THE EUROPEAN LAMP INDUSTRY'S STRATEGY FOR DOMESTIC LIGHTING

Frequently asked questions & answers on energy efficient lamps

EUROPEAN LAMP COMPANIES FEDERATION

Background

On 1 March 2007, The European Lamp Companies Federation (ELC) announced the first-ever joint industry commitment to support a government shift to more efficient lighting products for the home.

Shortly after, under the German Presidency, on 9 March 2007, EU Heads of State called for the European Commission to "rapidly submit proposals to enable increased energy efficiency requirements for incandescent lamps and other forms of lighting in private households by 2009". Proposals will take the form of *Implementing Measures* under the European Union's EUP Directive.

On 5 June 2007, the GE, Havells Sylvania, OSRAM, Philips and other members of the ELC announced their detailed proposals to the European Commission for binding minimum energy efficiency requirements for domestic lighting. These proposals, if adopted by the European Union, would lead to the phase-out of the least efficient lamps in the home from the European market by 2015. For more information on the proposals see "The ELC's proposal for domestic lighting", available to download on: *www.elcfed.org*

Following discussions with the media, end consumers and European and national policy makers, this paper attempts to answer a number of frequently asked questions on the issue of domestic lighting.

This list is of course not exhaustive, if you have any further questions or issues you would like to raise, please contact: *info@elcfed.org*

ELC Federation - Created in 1985, the European Lamp Companies Federation (ELC) is both the forum and the voice of the lamp industry in Europe. It represents the leading European lamp manufacturers, which collectively directly employ 50,000 people, and account for 95 percent of total European production, with an annual turnover in Europe of €5 billion. From the outset, ELC objectives have been to promote efficient lighting practice for a sustainable environment and the advancement of human comfort, health and safety. To this end, ELC monitors, advises and co-operates with legislative bodies in developing European Directives and Regulations relevant to the European lamp industry.

THE ELC'S APPROACH

1. Why has industry not made this announcement before?

For the lamp industry, the switch to energy efficient lighting has always been seen as an evolution and not a revolution. The ELC and its member companies have promoted energy efficient CFLis (Compact Fluorescent Lamp with an Integrated ballast or commonly known as 'energy savers') for more than 25 years. In addition the ELC works closely with the Commission to help advance proposals for minimum energy efficiency requirements for lamps under the EU's Directive on the eco-design of energy using products (EuP).

In line with the Commission's first priorities for EuP Implementing Measures, the ELC has concentrated its efforts on street and office lamps first. These are the products with the biggest potential savings in the short term and it is easier to identify and influence the purchasers. The ELC fully supports the call from EU Heads of States to adopt minimum energy performance standards for street and office lighting under the EUP Directive by 2008.

Work on lighting in the home is much more complex for a number of reasons including the size of the market concerned; the availability of practical replacements for some specialist lamps; poor market surveillance; the difficulty of changing the habits of domestic purchasers; and also production capacities. Requirements for domestic lighting must therefore be realistic in terms of timings for industry, the supply chain and consumers.

2. What does industry mean by 'realistic timings?'

Equally, the ELC supports the Commission's timescale of 2009 for setting energy performance requirements for energy inefficient lamps in the home under the EUP Directive. We have committed to work with the European Commission, who commenced its own study for an Implementing Measure on domestic lighting in the home in June 2007, to develop ambitious minimum energy performance requirements for domestic lighting.

We have proposed a time-phased approach to the European Commission, starting with highest wattage lamps and gradually covering lower wattages. This ensures the availability of practical energy saving alternatives in all domestic applications and is realistic for the businesses that must adapt to significant changes in production and supply. It would therefore deliver huge environmental and energy saving benefits while safeguarding the interests of consumers, employees and Europe's lighting supply chain.

3. Why does the proposed phase out take so long?

The 8-year phase-out proposal is designed to ensure that supply of efficient cost-effective products can satisfy demand, development and innovation. We have a responsibility to ensure that consumers are not faced with empty shelves.

4. Does the ELC proposal affect all domestic lamps?

The ELC proposal does not affect all domestic lamps. The initiative calls on the EU to apply binding minimum energy efficiency requirements, supported by strict market surveillance, for Edison and Bayonet cap lamps[1] as early as 2009. These lamps are mostly incandescent.

