

## **Comment regarding the European Commission's proposed regulation requirements for lighting products (Ecodesign Directive 2009/125 / EC)**

### **Introduction**

According to European Commission's amendment proposals, lightbulb energy consumption regulations will further be restricted in two consecutive phases, first on 1.9.2018 and second on 1.9.2018. These revisions are based on the Ecodesign Directive 2009/125/EG for 2020. Only LED bulbs will meet these new constraints. As a result, EU consumers will have no choice other than to use this undeveloped technology that has been proven controversial in many aspects of its impact on human health. In recent years, evidence of such health effects has been accumulating and become increasingly substantial.

Implementation of these new regulations would create undeterminable and unpredictable risks for the entire EU population. Since lighting technology touches all areas of daily life, including our private lives, special attention is vital in the development of guidelines that leave no room for alternatives.

Saving energy to support climate protection is crucial. However, lighting is accountable for only 3% of overall primary energy consumption (1). The expected energy savings must be compared to the significant health risks.

### **Main Concerns**

Energy efficiency is the primary focus when evaluating light bulbs. Calculations consider the operating current, while other energy-relevant factors are only partly considered. Health compromises are not taken in to consideration whatsoever.

So far, the question of the detrimental health effects of light bulbs has rarely been addressed. The SCHEER Report, which seeks to deal with such issues in EU law, is deficient (2). SCHEER's (6.7.2017) preliminary report describes the lack of information available. It is imperative to minimize risks before final decisions are made. Despite a lack of public discussion, people have been experiencing the impact of modern lighting, observable in an increase of sick leave and illness in work places.

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The following aspects require particular attention:

## 1. Health Risks

**1.1. Ocular Health:** Several studies point to noticeable eye health risks from exposure to blue-enriched lighting, which also occurs in home LED lighting; consumers are unaware of this risk because the generally high levels are not made explicit on bulb packaging.

In 2011, the French Ministry of Health's ANSES study clearly pointed out the dangers of blue-enriched lighting for children's eyes in 2011 and strongly advises against the use of LEDs in children's rooms and in all children's facilities (kindergartens, schools, leisure facilities, etc.) (3).

Even though the degree of danger has not yet been conclusively clarified, it is an indisputable fact that LEDs increase blue light exposure to our eyes, which leads to higher cell stress and retinal damage (4).

Children have little or no yellowing to the natural eye lens, in contrast to adults whose eyes build up yellowing over time; therefore, all blue light entering a child's eye is unfiltered, making young people's eyes far more vulnerable than adults'. As yet, there are no long-term studies available evaluating the hazards of children's exposure to high levels of blue light. (2) Existing research focuses on the effects of prolonged exposure with healthy adults, not people with higher light sensitivity (i.e. children, people with eye diseases).

In the elderly, the risks of age-related macular degeneration from high blue-enriched light levels have been demonstrated in several studies (5). Damage to the retina has increased significantly in recent years, mainly due to the blue LED light of display screens (6).

### Compounding Risk factors:

**1.2. Flicker:** The suggested limits for flicker LEDs in the Eco design Directive 2009/125 / EC (6) are significantly too high and lead to visual impairment of large parts of the population (7). Possible signs of a flicker or flicker stress are lack of concentration, dizziness, nausea, blurred vision, orientation difficulties, eye discomfort and headaches. Increased sensitivity exists especially in ocular motility, autism and epilepsy (8). Migraines, depression and anxiety disorders can also be triggered, or existing symptoms intensified. Flicker values must be clear on bulb packaging so buyers can evaluate the risk factor for themselves.

**1.3. Photosensitivity:** Increasing numbers of people are photosensitive (9). Those affected complain of headaches, stress and fatigue, and along with exclusion from social situations resulting from increased exposure to LED bulbs (10). Such challenges do not support integration and barrier-free environments for people with disabilities (11). There is a lack of

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scientific analysis and data for the numbers of people affected. These facts, along with their exact connections to different light sources need to be taken into consideration when evaluating bulbs.

