

# CONSUMER RELEVANT ECO-DESIGN REQUIREMENTS FOR DOMESTIC LIGHTING (PART 2 – DIRECTIONAL LIGHT SOURCES AND LED LAMPS)

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## Summary

In the context of the implementation of the Ecodesign of Energy-related Products (ErP) Directive, the European Commission is proposing ecodesign requirements for directional light sources, light-emitting diode lamps (LEDs) and halogen lighting converters. The Commission also proposed energy labelling requirements for luminaires and revised labelling requirements for general lighting.

This paper outlines the main consumer relevant issues related to the possible ecodesign requirements and recommends improvement options. We give specific, technical recommendations to increase the energy efficiency and overall performance of these products.

Our main points are the following:

1. Stricter efficiency requirements should be established for LEDs, the quality of which can vary enormously.
2. Consumer-friendly functionality requirements such as "lamp lifetime" should be based on non-misleading definitions identical across lamps families.
3. Information on functionality parameters should be clear and comparable; i.e. it should be provided in a harmonized way, on the Energy Label.
4. The method to set class limits on the Energy Label should be based on the most straightforward value: the lumen/watt ratio. This would notably help addressing the very significant efficiency gaps found in CFLs tested by our members.
5. The priority to address the "lock-in effect" of luminaires not able to accommodate efficient lamps should not so much be to establish a labelling scheme for luminaires but to set Ecodesign requirements on luminaires to phase out the least efficient models.

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## I. General Remarks

ANEC and BEUC welcome the Commission's proposal to issue an implementing measure for directional lighting and LED lamps under the Ecodesign Directive, as well as a Regulation on Energy Labelling. The proposal is important for two reasons:

- **Consumers need to be able to buy reliable and energy-efficient LED and directional lamps:** the proposed minimum requirements would allow for a certain quality and efficiency level for all products on the market. At the moment, LED lamps (directional and non-directional alike) are entering the market with nearly **no requirement with regard to minimum quality and efficiency standards**. In this respect, **it is of the utmost importance that early adopters are not dissatisfied<sup>1</sup>** and lose interest in this new technology which offers considerable energy efficiency gains.
- **LEDs are currently out of the scope of energy labelling, making it difficult for consumers to identify how efficient these lamps are** – especially when bought as retrofits where a comparison with incandescent light bulbs or halogens is needed.

## II. Comments on the working document on possible ecodesign requirements for directional lamps, light emitting diode lamps (LEDs) and halogen lighting converters

*General remark on the suggested Ecodesign requirements:*

The Commission generally suggests setting **equal efficiency requirements** for LEDs and compact-fluorescent lamps (CFLs) but **differentiated functionality requirements** (methodology to set lamp lifetime requirements, methodology to set premature failure rate, etc). **We suggest that consumers expect the exact opposite:** while consumers would be likely to accept that different lamp technologies will yield different performance results, it will be hard for consumers to understand that such consumer-friendly requirements as "lifetime" do not refer to the same definitions across lamp families.

### 1. Suggested energy efficiency requirements for directional lamps: LEDs can do better

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<sup>1</sup> See *Green Deal or no Deal*, Consumer Focus 2011: <http://www.consumerfocus.org.uk/files/2011/03/Green-deal-or-no-deal.pdf> : "Word of mouth from early adopters and change-makers will be crucial in normalising energy efficiency and engaging others."

ANEC and BEUC welcome the suggested minimum efficiency targets for directional filament lamps (a rating of class “C” as a first target, one year after entry into force of the regulation) and for other directional lamps (a rating of “A” as a first target). **The suggested targets strike a good balance between convenience for consumers** (who will not have to change their lamps overnight) **and guidance towards more efficient solutions** (by means of a uniform Energy Label).

Still, convenience for consumers would not suffer from **bringing back tier 3 targets from 4 years after entry into force to 3 years.**

Furthermore, we believe that **the suggested requirements for directional LEDs (uniformly categorized as “other lamps” along with CFLs) should be more stringent.** As LEDs are often marketed as being more efficient than the rest (including CFLs), **it is only logical that A+ should be aimed for in the first stage, and A++ in the second stage** (instead of A and A+ respectively, for both LEDs and CFLs). This extra requirement on LEDs is important as LEDs currently often do not deliver on the promises stated on their packaging with regard to lifetime, luminous flux, colour rendering, etc. The stronger the requirements, the better the experience for the early adopters.