1 **What is a Bayonet cap?** With its familiar "push and twist" action, "bayonet cap" (also known as BC or B22d) is used on most regular light lamps, mainly in Great Britain and France. It is 22mm diameter and with two locating lugs. The "small bayonet cap" (SBC or B15d) is very similar but only 15mm across. Although generally used for mains voltage lamps, the SBC fitting can also be found in a very small number of specialist low voltage halogen lamps. There are also many other "BC" variants including the 3-pin BC, B22d-3 sometimes used on Fireglow

5. What are you proposing?

The ELC's domestic lighting proposal has a number of phases, starting with highest wattage Edison and Bayonet cap lamps (>100W) and gradually covering lower wattages (≥25W).

For each phase, there would be minimum efficiency specifications based on an energy efficiency classification and on luminous efficacy or lumens per watt. For each wattage category, manufacturers are calling for requirements to become more stringent over time. All lamps that do not carry the EU Energy Label[2] are not in the scope of this proposal. Proposals to tackle reflector lamps, which make up 15% of the incandescent lamp market, are being also prepared.

To ensure continued quality and cost effectiveness for Europe's consumers, all lamps placed on the EU market should also have to have a minimum lifetime of 1000 hrs and comply with relevant IEC and CEN standards.

6. Your proposal targets 25W lamps and above only. What about those lamps under this wattage?

The majority of the lamps under 25W are classed by our member companies as either specialty lamps or lamps that have a limited environmental impact. These lamps have a lower environmental impact due to their power (lower energy consumption), frequency of use (mainly colored lamps, lamps in fridges, ovens and decorative lighting) and their market size (currently they represent 3% of the market). Furthermore, cost-effective, energy efficient alternatives for many of these lamps are not yet available on the market. We are currently working on scenarios and proposals for this category.

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THE CURRENT STATE OF PLAY

7. What percentage of lamps on the European market is energy efficient and what percentage is inefficient?

- One third (33%) of all lamps currently installed in the European Union are energy efficient.
- Two thirds (66%) of all lamps currently installed in the European Union are energy inefficient.

8. What percentage of lamps in Europe's homes is energy inefficient?

Approximately 85% of lamps currently in EU homes are energy inefficient.

lamps but perhaps more commonly on High pressure mercury lamps for industrial applications. The BY22d is used on some low-pressure sodium (SOX) lamps.

What is an Edison cap? Named after the pioneering inventor Thomas Edison, the Edison Screw or "ES" lamp fitting is used worldwide in a vast range of applications. The most popular ES or E27 fitting is 27mm diameter and is widely used in Europe. The US has a slightly smaller lamp cap type E26. The "Small Edison Screw" (SES or E14) is often used for smaller decorative fittings, chandeliers, and appliance lamps - predominantly in the UK and Europe. The "Candelabra Edison Screw" (CES or E12) is most frequently used in the US and Canada, especially for candle lamps. The Miniature Edison Screw (MES or E10) fitting is sometimes used in large chandeliers containing perhaps dozens of small lamps.

INTERNATIONAL EFFORTS TO 'BAN' INEFFICIENT LAMPS

9. Do your counterparts in other parts of the world support your position?

Yes, the setting of minimum energy performance standards is something that is generally considered important. Several governments worldwide have also recently announced plans to put legislation in place to eliminate the least efficient domestic lamps, including energy inefficient incandescent lamps, from the market over time. However, geographic and cultural differences have to be taken into account. Therefore the ELC is working closely with its international colleagues in America, China, Australia and Japan, to exchange best practice and learning, particularly on how to support and inform consumers.

10. Do you agree with recent calls from the governments of California and Australia to phase-out ALL incandescent lamps?

The governments of California and Australia have not called for the phase-out of all incandescent lamps. Like the EU, they will be working on developing energy efficiency standards for lamps. It is clear that the consequence of setting strict minimum energy efficient standards for lamps under legislation like the EU's Eco-Design of Energy Using Products Directive (EuP) will lead to the phase out of the least efficient lamps from the market place. The ELC supports the efforts by its global colleagues to develop energy efficiency standards for lighting but one should be realistic in terms of timings for industry, the supply chain and consumers.