**1.4. Electro smog:** Studies among others at a Canadian University have shown that LEDs cause more electro smog than incandescent and halogen bulbs (12). Electro smog may also be a contributing factor to the impairments previously listed.

**1.5. Sleep disorders:** For more than 15 years, the detrimental effects of artificial light on hormone balance (melatonin levels, etc.) which regulate circadian rhythms have been scientifically recognized. LEDs significantly contribute to increased over exposure to (bright) light compounding these proven risks. Several studies indicate evidence of sleep (rhythm) disturbances due to blue light exposure. There is a lack of studies assessing risks of bright LED light, especially for toddlers (in children's rooms, bedrooms and kindergartens), which means no clear legal limits for young children's exposure to such light.

## **2. Student Learning Performance Impairment**

Hardly any studies have been conducted on the effect of blue-enriched lighting on schoolchildren. Improvements under brighter (blue) light, if any, have been observed in increased cognitive abilities (15). A recent study shows that younger schoolchildren (10-14 years old) experience less creativity and memory capacity with LED classroom lighting (16). Memory is a prerequisite for most other cognitive processes and creativity is a basis for flexible future-oriented thinking; both are essential educational goals. These results suggest that the increased alertness from blue light is counter balanced by impairments to other abilities. Until proof is provided that (optimized) LED lighting for children of all ages does not cause any negative effects with regard to all relevant educational goals, widespread use of LEDs in schools due to the implementation of the present EU draft is irresponsible. The evidence does not yet exist.

## **3. Lack of Technical Sophistication**

**3.1.** LEDs currently still have considerable disadvantages compared to previous illuminants regarding color rendering, stroboscopic effects and the ability to be used under extreme environmental conditions (as in industrial production) (17).

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**3.2.** Furthermore, efficacy values of LEDs are measured and concluded in laboratories, and independent empirically collected data, for example on bulb life span, is scarce (18). A technological impact assessment is needed to evaluate the correlation between possible energy savings of LED use and resulting health risks.

**3.3.** The German Federal Institute for Occupational Safety and Health has tested 43 different LEDs for their photobiological safety. 30% of the tested LEDs fell into the risk group 2 (19). The French health agency ANSES recommends that LEDs of risk categories above 1 not be available or permitted for public use. The German Commission for Environmental Medicine of the Robert Koch Institute calls for buyers and users to be informed about possible photobiological risks caused by LEDs (regarding glare and retinal damage) and also to publicly share the risk classes (20). This has not yet happened.

## Conclusion

We expect the EU Commission to take into account all possible negative effects to public health, children's health in particular, into consideration in their decisions.

Studies indicate considerable risks from LEDs. The phase out of halogen lamps from 1.9.2018 is therefore questionable. We demand that halogen lamps, along with similar luminaires and lighting systems not be taken off the market until research proves:

- that LEDs pose no health hazard, especially to the eyes, in particular children's ocular health, along with consideration for influences on cell communication and regeneration.
- that LEDs have no negative impact on the school children's learning abilities in terms of cognitive, affective, psychomotoric and creative learning goals.
- that lighting alternatives to LEDs are developed and approved for sensitive groups such as children, elderly, people with eye diseases and photosensitivity, including consideration of individual's social participation.
- that LEDs are technically mature in all respects with clear indications on packaging in critical areas (flicker, blue value)

As long as there is evidence that LEDs pose a health hazard to the EU's population, no regulations should be adopted which make it difficult to purchase or prevent the use of other bulbs.

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Therefore, the EU Commission should suspend the ban on all halogen lamps to provide sufficient time for scientific analysis and technical development, a minimum of 6 years. The economical low-voltage halogen lamps (12V, 24V) efficiency class B and high-voltage halogen lamps (clear glass with base G9 and R7s in efficiency class C) and the associated luminaires and lighting systems, for which a license is available until 2018, should be made permanently available on the public market.

## Signatories

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