## **2. Energy efficiency requirements for retrofit LED lamps replacing CFLs without integrated ballast or high-intensity discharge lamps (HID)**

ANEC and BEUC welcome the proposal to set requirements specifically for LED lamps replacing CFLs. However, we raise the issue that although existing luminaires might in principle be suited for the use with LED lamps (compatible socket, wattage etc), **it should be ensured that the luminaires allow for proper heat dissipation.** Heat dissipation is instrumental in safeguarding LED lamps’ lifetime (the chip of LEDs produces a lot of heat that needs to be dissipated; otherwise the chip will be damaged). This is an important aspect as most consumers are not aware of the fact that LED lamps need to be used and built into luminaires that allow for good heat dissipation. This is also relevant for LED lamps used as directional light sources or as retrofits for non-directional lamps.

## **3. Beyond energy efficiency: functionality requirements (lamp lifetime, light output, color rendering, warm-up times, etc)**

- for directional CFLs:

For consumers, an important aspect of lighting is that **the lamps purchased meet the expectations generated through advertisement and packaging information.** A pre-requisite to achieve consumer satisfaction is that **packaging information must be understandable.**

In this respect, we believe that the suggested requirements for CFLs can be misleading. The Commission suggests aiming for a given lamp survival factor (i.e. the number of lamps of a given model that still operate) at a given lamp lifetime: 50% survival at the 6.000 hours marks. The Commission then suggests aiming for a Lamp Luminance Maintenance Factor (i.e. the percentage of luminance lamps of a given model maintain after a certain duration, compared to their original luminance) **at a**

**completely different time mark:** 80% at 2000 hours. We argue that it may not be the way the lamp lifetime can best be assessed by consumers. Rather, we suggest that **a requirement should be set on a long lifetime**; this unique lifetime requirement should then be **complemented with both requirements on Lamp Survival Factor (LSF) and Lamp Luminance Maintenance Factor (LLMF)**.

Regarding the exact values suggested for the LSF and LLMF, it is our understanding from the explanatory notes to the working documents that they will be discussed on a later stage. We will be happy to provide input in that discussion when it is held. Our preliminary views are that the values currently suggested in the working documents for LSF and LLMF are misleading for consumers and not ambitious enough.

Currently, the lifetime stated on the packaging is only met by 50% of the lamps ("LSF=50%"). This is **misleading for consumers, who cannot conclude that a particular lamp will last as long as its package says it will**.

Moreover, the **requirements on lumen maintenance appear not to be strict enough considering that the loss of lumen output of a lamp is a major concern for consumers** when they buy energy efficient lamps.

With regards to the colour rendering index, consumers should be informed that CFLs may not be suited for good colour rendering purposes (as this might be an important purchasing aspect for some consumers).

- o for all LED lamps:

The functionality requirements for LED lamps should be particularly strict as these lamps are currently lacking consistent quality and hence risk not satisfying the early adopters among consumers.

For LEDs, the lamp life requirements are expressed both terms of LSF (50% suggested) and LLMF (70% suggested) for a unique duration (15.000/10.000hours<sup>2</sup>). This raises the question why the same approach was not taken for CFLs.

As far as the suggested values are concerned, **the required lamp lifetime of 15.000/10.000 hours appears to be too low compared to what is often claimed on lamp packaging**. Furthermore, there is currently no standardised testing method to verify such long lifetime for LED lamps. How authorities intend to verify this requirement and how consumers can buy a reliable product that will really last at least the duration indicated on the package is unclear.

Furthermore, **it is not explained why LEDs and CFLs do not have to fulfil equivalent functionality requirements**. For consumers it should be clear that all energy efficient lamps on the market have to fulfil the same or at least equivalent functionality requirements. In this respect, not only should lifetime requirements, premature failure rate and other requirements be based on an **identical definition**, but LED lamps should fulfil at least the **same value** of switching cycles, especially as this is technically less of an issue for LEDs than it is for CFLs.

