

# ENERGY OBSERVER

A MONTHLY NEWSLETTER FROM AMERLUX®

JULY 2020

As the COVID-19 pandemic evolves, our employees' safety remains our highest concern. Therefore, Amerlux has activated contingency plans that will protect our employees without missing a shipment.

We are experimenting with innovative ways to stay productive companywide, while upholding our civic responsibility to protect our communities. We are keenly focused on the health of our employees, customers and the entire Amerlux family at large.

Together, we will emerge stronger.

To protect communities and maintain high levels of service, we have implemented additional measures:

- For employees who work on-site, we have implemented extra health precautions in the building to limit exposure to other team members.
- For employees who can work off-site, we have made it easier for them to work remotely.
- All business travel has been suspended.
- Our headquarters, including the showroom, remain closed to visitors.

And our innovative plan is working.

Our production capabilities have not been impacted by the COVID-19 outbreak. From different venues, our employees remain committed to working hard to ensure our products are ready for delivery with the same amount of care and custom craftsmanship that build our brand. We continue to work with our suppliers to ensure a productive supply chain. If we are required to shut down production, we will send separate notification.

Our resolve has not waned during these challenging times.

As part of the dedicated Amerlux family, we wish good health to you and your families.

Please stay safe and be well.

Chuck Campagna  
President,  
Amerlux, LLC

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## National Energy Market Observer:

**1. Lots of Rebate Programs Are Now Offering a Bonus** - Most rebate programs have participation and energy reduction targets they strive to achieve each year. Occasionally, when they're having problems meeting these goals, they implement bonus programs. These programs typically offer increased incentives for the existing rebate measures for a set period of time. The value of the bonus will vary depending on the utility. Sometimes, it's an extra 10% or 20%; other times, it can more than double the original rebate. Currently, 75% of the US is covered by a commercial lighting rebate. Of that, almost 20% is offering an additional or bonus opportunity. Learn more at: <https://briteswitch.com/news/RebateProgramsAreNowOfferingBonuses.php>

**2. Time to Ditch the Lumen, Says Top Lighting Scientist Dr Christopher Cuttle** - The lumen, a measure of lighting since the 1920s, is outdated and needs replacing, one of the world's top lighting scientists has claimed. Dr Christopher Cuttle, lecturer in Advanced Lighting Design at the Queensland University of Technology in Brisbane, Australia, says that the notion of a fundamental unit of light is no longer tenable and it needs to be revised. His contention is that the lumen is purely a measure of visible light, and doesn't take into account its non-visual impact on humans, such as its role in setting our sleep-wake cycle. The lumen is the SI unit of luminous flux, a measure of the total quantity of visible light emitted by a source per unit of time. Cuttle points out that it is based on brightness responses for a small light field and doesn't represent all of the effects on the eye and brain. He suggests it would be better to measure lamp and luminaire performance in terms of its spectral power distribution in Watts per nanometre. <https://www.luxreview.com/2020/06/01/time-to-ditch-the-lumen-says-top-lighting-scientist/>

3. **Thank You Mr. Edison, We'll Take It From Here by Chuck Swoboda** - I had the opportunity to be part of that meeting in California as the CEO of Cree, one of the LED companies that hosted the event. I was convinced at the time that the future would be lit with LEDs, but to my surprise, the major lighting companies like GE, Philips, and Osram Sylvania were skeptical. These companies were the undisputed market leaders and controlled approximately 70% of the world market for light bulbs at the time. And although they acknowledged the potential of LED technology for certain niche applications, they didn't believe that it would eventually overtake their industry. As LED technology improved, the major lighting companies did eventually embrace it. However, they initially positioned LEDs not as a mainstream lighting solution, but as a premium alternative. They had factories to run, and the prospect of light bulbs that lasted ten times longer would be bad for business. Their unwillingness to disrupt their existing business model created the opportunity for new LED competitors to enter the market and gain access to consumers through major retail channels. Over the last several years, Philips and Osram have either separated or sold their lighting businesses, and with GE's recent announcement, it is indeed the end of an era. <https://www.forbes.com/sites/chuckswoboda/2020/06/01/thank-you-mr-edison-well-take-it-from-here/#5294e7d7cbe6>

4. **Denver LED Specifier Summit to Move to Spring 2021** - Based on the recent decision by Governor Polis to close the Colorado Convention Center this fall, LED Specifier Summit show management today announced that it will move the Denver event - which was originally scheduled to stage October 15, 2020 - to the spring of 2021. More details will be available soon. Interested participants can check the event website for updates: <https://www.ledspecifiersummit.com/denver/>

