

# IN A NEW LIGHT

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**Accelerate SSL**  
Innovation for Europe

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CONTAINS PRACTICAL RECOMMENDATIONS

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# | LIGHT BEYOND LIGHT



The recent evolution in lighting technology has brought many new possibilities but also increased the need for informed decision-making. The field of light applications has widened, as the progress has been monumental since the introduction of LED. Digital light has become shapeable and user adjustable and can now serve society through energy saving, manageability, and last but most importantly adapting the light to the human needs. Intelligent lighting control can make our living and working environments much more functional and attractive. With modern lighting technology comes the first true opportunity to provide people with a more humane lighting – Human Centric Lighting.



## Adaptability

One and the same fixture can now supply several different light colors and intensities, which can be very useful to enable multipurpose uses of a room. A bright examination room at the hospital can be converted into a comfortable and welcoming office. At the touch of a button a bright neutral light can become soft and warm. A day room at the elderly care center can be given a dynamic atmosphere in the morning to encourage activity, but imitate natural light shifts evening time and become a place of calm and meditation, helping the residents come to rest.

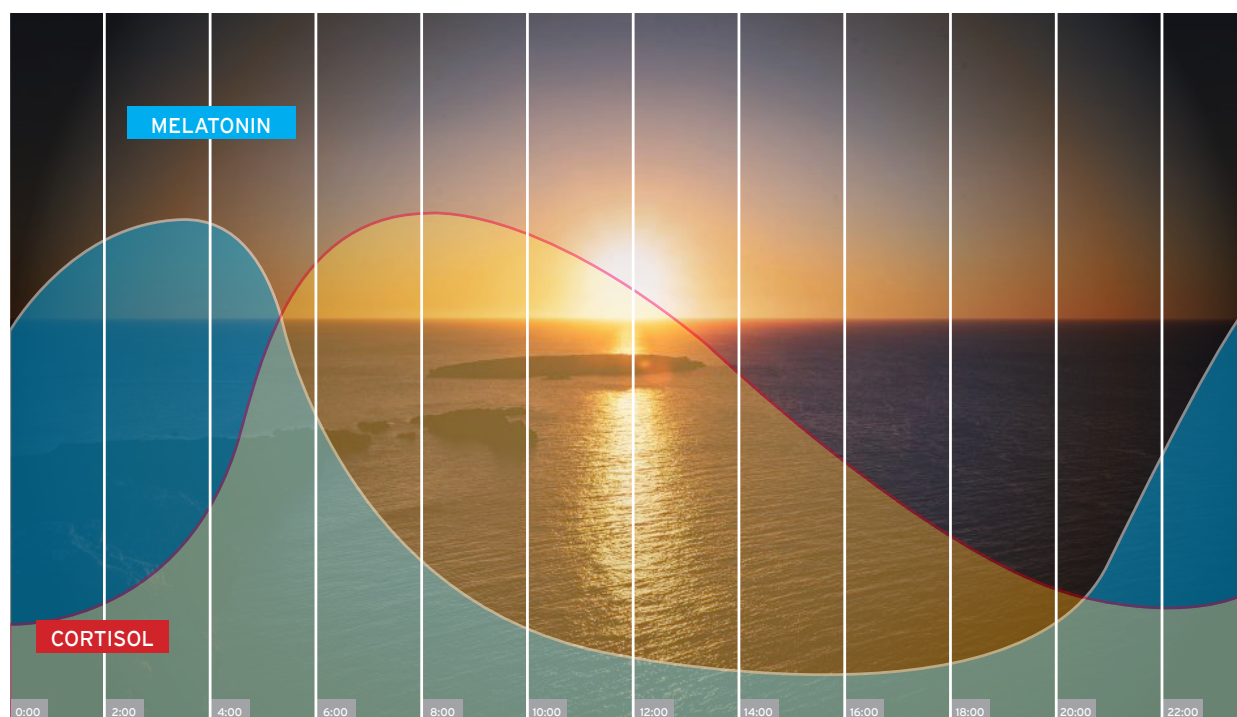
The adaptability of digital solid state light to human physical and social needs differentiate it from previous solutions and is its' biggest advantage.