PRODUCTION & CAPACITY

11. Will factories have to be closed in Europe?

The production process of the targeted lamps will eventually stop in line with this strategy. We are currently reviewing alternate operations of these factories, to support the production of other products.

12. What are the potential production capacity problems you envisage?

A switch to more efficient domestic lighting will require significant manufacturing changes within the ELC Member companies. Lamp manufacturers currently produce 8 times more "traditional" lamps than the more energy-efficient equivalents. This is why we have proposed a time-phased approach in order to manage this process in a suitable timescale, in order to safeguard the interests of employees, supply chain and consumers.

13. How many ELC Member Company factories in Europe currently produce incandescent lamps?

In total, 10 lamp factories and 6 pre-material (e.g. glass, filament etc) factories currently produce incandescent lamps in Europe.

14. Will this transition have a negative impact on the overall employment situation in Europe?

A switch to more efficient lighting in the home will require significant manufacturing changes within the ELC Member Companies. The lamp manufacturers are committed to manage this process carefully and aim to minimize the impact on the workforce by retraining among other things.

COMPACT FLUORESCENT LAMPS (CFLi) OR 'ENERGY SAVERS'

15. Why do CFLis cost so much? Will the price be coming down?

CFLis lamps have traditionally been more expensive than 'traditional' incandescent lamps because they are more expensive to make (these lamps have integrated ballasts). The price of a CFLi has decreased over the last several years. This is great value when you consider a consumer can save around €80 over the life just by replacing a 100-watt incandescent with a 20-watt CFLi.

16. What are the cost savings, in energy terms, for a CFLi compared to an energy inefficient incandescent GLS lamp available today over its lifetime?

A six-year-life rated energy-saving lamp would therefore save about €80 during its lifetime.

Although initially higher in price, a typical CFLi can offer a saving of up to €13 per year on average when compared to an energy inefficient incandescent lamp. A six-year-life rated energy-saving lamp would therefore save about €80 during its lifetime. (100W incandescent versus 20W CFLi) This is based on an assumption of 3 continuous burning hours per day, for an energy cost of 0,15 €/kWh.

17. Which CFLi lamp should I buy to replace a 60-, 75-, 100- or 150-watt regular lamp?

The ranges below provide wattage equivalents (that produce the same amount of light) for regular incandescent and CFLi lamps.

- **25 watt** incandescent lamp = **5-7W** CFLi
- **40 watt** incandescent lamp = **7-9W** CFLi
- **60 watt** incandescent lamp = **11-15W** CFLi
- **75 watt** incandescent lamp = **15-18W** CFLi
- **100 watt** incandescent lamp = **20-23W** CFLi
- **> 100 watt** incandescent lamp = **23W** CFLi and above

Along side this range of CFLi lamps there is also a range of energy saving Halogen lamps available. These lamps provide high quality, brilliant light. Additional ranges are currently in development.

18. How much energy does it take to produce a CFLi lamp compared to an energy inefficient incandescent GLS lamp available today?

It takes approximately five times more energy to produce one CFL compared to one energy inefficient incandescent GLS lamp. However, as CFLi lamps last on average between 6 to 15 times longer than energy inefficient incandescent GLS lamps, the amount of energy needed for the production of one CFLi is comparable to the production of between 6 to 15 GLS lamps – hence the saving over the lifecycle of the product is much higher.

Therefore, an energy saving CFL has a much lower overall environmental impact than an energy inefficient incandescent lamp throughout its lifecycle. More than 90% of energy consumed during the lifecycle of a lamp is in the use phase and as CFLis are up to 80% more efficient than an average inefficient incandescent lamp, the savings are evident.

19. Many consumers complain that CFLi energy saving lamps are of an inferior quality. Are there quality standards in place for lamps in the EU?

The Member companies of the ELC manufacture lamps that meet the relevant CEN/CENELEC Standards. The ELC urges the market surveillance authorities in the EU Member States to protect the consumer from lamps that are inferior and do not meet these standards.

20. Some people don't like the light quality of CFLis. Is that being improved? Will it ever be more like incandescent lamps?

CFLi lamps have evolved to the point where good quality lamps now are usually very similar in functionality to incandescent lamps. They last longer and they will continue to get smaller, better, more efficient, safer and less expensive.

