy saving and low in carbon emission, therefore can be viewed as a beacon for Green Technology.

LES IS MORE

Light Emitting Surfaces (LES) is the innovative lighting on the glass, the only cold light source in the industry with a uniform diffusion of light that mimics the moonshine effect. Without the limitation of traditional light bulb, LES print technology is capable of even dispersion of light across large surface. With no heat and glare produced, LES allows you to conveniently light up more area with less energy required. Cool ambient luminescence allows to create a harmonious and peaceful environment lighting that does not invade its surrounding.

PAINT LIGHT ON GLASS


LES is the first print lighting technology that captures the light on glass like never before. Cool ambient luminescence allows architects and designers to create a harmonious and peaceful environment that does not invade its surrounding in creative lighting applications such as facade lighting, glass features, designer lamps, signages, billboards and others. A key differentiator for LES is that technology allows to feel no discomfort when staring directly into LES light source that can be viewed evenly at a wider angle and for a longer distance. Throughout the day, LES printed technology allows to reject a heat transfer by providing insulation. In the night time, a display of soft, cool light mimics the glow of the moonshine with minimal energy consumption.



SG-GLASS



SG-TECH

 www.lightemittingsurface.com

 les@sgcorp.biz

SG Glass is committed to environmental sustainability and actively initiates Go-Green efforts with LES lighting solution. Energy efficiency and environment cohesiveness will continue to be a priority for SG Glass with the introduction of LES surface lighting technology