## Green light

The efficiency of SSL is a strong argument for a technology shift. Converting to newer technologies will result in substantial net energy use reduction, and thereby decrease in greenhouse gas emissions.

These arguments also appeal to a conscientious public. Good lighting design using new technologies results in an attractive city and also save energy. In a tough competition for qualified personnel a conscious green policy is favorable. A smart city is an attractive city and can contribute to building the city's reputation.



# | ENDLESS LIGHT

## Unregulated markets

A rich variety of SSL light sources are readily available commercially. Since the development has been very rapid regulations are still catching up, and as a result the available quality has varied. Although the technology is still evolving, the quality has today reached a stable platform. The consumer retrofit products that were first available were often of inferior light quality but sold at a much higher price than traditional light bulbs. As a result, they were interpreted by the public as being the result of another bad regulatory measure just like the introduction of the compact fluorescent tube, and a compromising concession for the environment. Unfortunately this reputation largely still persists. To add one more dimension, many of the available consumer solutions are not entirely compatible to existing fixtures. The incorporated gear changes the geometry and the center of light is shifted, resulting in a modified light image once installed. The replacement solutions are not standardized, so no general rule of physical compatibility applies.



## Development opportunities

Solid state technology has much higher potential than to solely replace the previous reference light sources. A comparison would be to base the design of 5G telephones on the functionality of public payphones. Although the primary function is the same (to make phone calls), their actual definitions are fundamentally different. Digital lighting goes far beyond copying what was a rather unnatural light. SSL has great potential as an ICT component in open ended system development, i.e. system characteristics that enable very many different solutions and further progress.

To optimize the use of the vast offer of SSL products new terms need to be employed. With the spreading of standardized measures like CRI, lumen output and color temperature we can replace obsolete notions like Watt as terms of classifying lighting, providing a tool set for light quality and character comparison. This knowledge will also raise understanding for the potential value of the light that is enabled by SSL.



## True qualities

Since much effort has been spent on creating imitations of previous solutions, the true qualities of SSL were set aside on the public consumer market. The different physical properties of modern lighting technology in comparison to classic light sources enable a higher value of light by better adaption to the users' needs and wants. Because SSL sources produce less heat than conventional sources they can be installed in more confined spaces.

The miniature technology contributes to this advantage, but also allows for new configurations. For example solid state linear light lines can, due to their small components, be bent in a function that neither fluorescent nor neon lines were capable of, which opens up for entirely new design possibilities. Less fragile by nature than light bulbs and other glass enveloped sources SSL present an advantage. In fact, solid state lighting is a game changer due to widely improved performance and physical properties.