5. **New LEED Guidance Addresses Covid-19 Reopening Strategies** - The U.S. Green Building Council (USGBC) has released four new Safety First Pilot Credits in response to COVID-19. The credits outline sustainable best practices that align with public health and industry guidelines related to cleaning and disinfecting, workplace re-occupancy, HVAC, and plumbing operations. The credits can be used by LEED projects that are certified or are undergoing certification. The Safety First credits are part of USGBC's economic recovery strategy released last month, which focuses on sustainable solutions to rebuild a stronger and healthier economy by prioritizing healthy people in healthy places. <https://www.usgbc.org/>

6. **Signify and Boston University Validate Effectiveness of UV-C Light Sources** - Since the start of the SARS CoV-2 pandemic, Dr. Anthony Griffiths, Associate Professor of Microbiology at Boston University School of Medicine and his team have been working on developing tools to support scientific advancement in this field. During their research they have treated inoculated material with different doses of UV-C radiation coming from a Signify light source and assessed the inactivation capacity under various conditions. The company's medium-pressure mercury vapour lamp - which emits UV-C at a wavelength of 254 nanometres - has been shown to kill the coronavirus 'in seconds'.



- Test results show that the virus could no longer be detected after seconds of exposure
- Signify to make its UV-C lighting technology widely available to other lighting companies
- Signify has been at the forefront of UV technology for more than 35 years

<https://www.signify.com/global/innovation/uv-c>

7. **Osram, Like Signify, Is Ramping Up Conventional UV-C Lamps to Fight COVID** - It's working on an LED version, but for now, a 30-year-old mercury tube is getting the call. On the heels of Signify announcing it is cranking up production of ultraviolet-C-band (UV-C) lamps proven to kill the coronavirus in a lab, Osram said that it, too is ramping up output of a similar product, which like Signify's uses conventional mercury discharge, not LED technology. Osram said Chinese hospitals in Wuhan and Beijing have installed 2000 of the company's 254-nm (253.7-nm, to be precise) ultraviolet AirZing tube lamps, and that it has supplied about 10,000 to children's nurseries. While Osram did not rule out eventually using LED technology for UV-C, and told LEDs Magazine that it is working on such a product, its 30-year-old mercury product is now getting the call in the fight against COVID-19. <https://www.ledsmagazine.com/>

**8. More Daytime Light Exposure Leads to Better Sleep Quality and Less Stress** - The Lighting Research Center (LRC) at Rensselaer Polytechnic Institute is investigating the impacts of working from home or quarantining indoors due to the COVID-19 pandemic on individual daily light exposures. The results showed that indoor and outdoor light exposure significantly impacted people's sleep quality and psychological health. LRC conducted a survey on people who had been staying home due to the pandemic in May 2020. The survey collected 600 effective data and found that daily indoor light exposure and time spent outside had a major impact on all survey outcomes, including sleep disturbances, sleep-related impairment, anxiety, stress, depression, and mood. People spending time under "somewhat bright" to "very bright" lighting reported that they suffered fewer sleep disturbance and less anxiety and depression, comparing to people with "somewhat dim" to "very dim" indoor lighting.

[https://www.ledinside.com/news/2020/6/lrc\\_light\\_impact](https://www.ledinside.com/news/2020/6/lrc_light_impact)

**9. Scientists Identify the Exact Blue Light Synchronizing Human's Circadian Rhythms** - Scientists at the Circadian Light Research Center published their new finding in the Journal of Biological Rhythms pointing out the narrow band of blue light that synchronizes our circadian rhythms during the day and disrupts them at night. The study could help lighting fixtures and LEDs to be further engineered and designed to optimize human health. Blue light exposure at night is a well-established public health hazard. It suppresses melatonin, causes circadian disruption, and is linked to an increased risk of sleep disorders, obesity, diabetes, and breast and prostate cancer. But what is the precise band of blue light that disrupt our circadian rhythms at night?

[https://www.ledinside.com/news/2020/6/bluelight\\_circadian\\_lighting](https://www.ledinside.com/news/2020/6/bluelight_circadian_lighting)

**10. LRC Launches New Website: Lighting for Healthy Living** - Introducing the LRC's new Lighting for Healthy Living website! Integrating recent developments in lighting research and education, and bridging them to lighting applications in real-world situations, the new website focuses less on patterns and more on process. This website integrates recent developments in lighting research and education, bridging them to lighting applications in real-world situations by providing design suggestions that meet the unique needs of the people who occupy specific places. To learn more about lighting and its impact on the circadian system, visit the Background page. To learn more about how to apply circadian-effective design, visit the Application page.

