

LIGHTING

The anatomy of better lighting

According to the World Health Organisation (WHO), people spend an average of 90% of their time indoors – highlighting the importance of indoor comfort and wellbeing. How do we create such indoor comfort and wellbeing? The answer is with better lighting. While traditional electric lighting may do wonders in terms of the visual, it lacks the non-visual benefits of natural light, such as supporting an occupant's emotional and biological wellbeing. Better lighting bridges this gap between traditional lighting and natural light.

“Using daylight as the baseline for quality lighting, better lighting brings the benefits of natural light inside,” says Ourania Georgoutsakou, Secretary General at LightingEurope, the voice of the lighting industry. “It provides the right light at the right place and the right time for the various activities we carry out each and every day.”

Better Lighting also represents a big opportunity for specifiers. For example, with its EU Renovation Wave Initiative a central component to the European Green Deal, the European Union aims to double renovation rates across Europe over the course of the next decade. Considering that as much as 75% of Europe's current building stock is deemed energy inefficient, the need for energy efficient renovations is nothing short of huge. “This is a unique opportunity to achieve the twin goals of improving energy efficiency and indoor comfort and wellbeing,” adds Georgoutsakou.

The challenge, however, is that better lighting doesn't just happen – it must be designed. With better lighting being key to achieving both goals, specifiers, including lighting designers, installers and architects, will play a central role in the initiative's success.

“Professional lighting designers are uniquely qualified to bridge the gap between technical

regulations and aesthetic considerations,” says Georgoutsakou. “They understand the role of lighting in architecture and interior design and rely on their extensive knowledge of lighting equipment and systems to ensure high-quality design in the built environment.”

Use a professional lighting designer

A professional lighting designer:

- Strengthens and enhances any space through creative and practical lighting solutions, meeting the needs of the people who use the space;
- Specifies the most appropriate, cost-effective and energy-efficient products for a project;
- Creates an innovative lighting scheme that achieves the perfect balance of function and aesthetics;
- Solves the unique lighting challenges posed by a wide range of interior and exterior environments.

There is no one-size-fits-all solution for providing better lighting ... it must be customised to meet the needs of a particular space. This customisation can be achieved by applying various combinations of better lighting characteristics, several of which are highlighted here.

LightingEurope joined forces with the International Association of Lighting



Ourania Georgoutsakou,
Secretary General at
LightingEurope.

Designers (IALD) and has published a joint paper outlining the characteristics, requirements and design tips to design and deliver better lighting.

Using adjustable light levels

Traditional lighting design involves such metrics as lux levels on a task plane, surrounding area, ceiling and walls, uniformity and discomfort glare. “While these metrics are important to adequately light a space, they do not necessarily help promote the well-being or the biological and emotional performance of an individual,” says Georgoutsakou.

To do this, other factors must be taken into account, including variation in illuminance. “The range of lighting levels required by occupants is most commonly considered at the floor level or on a nominal working plane,” remarks Georgoutsakou. “But the vertical illuminance within a space is important too, as this is the plane that the eyes are generally looking in.”

Glare is also a factor to be considered. By washing the walls or ceiling with light, better lighting can reduce the glare caused by large

contrasts in lighting levels. Furthermore, better lighting can incorporate areas of relative darkness as a means of providing visual interest. “By mimicking shadows, dark areas give a space a more natural appearance,” adds Georgoutsakou.

Speaking of natural appearance, daylight is also an important factor to consider. As a rule of thumb, the more light there is during the day the better. With that being said, one should keep in mind that higher light levels may cause discomfort due to glare or contrast issues.

How a space is used can also impact glare. For instance, in an office setting, the ratio between computer screen brightness and background will affect glare and thus the visual comfort of the user. “Individuals will have different preferences, and better lighting can address these preferences by looking at illuminance levels and using personal controls to dim or boost those levels,” says Georgoutsakou.

