LIGHTINGEUROPE
THE VOICE OF THE LIGHTING INDUSTRY

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Recommendations on the Renovation Wave Initiative

Introduction

The World Health Organisation estimates that people spend approximately 90 % of their time indoors in residential and non-residential buildings. The yearly renovation rate of the building stock varies from 0.4 to 1.2 % in EU Member States.[1] But if Europe is to fulfil its 2050 climate and energy goals, this rate will need at least to double to reach 3 % per year.

Renovation is at the heart of the European Green Deal and has been identified as a key driver for the European society and economy post COVID-19. LightingEurope strongly supports the call for scaling up renovation rates across Europe. With 97 % of EU buildings in need of renovation, we believe that the upcoming Renovation Wave Initiative represents a unique opportunity to not only ensure the energy efficiency of buildings but also to address the wellbeing of occupants through a better indoor environmental quality, both of which lighting contributes to.

With this paper, we urge policymakers to address lighting as part of the Renovation Wave Initiative and share our recommendations.

Our recommendations – No renovation without lighting

LightingEurope recommends:

- A **focus on non-residential buildings** (public and commercial buildings), as already set out in the Energy Performance of Buildings Directive. We believe that public buildings, in particular, should lead by example.
- The **use of LED lighting, in combination with controls and sensors**. By switching from incandescent lamps to energy efficient LED lamps, it is estimated that Europeans have benefitted from up to 90 % savings.[2] Furthermore, lighting systems, in addition to allowing for large energy savings (see dedicated section), also offer significant benefits to the building users as regards their visual comfort, wellbeing, and productivity.
- A **full renovation of luminaires** to include controls and sensors, with minimum SRI level – see below. “Just relamping” – simple replacement of a lamp – should be avoided. Replacing luminaires or introducing a whole new lighting design should be stimulated as

[1] European Commission, Communication from the Commission on the European Green Deal, COM(2019) 640 final (Brussels: 11 December 2019). < https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2019%3A640%3AFIN >.

[2] VHK, *Market Overview on Directional Mains-Voltage Lamps related to stage 3 of Commission Regulation (EU) No 1194/2012*, study prepared for the European Commission (Brussels: 3 September 2015). < https://ec.europa.eu/energy/sites/ener/files/documents/Draft%20Final%20Market%20Assessment%20data.pdf >.

this will lead to greater benefits in terms of energy savings and indoor environmental quality.

- The **design of safe indoor spaces that includes the installation of UV-C disinfection technologies**, as a means not only to address the current COVID-19 pandemic but also more generally and in the longer term to help ensure healthy indoor environments.
- The **Smart Readiness Indicator (SRI) should be applied across the EU** to maximise its energy savings potential and capture all the benefits it can bring to the wellbeing and performance of building occupants. Renovations should lead to a certain minimum SRI score – see below.
- The **introduction of mandatory minimum requirements on Indoor Environment Quality** (IEQ). Instructions for lighting can be found in EN 12464-1 and should be referenced to in the Renovation Wave Initiative.
- **Access to public financing should be subject to the fulfilment of certain conditions**. An obligation to include lighting renovation to obtain full subsidy should be introduced.

Conditions to be fulfilled

- Lighting should **comply with EN 12464-1**.
- **UV-C disinfection technologies should comply with existing standards and guidelines** – for further details see the Global Lighting Association's UV-C Safety Guidelines.
- **Use of controls and sensors, with minimum SRI level**:
  - **For lighting service 1a (occupancy control for indoor lighting)**, a minimum functionality level of 2 (automatic detection) should be required, as level 2 functionality is simple to implement and is based on established technologies that provide good additional levels of energy saving and user satisfaction as compared to level 1; **and**
  - **For lighting service 2 (control artificial lighting power based on daylight levels)**, a minimum functionality level of 3 (automatic dimming) should be required, as level 3 functionality is simple to implement and is based on established technologies that provide good additional levels of energy saving and user satisfaction as compared to level 2.

Energy savings through lighting

Depending upon the scenario, lighting accounts for around 20 % of the total cost-effective energy savings potential in non-residential buildings towards 2030. Properly designed and well-coordinated lighting systems are one of the most cost-efficient ways to reduce energy consumption and CO_2-emissions.

An estimation of the energy savings potential of lighting systems:[3]

	2030	2050
Annual energy savings (EU28)	20 – 29 TWh/y	48 – 56 TWh/y
Savings (%) of electricity use (BAU)	9 %	18 %
Cumulative energy savings	110 – 180 TWh	900 – 1,000 TWh
Cumulative GHG reduction	40 – 60 $MtCO_2eq$	270 – 300 $MtCO_2eq$
Energy expenditure reduction	€ 3 – 5 B/y	€ 21 – 25 B/y

[3] Energy savings for optimised lighting systems (both indoors and outdoors) with controls. VITO et al. (commissioned by the European Commission), *Preparatory study on lighting systems 'ENER Lot 37'* (Brussels, 15 December 2016), p. 331.