<https://www.lrc.rpi.edu/healthyliving/>

**11. LRC Releases Open Access Horticulture Luminaire Calculator** - The Lighting Research Center at Rensselaer Polytechnic Institute (LRC) invites you to make use of this free online calculator. The calculator allows luminaires to be compared based on equal photosynthetic photon flux density (PPFD). PPFD for plants is analogous to photopic illuminance on a work surface in an architectural application. The calculator includes the analysis of luminaire-specific and application-specific metrics, which provide the best available information regarding any given horticultural luminaire's performance. To make these calculations, it uses an IES file and spectral power distribution (SPD). The calculator results include a comparison with other commercially-available luminaires. <https://hortcalc.lrc.rpi.edu/>

**12. Acuity Brands to Use Ushio's Far-UVC Light for Human-safe Indoor Disinfecting Lighting** - The two companies entered into an alliance agreement that Ushio will supply Acuity Brands with its Care222® UV disinfection module, which generate far-UVC light which is safe to human skin but capable of inactivating viruses and bacteria on indoor surfaces. Under the agreement, Acuity Brands will have an exclusive right to use Ushio's far-UVC disinfecting module for general illumination uses throughout North America and non-exclusive right for the worldwide market outside of Asia. Acuity Brands plans to incorporate these lamps in a range of its products, including its ceiling and wall-mounted lighting fixtures that can operate in occupied or unoccupied spaces, to reduce pathogens. The mercury-free Care222 excimer lamps produced by Ushio can filter out the longer UV wavelengths that are harmful to humans from the lamp. The result is a narrow band 222nm wavelength of UV light that can inactivate viruses and bacteria, effectively preventing them from replicating. [https://www.ledinside.com/news/2020/6/ushio\\_acuity\\_brand](https://www.ledinside.com/news/2020/6/ushio_acuity_brand)

**13. OLED Screens of iPhones May Adopt LTPO Backplanes in 2021** - Apple has yet to introduce its 5G iPhones for 2020, but its supply chain is already developing OLED screens using LTPO (low temperature polycrystalline oxide) backplane technology for next year's premium iPhone models, according industry sources. <https://www.digitimes.com/news/a20200605PD200.html>

14. **GE Current (a Daintree Company) to Expand Smart Lighting Solutions in Canada** - Omnilumen Technical products is covering the Greater Toronto Area for luminaires and wired and wireless controls. GS Lighting Group is covering the province of Ontario for the Lamps & Ballast business, on top of continuing to manage the line for the region of Southwest Ontario. These partnerships will bring Current's expansive portfolio of lighting and digital controls solutions to more businesses throughout Ontario. Omnilumen and GS Lighting Group can now feature Current products in lighting designs and layouts for new construction projects and LED retrofits. This includes Current lamps and fixtures spanning indoor, outdoor and industrial applications, as well as wired and wireless controls. [https://www.ledinside.com/news/2020/6/ge\\_current\\_smart\\_lighting\\_canada](https://www.ledinside.com/news/2020/6/ge_current_smart_lighting_canada)

15. **NEMA Updates Industry Photocontrols Standard** - Published by the National Electrical Manufacturers Association (NEMA), American National Standard for Roadway and Area Lighting Equipment—Non-Locking (Button)–Type Photocontrols covers the electrical and mechanical interchangeability of nonlocking type photocontrols for mounting within a roadway or off-roadway luminaire. These controls are commonly called “button” photocontrols. This lighting industry Standard was updated to add ingress protection specifications, update labeling requirements, define environmental requirements, and define load test procedures. It is available for \$67 at: [https://www.techstreet.com/nema/standards/ansi-c136-24-2020?product\\_id=2110176](https://www.techstreet.com/nema/standards/ansi-c136-24-2020?product_id=2110176)

16. **LEDs Keep Salmon Free of Sea Lice, Boost Yield and Profit** - LEDs continue to amaze in life science applications, and Signify has made that point abundantly clear in the announcement of the Philips Seacage 340W luminaire designed for aquaculture applications. The solid-state lighting (SSL) product is designed for submerged usage. Signify called the product a fish light but it actually is said to drive the fish into deeper water where the farmed fish avoid the dangers of sea lice. The amazing thing about LEDs in such applications is the variety of ways that the technology is applied. And it's a combination of inherent efficiency, the ability to tune spectra, and the fact that LEDs can serve in harsh environments that together deliver versatile uses. <https://www.ledsmagazine.com/>