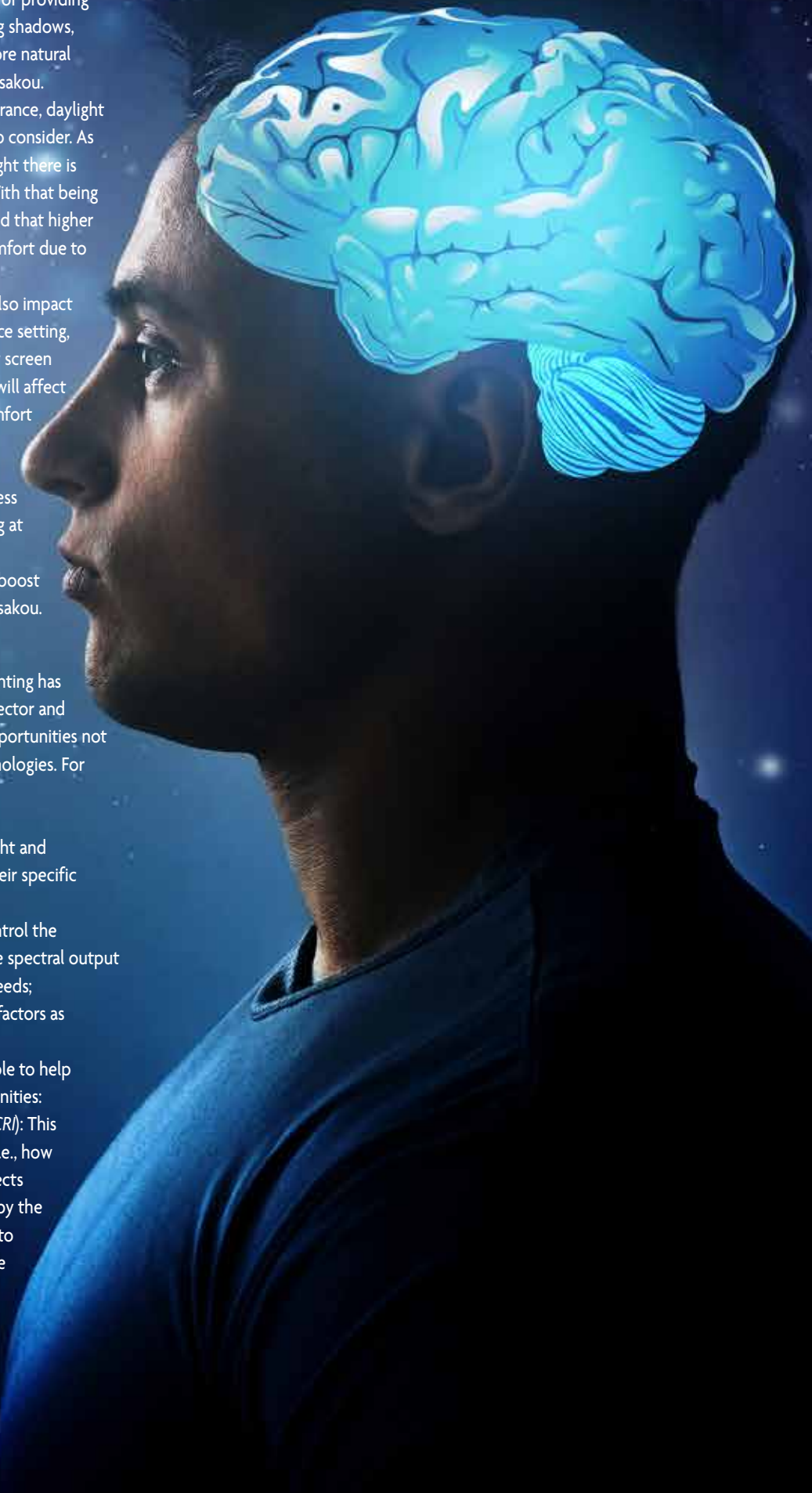
Use quality light sources

The development of LED lighting has revolutionised the lighting sector and opened the door to new opportunities not possible with previous technologies. For example, LED lighting:

- Allows users to control light and dynamically adapt it to their specific needs;
- Provides the ability to control the colour temperature of the spectral output to better suit occupant needs;
- Eliminates such annoying factors as flickering and strobing.

Several metrics are available to help best leverage these opportunities:

- *Colour Rendering Index (CRI)*: This measures colour fidelity, i.e., how similar the colours of objects appear when illuminated by the light source as compared to illumination by a reference light source of the same colour appearance;
- *Melanopic Equivalent Daylight Illuminance (mEDI)*: This measures non-visual performance by combining illuminance levels





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and spectral composition, indicating the effect the light source may have on human circadian rhythms.