Energy saving lamps from reputable manufacturers render a light quality which approaches very closely that of incandescent lamps.

Energy saving lamps from reputable manufacturers render a light quality which approaches very closely that of incandescent lamps. The Color Rendering Index (CRI) expresses the level to which colors a represented in its natural form i.e. as if lit by sunlight, where an incandescent lamp has a CRI of 100, good quality energy savers typically have a CRI value between 80-85. Previous generations of energy savers, as well as many present energy savers from C-brands, render an unnatural light, giving for example a greenish or blueish light. Additionally, the production process of C-branded lamps is unstable, resulting in significant observable color differences between individual lamps. If a colour rendering index of higher than 80-85 is needed for specific applications, halogen lamps with a CRI of 100 should be used.

21. Frequent switching reduces the life of CFLis

A CFLi's life is no longer affected by switching. The current standards for 'Energy Recommended' accreditation requires over 3,000 switching cycles per 8,000 hours of tested life which is many more than would be necessary for normal domestic use. For special applications such as hallways in flats and lights in corridors activated by motion sensors, some manufacturers produce 'heavy duty' CFLis with up to 500,000 switching cycles capability and 15,000 hours life!

22. CFLis are too big

The latest generations of CFLis offered by the major manufacturers are no longer very large.

The latest generations of CFLis offered by the major manufacturers are no longer very large. In some cases they are slightly smaller than their GLS equivalent and with the new classic shapes, also look almost the same as GLS lamps.

23. CFLis need to be left switched on for more than 45 minutes as they consume so much energy when first switched on

There is no reason to keep a CFLi switched on for longer than a normal GLS lamp as they do not consume any greater energy during start up and run very efficiently immediately after the first 2 or 3 seconds.

24. You can't dim CFLis

There are new lamps available today which can dim on ordinary domestic dimmer switches or alternately by staged dimming using a standard light switch. These products are a relatively new innovation and therefore in limited supply, that said the number of these types of products is expected to increase over time.

CFLis AND YOUR HEALTH

25. CFLis flicker with a stroboscopic effect, I've heard they switch on and off 50 times per second. Do they cause medical problems such as epileptic-type fits, mental disturbances?

CFLis give a constant, flicker free, non-stroboscopic light. They operate at high frequency through their electronic controller at between 30,000-50,000 hertz (normal mains voltage cycles at just 50 hertz or cycles per second).

A small number of cases have been reported by people who suffer from reactions to certain types of linear fluorescent lamps. In the majority of these cases, the lamps in question were used in offices, restaurants (in certain European countries) and in limited places in domestic households (such as kitchens and garages) and were almost certainly triggered by OLD technology which operated on a conventional (Copper-Iron) ballasts with a low frequency (<50Hz mains frequency); this is not the case with new energy efficient linear fluorescent lamp technology which unlike earlier energy efficiency technologies, operates on high frequency drivers (for example, certain fluorescent lamps operate on 50kHz or 50,000Hz).

The above health related problems can be therefore be avoided if consumers opt for new technologies such as integrated energy savers (CFLi) in households and other sources using high frequency drivers (e.g. linear fluorescents and HID) in other applications (such as offices, restaurants etc).

26. What about those who suffer from light sensitivity or Lupus sufferers, for whom a ban on normal incandescent lighting would result in a total disruption of normal everyday life?

People affected from light sensitivity or lupus sufferers (a chronic autoimmune disease – of which sensitivity to ultraviolet light is a key symptom) could be affected by either the intensity of the light (i.e. the lumens of the lamp), the spectral property of the light (particularly when the light contains more blue) or when a lamp radiates a small amount of ultra-violet (UV) light. There is a small amount of UV generated by fluorescent lights (such as CFLis). But this is fractional if you compare this to natural daylight. For the many energy savings lamps (such as CFLis) that do generate higher quantities of UV and blue light, filters are now used to reduce radiation.

LED lamps can emit a range of colors (green, red and blue) and can emit white light by combining red, blue and green LEDs or a LED with a phosphor similar to the ones used in fluorescent lamps. The whiter the lamp is, the more blue (and possible UV) is radiated. Negative reactions to LEDs therefore are probably due to the use of LED lamps with a very white color tone, thus containing a lot of blue. It is important to note that LED technology is still in the very early stages of development, and as such there is a strong possibility that lamps will be made with a certain spectral composition in the future, hence alleviating some of these initial problems.