17. **Zhaga Publishes Book 20 on Smart Interface** - Zhaga Book 20 defines a smart interface between an indoor LED luminaire and a sensing/communication module. The module connects to the LED driver, and typically provides sensory inputs or enables communication between network components. It brings together complementary specifications from the Zhaga Consortium and the D4i specifications from the Digital Illumination Interface Alliance (DiiA). Zhaga Book 20 eases investment decisions for end-users, as luminaires can be adapted when needed with modules for different functions, like air quality sensing, presence detection or light levels controlling. <https://www.zhagastandard.org/>

18. **WHITEPAPER: Electromagnetic Compatibility of Lighting Equipment by Schaffner** - Today, testing standards for lighting continue to be created, updated, and implemented—with some still in a draft stage—to help ensure uniform evaluation of EMC for the many new lighting technologies around the world. Electromagnetic Compatibility of Lighting Equipment reviews the various standards that relate to lighting products. It details:

- Specific standards for the U.S., Canada, and Europe
- EMC filters in lighting technology
- Mains filter design for lighting technology
- Current-compensated chokes for the load and control terminals, and more.

<https://products.schaffner.com/emc-of-lighting-equipment-download>

19. **Far-UVC Light Safely Kills Airborne Coronaviruses, Study Finds** - More than 99.9% of seasonal coronaviruses present in airborne droplets were killed when exposed to a particular wavelength of ultraviolet light that is safe to use around humans, a new study at Columbia University Irving Medical Center has found. In the study, the researchers used a misting device to aerosolize two common coronaviruses. The aerosols containing coronavirus were then flowed through the air in front of a far-UVC lamp. After exposure to far-UVC light, the researchers tested to see how many of the viruses were still alive. The researchers found that more than 99.9% of the exposed virus had been killed by a very low exposure to far-UVC light. <https://www.sciencedaily.com/>

20. **Apple as Nudge to Epistar and Lextar Merge?** - Taiwanese LED chip maker Epistar and Lextar are going to form a new holding company, aiming to intensify its growing momentum in next-gen display technologies Mini LED and Micro LED. LEDinside noticed that Apple, who is reportedly launching Mini LED-based products, could be a nudge that lead to the alliance of Epistar and Lextar. [https://www.ledinside.com/news/2020/6/epistar\\_lextar\\_apple](https://www.ledinside.com/news/2020/6/epistar_lextar_apple)

21. **DOE Integrated Lighting Campaign Website Launched** - The Integrated Lighting Campaign (ILC) is a program designed to help facility owners and managers take advantage of savings opportunities and benefits of advanced lighting controls and of integrating lighting systems with other building or business systems in their facilities. The ILC serves as a resource for relevant research regarding new advanced lighting controls and integrated lighting systems and provides a platform to recognize exemplary projects shared by ILC participants and supporters. <https://integratedlightingcampaign.energy.gov/about>

22. **DOE Announces \$11 Billion in Energy Savings from Better Buildings Partners** - The U.S. Department of Energy (DOE) has announced nearly \$11 billion in energy-cost savings by more than 950 public and private sector organizations in DOE's Better Buildings Initiative. To date, partners have saved nearly 1.8 quadrillion British thermal units of energy, which is equivalent to the electricity consumption of 27 million homes in America over one year. The 2020 Better Buildings Progress Report, released at the Better Buildings, Better Plants Virtual Leadership Symposium, details partners' progress in advancing energy productivity and highlights the 20 organizations that achieved their energy efficiency goals in the past year. DOE also recognized partners that met previous challenge goals and have set new goals to achieve even greater energy efficiency. <https://www.energy.gov/articles/doe-announces-11-billion-energy-cost-savings-better-buildings-initiative-partners>

## Global LED Market Observer:

23. **The Worldwide Market for LEDs, Market Review and Forecast 2020** - The Worldwide Market for LEDs report by Strategies Unlimited analyzes and estimates LED lighting market on a global and regional level. This report is a deep dive on the data to provide new insights and trends for the LED industry. The report includes assessment of market conditions for key applications including: Display Backlighting, Automotive Lighting, Mobile Applications, Signs, Lighting, and more. [https://store.strategies-u.com/content/WC\\_WW\\_LEDs\\_2020\\_Sample.pdf](https://store.strategies-u.com/content/WC_WW_LEDs_2020_Sample.pdf)