The main difference in the suggested functionality requirements for CFLs and LEDs lies in the better colour rendering requirement for LED lamps. We welcome this

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<sup>2</sup> 15.000 hours for LEDs, 10.000 hours for retrofit LEDs with integrated control gear.

differentiation as consumers are used to the good colour rendering properties of incandescent light bulbs, which good-quality LEDs can best approach.

Concerning the suitability of LED lamps as retrofits, **one aspect is missing: the requirement for a good thermal management that is needed for the operation of the LED lamp in existing luminaires and fittings**<sup>3</sup>. It should be clear to consumers whether and under which conditions an LED lamp can be operated as a retrofit, and thermal management is an important aspect of this.

- for directional lamps other than CFLs, LEDs and HID:

Here again, ANEC and BEUC would like to point to an inconsistency between the approach for setting a lifetime target for CFLs and for LEDs, HID and other lamps: in the former case, a LSF for a given duration and a LLMF for another duration are given; while in the case of LEDs and other lamps, the Commission suggests a LFS and a LLMF for a unique duration. It is unclear why a single approach was not taken across the different families of lamps.

As far as the suggested values for lamps other than CFLs, LEDs and HID are concerned, **the lamp lifetime requirements for other directional lamps appear to be very low, even when considering that the measure would not aim at phasing out halogen directional lamps**. We argue that halogen lamps can have lifetimes higher than 2.000 h. So **the requirement of 4.000 h should not only be set for extra low-voltage halogens but for all lamps covered by Table 6** of the working document.

#### 4. Product information requirements

ANEC and BEUC strongly believe that **product information needs to be concise and understandable for consumers**. For example, the requirement to display the nominal useful flux is in principle good as it is the only parameter that allows a comparison between different lamp types.

We also strongly argue in favour of **harmonizing the information provided to consumers, by means of the Energy Label**.

When a lamp is claimed to be suited as retrofit, the lamp equivalences should be stated on the packaging (as requested in Table 8 of the working documents).

However, **consumers mostly cannot understand the denominations of types by numbers**. They would need more guidance in the form of e.g. "suited as halogen retrofit in 12 V systems with GU4 caps".

Similarly, **the information on the nominal beam angle might not be that useful for consumers** as they would rather choose their directional light sources according to other criteria such as fashion/design, etc. It would be more helpful to explain to consumers that directional light sources are not suited for general lighting and in which cases what kind of directional lighting is suited, and what the beam angle means in that respect.

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<sup>3</sup> See point 2 above, page 4.

Furthermore, a statement on the colour temperature could be enhanced by guidance such as “has good colour rendering properties and is suited to replace a halogen lamp”.

**If the lamp contains mercury, indications on how to dispose of the lamp should not only be published on the internet but also on the lamp packaging.** It is not demonstrated in the working documents that consumers tend to first check the internet when they have broken a lamp.

Concerning the requirements for retrofit LED lamps, general information should be added on the suitability of LED lamps as retrofits. Generally speaking, LED lamps develop their full potential only when they are specifically designed to be built in a certain type of luminaire. Lamps sold as retrofits cannot deliver the same quality and efficiency.

### **III. Comments on possible energy labelling requirements for general lighting lamps (revised requirements) and household luminaires**

*General remark on the suggested revised Energy Label:*

The Commission suggests that the energy label continues to show only the energy class (and the annual energy consumption in certain cases). It would be **highly regrettable if such key purchasing selection criteria as watts, lumens or lumens/watt were not provided in a harmonized way, on the energy label**, as these criteria provide useful information to consumers, especially to compare several lamps tied for the same energy class. With neither the suggested new energy label nor the ecodesign document requiring an indication of “Watts”, manufacturers could even have the possibility to not indicate the wattage of lamps anywhere on the package!

#### **1. Calculation formula for class limits: lumen-per-watt is the best approach to address huge gaps in the efficiency of CFLs**

The Commission argues that establishing lamp classification on the Energy Label on the basis of the lumen-per-watt value would be detrimental to the development of more energy-efficient filament lightbulbs.