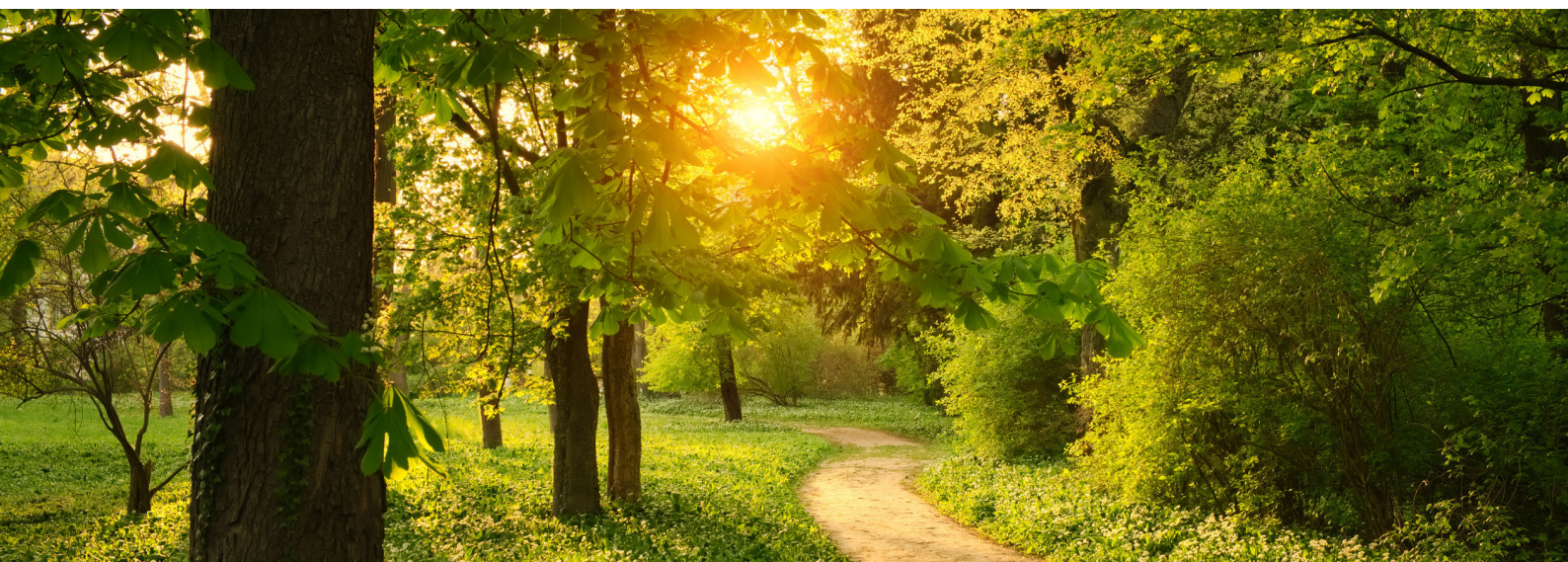
## Game changer

Lighting technology is passing through a critical phase. Light defined as Watts generating homogenous lux on a given surface belongs to the past. The investments made today need to enable the potential applications of tomorrow. Although the initial technological threshold may appear high, in the end the change will result in easier applications. There is no other path, and the road ahead leads to significant progress.

Creating attractive environments at the touch of a button, correlating lighting with activities, supporting therapeutic work with engineered light. It is now possible to supply adaptable, energy saving and maintenance friendly solutions. The economic benefits are apparent. SSL technology is a game changer setting new rules and benchmarks. More so, since we can deliver health promoting light -human centric light- it is our duty to do so.

## Recommendations

*New technology requires new ways of thinking. Our role today is not to arrange quick fix remedies to aging installations. By using retrofit solutions to renovate existing installations we are not addressing the need to improve, and most of all we are not at all using the full potential of today's technology.*



### Procurement

Lighting has become a more advanced technology. Since it has changed from being a simple commodity to a high technology systems solution the procurement process needs to evolve. There is a need for development of new networks, new support functions and new competences amongst the acquirers. Support should be found in a close relationship with entrusted suppliers and professionals. In a domain characterized by rapid evolution it is important to make demonstrations and support innovation. Working on development together with the suppliers will result in more pertinent and innovative solutions reaching the market.

### Defining technical specifications

To ensure a good result it is vital to adapt the technical specifications and the procurement process to SSL. These technical specifications should include (but not be limited to):

- Light distribution
- System efficacy
- CRI (Colour Rendering Index)
- Interoperability, e.g. communication protocols
- Dimming compatibility
- Flickering (see standard IEEE 1789-2015 for guidance)
- Color shift and binning
- Lumen depreciation
- Melanopic lumen, i.e. amount of blue, when considering circadian effects

### Maintenance

Since the lifetime of LEDs largely exceeds that of previous technologies the need for replacement maintenance is greatly reduced. However, due to the sensitive nature of the electronic equipment and the longevity of the installation, regular cleaning becomes crucial for maintaining functionality. It is also important to make use of the potential of intelligent system solutions to support more effective maintenance.

Ensuring that we make use of the full potential of the new lighting technologies is a wise investment for the future. By embracing the digital aspect of Solid State Lighting our benefits rise substantially.

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