Table 1.1 Ranking of Worldwide LED Companies by LED Revenue

	Company	Location	Revenues	% Share
1	Nichia	Japan	\$2,132	13%
2	Osram Opto	Germany	\$1,411	9%
3	Lumileds	USA	\$1,202	8%
4	Seoul Semiconductor	South Korea	\$867	5%
5	Mulinsen (MLS)	China	\$860	5%
6	Samsung	South Korea	\$749	5%
7	LG Innotek	South Korea	\$572	4%
8	Cree	USA	\$502	3%
9	Everlight	Taiwan	\$441	3%
10	Nationstar	China	\$353	2%

24. **Global Lighting Association Cautions Over UV-C** - The Global Lighting Association has added its voice to the debate on the use of ultraviolet light to tackle the coronavirus pandemic. It says it is becoming increasingly concerned at the proliferation of disinfecting devices based on ultraviolet lighting - particularly being sold on the internet - with dubious safety features and inadequate safety instructions. This week the association issued a position statement containing guidelines for the safe use of UV-C devices. It said germicidal ultraviolet irradiation 'is a proven methodology' for inactivating viruses on solid surfaces, in water and in air. 'As such it is expected to be a useful tool in the fight against the Covid-19 pandemic'. The Global Lighting Association position statement on germicidal UV-C irradiation: UV-C Safety Guidelines may be downloaded at: [https://www.globallightingassociation.org/images/files/publications/GLA\\_UV-C\\_Safety\\_Position\\_Statement.pdf](https://www.globallightingassociation.org/images/files/publications/GLA_UV-C_Safety_Position_Statement.pdf)



**25. Bisley Introduces Ultraviolet-Lighting Meeting Rooms** - UK office furniture giant Bisley is to supply meeting pods and phone booths with ultraviolet lighting to kill bacteria and viruses. The units, made by Vetrospace in Finland, are 'the most hygienic, private modular spaces on the market,' the company said. The Clean Room version is certified to ISO-7 Clean Room certification and is fitted with anti-microbial photon disinfection lighting that kills bacteria including MRSA and E-Coli. ANTiBAC clean lighting is automatically activated when you step into a Vetrospace, which restricts the growth of microbes. When you leave the pod, the Wisdom AiR UV disinfection lights turn on. This generates what the manufacturer terms a powerful antimicrobial effect, which kills up to 99.9 per cent of microbes, but is harmless to humans and material and makes a room clean of all bacteria in six hours. In addition it has a HEPA filtration system that filters out 99 per cent of all particles in the air entering the room. The Health variant also comes with the entire room coated in a photocatalytic nano coating that kills viruses on contact including Covid-19.

<https://www.luxreview.com/2020/06/10/bisley-introduces-ultraviolet-lighting-meeting-rooms/>

**26. LightingEurope Calls for UV-C Products to be Allowed on EU Market** - LightingEurope endorsed the recent UV-C safety guidelines published by the Global Lighting Association (GLA) and called on European Union Member States to ensure UV-C products can continue to be placed on the EU market. Germicidal ultraviolet irradiation is a proven methodology for inactivating viruses on solid surfaces, in water and in air, and it is expected to be a useful tool in the fight against the COVID-19 pandemic. The GLA statement provides guidance to manufacturers and to potential users on the requirements UV-C products should satisfy to allow safe use. LightingEurope shares the GLA's concern at the increase in products, in particular online, with dubious safety features and inadequate safety instructions. While UV-C is helping to contain viruses, if not used properly, it can pose risks to human health. <https://www.globallightingassociation.org/>

**27. German UV Technology Developer Proves Effectiveness of UVC irradiation for Diminishing Coronavirus** - Dr. Hönle, a Germany-based UV technology developer, announced that it has proved that energy-rich short-waved UVC irradiation is highly effective for inactivating SARS-CoV-2 viruses, pathogen of COVID-19. The tests were conducted at the Institute for Medical Virology of the University Hospital Frankfurt. The results show that, using special Hönle UV units, the new corona virus can be killed reliably within seconds. An inactivation rate of 99.99% was confirmed in the laboratory. [https://www.ledinside.com/news/2020/6/uvcdisinfection\\_drhoenle](https://www.ledinside.com/news/2020/6/uvcdisinfection_drhoenle)