ANEC and BEUC argue, on the basis of multiple tests carried out by our member organizations, that **the most pressing issue at stake in the methodological debate is the need to distinguish highly efficient CFLs from inefficient CFLs<sup>4</sup>, not the need to ensure future research/development for outdated filament lightbulbs**. We therefore strongly support the option B put forward by the European Commission<sup>5</sup> to change to single lumen-per-watt requirement across the light output

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<sup>4</sup> Models scoring a 45 lumens/watt are currently found in the same energy class as models rated at 70 lumens/watt!

<sup>5</sup> Page 7 of the explanatory notes for the labelling working document.

range. The suggested **option C (i.e. keeping the current method) will not pressure manufacturers of CFLs to improve their products.**

## **2. Labelling luminaires: tackling a real issue by the wrong end**

*The Commission suggests extending the labelling scheme to luminaires, in order to indicate which lamps each luminaire can accommodate. This is conceived to warn consumers that some luminaires can only operate with inefficient lamps, restricting the potential for energy savings (in that sense, some luminaires can be "indirectly inefficient").*

**ANEC and BEUC strongly argue that luminaires not suited for efficient lamps should be phased-out themselves.** Luminaires are purchased to be used over several years, sometimes dozens of years. In that context, we believe that phasing-out inefficient lamps while leaving on the market indirectly inefficient luminaires would be highly inconsistent. If no Ecodesign requirements are set for luminaires themselves (and not only the lamps they use), the situation will be reached soon enough when consumers will feel trapped (the phenomenon is referred to as the "lock-in effect"). As a result, **the public opinion's frustration with the Ecodesign and Energy Labelling schemes can only grow, for a product group where too much media damage has been sustained already.** The impact on resource efficiency will also be catastrophic, with consumers forced to change luminaires much more frequently than needed. While this might benefit the industry, it will cost consumers significant amounts of money and it is not in line with the Commission's flagship initiative on resource efficiency.

One way out of the lock-in effect would be for consumers to stock large amounts of inefficient lamps fit for their luminaires but destined to be phased-out. But it would be somewhat ironic that the Commission should "organize" the stocking of inefficient lamps, while the stocking of inefficient lamps is a much-publicized negative side effect of the phase-out of incandescent light bulbs. We believe that **a phase-out of the least efficient luminaires would offer an opportunity to learn from past challenges.**

Beyond a much-needed phase-out of the least efficient luminaires, we believe that what is needed for a good measure is to include an **indication of which lamp class the lamp sold together with a luminaire belongs to.** Best would be however to add **the information on whether this is already the most efficient lamp the luminaire can operate with** or not. Moreover, it should be ensured that consumers will not be led to believe that the energy label on the packaging of a luminaire does not refer to the luminaire itself but to the lamp.

## **3. Allow for a proper comparison between directional and non-directional light sources**

We question the Commission's statement that consumers have a clear understanding of which of directional and non-directional lighting is best suited for their purposes, and the ensuing conclusion that consumers will not compare the energy efficiency of a directional light source with that of a non-directional light source. We believe that it would be **helpful if there was a possibility of comparing the energy efficiency of a directional light source with that of a non-directional light source at constant lumen output. This is currently not the case in the proposed**

**classifications**, as the Commission suggests introducing identical classes but different requirements for both types of lamps. In the current version of the working documents, consumers could be misled in the sense that an efficient directional light source might appear to have the same efficiency as a non-directional light source, while this is not the case as the directional solution will have to fulfil lower requirements to be labelled in the same class as the non-directional solution. From a consumer perspective, **the same classification requirements should be used for both directional and non-directional light sources.**

#### **4. The unnecessary distinction between simple and full lamp labels**

ANEC and BEUC welcome the fact that the annual energy consumption is now added to the label. Yet, we argue that **no difference should be made between full and simple lamp labels** as even if the annual energy consumption is stated elsewhere on the packaging, **consumers need consistent labelling**. Moreover, as manufacturers find ways of displaying customized logos and pictograms on the packaging of their products, it is possible to put these elements on the Energy Label. Pictograms' customization only serves marketing purposes which do not have consumer confidence in mind.

#### **5. Indication of mercury contents**

**The way consumers are informed about the mercury contents of lamps is currently unsatisfactory.** The value is often given in terms not understandably by most consumers (i.e. "Hg" instead of "mercury" next to the nominal value).