“As mEDI is still an area of research, applying this metric is indicative rather than absolute and care should be taken in application design and performance claims based on this metric,” notes Georgoutsakou.

Using tunable solutions

Another key characteristic of better lighting is that it is tunable. “Better lighting should have a tunable spectrum or be able to be tuned to support a space’s specific activity,” says Georgoutsakou.

Georgoutsakou goes on to say that it should be possible to control a lighting installation’s spectrum and intensity both simultaneously and automatically. “This capability may be valuable for aesthetic reasons, by introducing dynamism and drama to the space,” she adds. “It can also be used to improve visual acuity for certain tasks that benefit from having different light levels or spectral composition.”

Tunable and dynamic lighting further allows the intensity and colour temperature of the electric light inside a space to be aligned with those of the daylight or sunlight outside, creating the effect of “bringing the outside in”.

Growing awareness about the human desire to be connected with nature has driven lighting designers to increasingly incorporate daylight-mimicking aspects into their designs. A key aspect of daylight is its dynamic nature, and tunability is better lighting’s answer to this dynamic.

LightingEurope advice

- Choose luminaires and a lighting control system that allow both brightness and colour appearance to be adjusted separately. This makes it possible to mimic

time of year, day and possibly even current weather conditions;

- Using lighting that can have its colour appearance and brightness changed means users can tune it to the specific needs of the space and the activities being carried out at a particular time.

Using personalised controls

It has been demonstrated that providing personal control of lights and shades can improve satisfaction at work. Furthermore, being able to achieve one’s preferred lighting conditions increases satisfaction with the indoor environment.

Unfortunately, implementing such personalised controls has traditionally been based on the often-misinterpreted Application Standard (e.g., EN 12464-1 for indoor workplaces). “All too often, the misinterpretation of this standard has meant visually-uninteresting lighting designs, with limited visual comfort and, for a significant number of individuals, too low or too high levels of lighting,” says Georgoutsakou.

Instead, designers should utilise the 2021 revision of EN 12464-1. This revised standard includes the concept of modified light levels, which allows for the adjustment of illuminances upwards for situations where higher levels may be required and for dimming of lighting according to personal need or preference. Common features include pre-programmed settings that automatically change light levels and the ability for occupants to activate certain settings based on their own personal preferences and needs.

“The personalisation and optimisation that is achieved by using lighting controls both saves energy and helps ensure that occupants are provided with the right light when and where they need it,” notes Georgoutsakou.

Better lighting uses daylight

Daylight in indoor workspaces improves occupant satisfaction and productivity. Furthermore, high levels of daylight during the day can improve sleep quality during the night. But daylight also has environmental benefits. For instance, by “harvesting” daylight, one can “dial down” the electric lighting installation, greatly reducing daytime energy consumption.

While the benefits of natural light are clear, daylight does have its drawbacks, including glare and overheating. “Managing daylight is a balancing act between maximising its benefits and minimising its drawbacks,” notes Georgoutsakou.

Better lighting strikes this balance by using commercial installations such as automated shading systems. “When used in tandem with automated lighting controls, these shades can ensure the system constantly performs this balancing act in a way that provides optimal results for the building and its occupants.”

Benefits are clear

When properly designed, better lighting is proven to benefit a wide range of users, including patients, residents and staff at hospitals and nursing homes; students and teachers in schools; employees in offices; workers at manufacturing sites; and residents in their private homes.

“The energy-saving and personal wellbeing benefits that better lighting offers are clear,” concludes Georgoutsakou. “The knowledge, technology and products to design better lighting are already available. By making better lighting a core part of building renovations, not only will we ensure that Europe experiences a renovation renaissance, but also a new era in personal wellbeing.”

Collaboration in the value chain is key to delivering better lighting. “We very much value our collaboration with IALD. It is important that we regularly exchange views on better lighting and that we pool our respective expertise and outreach to give clear messages to the market, be it specifiers or customers, about what lighting can do for people and the planet,” Georgoutsakou says.

LightingEurope liaises with European legislators to share its members’ technical expertise and to help shape a healthy regulatory framework with simple rules that are better enforced, benefit people and the planet, and foster a fair and competitive business environment in Europe.

See www.lightingeurope.org or email contact@lightingeurope.org ■