**28. Signify Bets Big on Upper-Room UV-C Lighting** - Signify is increasing production of its UV-C mercury lamps by eight-fold, launching no fewer than 12 product ranges using UV-C light, and has bought the assets of Germicidal Lamps & Applications (GLA), a Dutch firm with expertise in UV-C disinfection. The launches include UV-C luminaires designed for the deep disinfection of surfaces in offices, schools and toilets. They are equipped with sensors and controls to ensure that they only operate when people and animals aren't present. Other products include mobile, freestanding UV-C luminaires that can be wheeled into a hotel room or used to disinfect surfaces on public transport such as buses and trains. <https://www.luxreview.com/2020/06/25/signify-bets-big-on-upper-room-uv-c-lighting/>

**29. Bradford to Upgrade 60,000 Streetlights with Smart LED** - The West Yorkshire town of Bradford is to replace over 59,000 street lights and 17,000 lampposts in an ambitious project which will feature a central management system. The project will reduce Bradford City Council's street lighting power consumption by 65 per cent and the ability to support a wide range of emerging IoT technologies will potentially assist it in making further cost savings in other areas in the future. The £2 million project, awarded to Costain, will take a period of four years. Possible additional IoT capabilities include the measurement of road temperatures, air pollution, road gully condition and river levels to even more effectively target maintenance and capital programmes. <https://www.luxreview.com/2020/06/15/bradford-to-upgrade-60000-streetlights-with-smart-led/>

**30. CEA-Leti Breaks Throughput Record for LiFi Using Micro LEDs** - CEA-Leti recently announced its researchers have broken the throughput world record of 5.1 Gbps in visible light communications (VLC) using a single GaN blue micro- light-emitting diode (LED). Their data transmission rate of 7.7 Gbps achieved with a 10 µm microLED marks another step toward commercialization and widespread use of LiFi communication. CEA-Leti is a non-profit research institute based in Grenoble, France. <http://www.lightnowblog.com/2020/06/16307/>

## Monthly Feature:

**Rising Lighting Applications You Can't Miss in Post-pandemic Era** - In 2020, people all around the globe are living in ways that we would never have thought because of COVID-19 pandemic. Majority of the world population has spent most of their time at home with lockdown policies and to avoid infection in the past few months. Even now that several areas have lifted up the restriction, people's lifestyle is likely to change forever.

Lighting applications, which highly related to our daily life, reflect the changes of people's behaviors. LEDinside is thus seeing some rising trends in the lighting industry in response to the impact of COVID-19.

**Smart Lighting Combining Sensing and Disinfecting Applications** - Smart lighting is nothing new, but in the post-pandemic era, it can integrated with sensing technology and disinfecting function to control people flow while and reduce the risk of air infection. Several sensing technology suppliers have collaborated with software builders to create platform for space management. The function could combine with lighting installation in public area to maintain distance between people and monitor health status of individual in real-time.

Signify, for example, optimized its Interact Office software applications that enable users to use connected lighting infrastructure for monitoring space occupancy, temperature, air quality and more. Based on these data, office or building owners can identify any high-traffic areas so they can be cleaned more frequently. Disinfecting lighting is also popular. Many researchers are now working on UVC light that can kill pathogens without harming human. Far-UVC light is considered an option and lighting supplier Health introduced a new product based on far-UVC for environment sanitization.

**Circadian Lighting to Enhance Healthier Indoor Life** - The pandemic has forced people to work from home and some companies including Facebook and Twitter now implemented permanent remote-work policy, meaning that more and more people might be spending more time at home. Circadian lighting that supports human circadian rhythm and helps people to be more energetic in daytime is drawing more attention. LED chip makers like Samsung, Nichia, and Seoul Semiconductor have released full spectrum LEDs for circadian lighting applications. Lighting companies such as Signify, BIOS, LEDVANCE and more also launched different type of lighting fixtures featuring circadian lighting to improve people's wellbeing.

**Horticulture Lighting to Secure Food Supply** - Food supply shortages is a severe issue during countries lockdowns and strict travel restrictions. How to secure food supply has thus become one of the priorities for governments and building plant factories to improve food self-sufficiency becomes a solution for many. As plant factories usually depend highly on artificial grow lights, demands for horticulture LED lighting are growing. In April, the Abu Dhabi Investment Office announced an investment of US\$ 100 million to initiate vertical farm projects in the UAE. Singapore also said that it will push urban farming to boost local food supply. Osram, who accounted for a big market share in horticulture LEDs, noted that the demands continue to hike and it has released more products to meet a wider range of requirements for grow lights.

[https://www.ledinside.com/news/2020/5/lighting\\_post\\_pandemic](https://www.ledinside.com/news/2020/5/lighting_post_pandemic)