Better Lighting for an improved Indoor Environmental Quality

Although traditional electric lighting does wonders in terms of the visual, it simply lacks the intensity, timing, colour, dynamics, and other non-visual benefits that only natural light offers. This is where Human Centric Lighting (HCL) comes in. Using daylight as the baseline for quality lighting, HCL brings the benefits of natural light inside. More specifically, HCL supports the health, wellbeing, and performance of humans by combining the visual, biological, and emotional benefits of light.[4]

HCL provides the right light, at the right place and the right time for the activities we carry out each and every day. That is why a wide range of users can benefit from HCL, including patients, residents, and staff in hospitals and nursing homes; students and teachers in schools;[5] employees in offices; workers in manufacturing sites; and residents in their private homes. Furthermore, recent scientific developments indicate that the benefits of HCL vary depending on the application.

These benefits include:

- **Visual**: good visibility, visual comfort, safety, orientation
- **Biological**: alertness, concentration, cognitive performance, stable sleep-wake cycle
- **Emotional**: improved mood, energise, relaxation, impulse control

Within the HCL design process, lighting should address the core issues of safety, task requirements and occupant needs in a coherent and integrated manner. Within the framework of a Healthy Building, this means ensuring that the HCL system is:

- **Dynamic**: that the light can vary in level and, at the very least, be 'dimmable' (lower light levels) and, preferably, also 'boostable' (higher light levels);
- **Tuneable**: light can vary in spectrum; and
- **Includes default lighting control setting**: personal control should be available so the user can influence the light settings.

The introduction of LED light sources has revolutionised the lighting industry and opened the door to many exciting new HCL-related opportunities not possible with previous technologies. For example, Intelligent Lighting Systems make indoor environments more attractive and functional, allowing users to dynamically adapt light to their specific needs. LED lights also allow for increased energy efficiency and savings, especially when used within a well-planned HCL system.

For more information, please refer to our Position Paper on Healthy Buildings and our #BetterLighting Campaign.

Design safe indoor spaces including the installation of UV-C disinfection technology

UV-C is an established technology for disinfection. It has been applied extensively since 1910 when it was found to be an effective tool in preventing the spread of disease. For more

[4] LightingEurope and IALD, Position Paper on Human Centric Lighting (Brussels: February 2017). < https://www.lightingeurope.org/images/publications/position-papers/LightingEurope_and_IALD_Position_Paper_on_Human_Centric_Lighting_-_February_2017-modified_version-v2.pdf >.

[5] Value of Lighting. < https://www.valueoflighting.eu/ >.

details on the benefits of UV-C disinfection technologies, please see the LightingEurope Position Paper.

Today, UV-C disinfection technologies are assisting the battle against the current pandemic. More generally, **the technology has been proven to inactivate, without exception, all bacteria and viruses against which it has been tested including among others those causing tuberculosis, influenza, the common cold and SARS**.

UV-C is a broadly employed disinfection technology used to disinfect water, air, and surfaces in industrial, commercial, medical, public and residential environments. UV-C de-activates viruses and microorganisms such as bacteria, moulds, spore, fungi and yeasts, by destroying their DNA/RNA. The Global Lighting Association has published an overview of the applications of UV-C disinfection technologies in its document on Germicidal UV-C Irradiation: Sources, Products and Applications.

Safety is ensured when products are manufactured, installed and used in accordance with existing standards and the Global Lighting Association's UV-C Safety Guidelines. In case of high UV-C irradiance levels, direct exposure to UV-C is harmful to humans or animals. Standards and industry guidelines outline the information and safeguards manufacturers must provide to ensure people's safety and address foreseeable misuse. The Global Lighting Association has published and widely disseminated UV-C Safety Guidelines providing guidance on the safe use of UV-C products, by means of technical safeguards (e.g. presence detection or access controls) and/or instructions and warning labels as needed and applicable. Standards also exist to avoid chemical decomposition product, e.g. ozone - these are outlined in the GLA Safety Guidelines.

UV-C is a key element in the design of safe spaces. The design of safe and healthy indoor environments that minimize transmission of infectious diseases encompasses many factors, including ventilation, design of traffic flows and physical touchpoints. While such design elements can greatly reduce transmission, they are limited by practical considerations and the desire to have productive and comfortable spaces where people can interact. UV-C disinfection is an important tool to realize such spaces. We emphasize the importance of an integral design process where the design elements are considered together rather than applying individual measures in isolation.

Contact

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About LightingEurope

LightingEurope is the voice of the lighting industry, based in Brussels and representing 33 companies and national associations. Together these members account for over 1,000 European companies, a majority of which are small or medium-sized. They represent a total European workforce of over 100,000 people and an annual turnover exceeding 20 billion euro. LightingEurope is committed to promoting efficient lighting that benefits human comfort, safety and well-being, and the environment. LightingEurope advocates a positive business and regulatory environment to foster fair competition and growth for the European lighting industry. More information is available at www.lightingeurope.org.