General tips for people who are sensitive to light

- If you suffer from a special light sensitivity do not expose yourself directly to the light source. Use indirect light via a white surface, as, in many cases, during reflection UV-radiation will be absorbed (depending of course of the type of surface and material/paint used).
- Special covers can be used to fully filter the last bits of harmful radiation from the lamps. For example, Plexiglas or special glass UV filters will filter most of the UV light.
- Use yellow filters to filter the blue light
- When filters are no option, mains voltage halogen lamps are an acceptable alternative. Due to the UV-filtering quartz of the burner, these lamps have UV output levels that are similar to incandescent lamps.
- Reduce the dose (time of exposure, quantity) of light by dimming the lights when possible
- Use light sources with a warm color tone (low correlated color temperature); they contain the lowest quantity of blue light.

CFLis AND MERCURY

27. A big issue in the uptake of CFLis is their mercury content.

Compact fluorescent lamps are low-pressure discharge lamps that operate on the following principle: after ignition, mercury vapour in the glass tube emits UV radiation. This radiation is converted by the phosphors on the inside of the glass tube into visible light. The phosphors used are fully annealed inert substances that pose no risk to health even if they are released as a result of a lamp breakage.

When the lamps are in a cold state, mercury is present in the form of small mercury droplets or as a solid amalgam or mercury/iron pellet in the discharge vessel (lamp). When the lamp is switched on, the mercury vaporizes as the temperature of the lamp rises, and the mercury vapour needed for the discharge fills the entire lamp. Mercury is released if the lamp breaks.

The EU Reduction of Hazardous Substances Directive (2002/95/EC) allows for the use of mercury in lamps. Below lists the approved exemptions, which have undergone expert analysis by the Commission and is outlined in the Annex of the Directive.

1. Mercury in compact fluorescent lamps not exceeding 5 mg per lamp.
2. Mercury in straight fluorescent lamps for general purposes not exceeding:
    - halophosphor 10 mg
    - triphosphor with normal lifetime 5 mg
    - triphosphor with long lifetime 8 mg.
3. Mercury in straight fluorescent lamps for special purposes.
4. Mercury in other lamps not specifically mentioned in this Annex.

A typical mercury thermometer has between 500 and 3,000 milligrams of mercury, depending on its size. Furthermore, it is widely known that electricity generation uses mercury. When using an incandescent GLS lamp, the total mercury emission caused by electricity generation is up to twice as high compared to the combined mercury content and emission from electricity generation of using a CFLi.

DISPOSING OF CFLis

28. Should I be concerned about using CFLis in my home or should I take any special precautions?

CFLis are safe to use in your home. No mercury is released when the lamps are in use and they pose no danger to you or your family when used properly.

CFLis are safe to use in your home. No mercury is released when the lamps are in use and they pose no danger to you or your family when used properly. However, CFLis are made of glass tubing and can break if dropped or roughly handled. Care should be taken when removing the lamp from its packaging, installing it, or replacing it. Always screw and unscrew the lamp by its base, and never forcefully twist the CFLi into a light socket by its tubes. Used CFLis should be disposed of properly (see question 29).

29. What do I do with a CFLi when it burns out? What is the proper disposal procedure?

In Europe, all CFLi lamps have to be disposed as special waste under EWC Code 20 01 21- Fluorescent tubes and other mercury-containing waste. Furthermore, as part of its obligations under the EU's WEEE Directive[2], the European lighting industry has set up a European-wide recycling infrastructure for all gas discharge lamps (including CFLis), capable of recycling mercury, as well as other metals, glass, etc. All CFLi lamps are provided with the crossed-out wheeled dustbin logo, indicating that consumers should deposit the product separately, making use of the existing, local waste depots.

Disposing of CFLis

Follow these guidelines to dispose your CFLi properly:

- Like paint, batteries, thermostats, and other hazardous household items, CFLis should be disposed of properly.
- Do not throw CFLis away in your household garbage if better disposal options exist.
- If your local waste management agency offers no other disposal options except your household garbage, place the CFLi in a plastic bag and seal it before putting it in the trash.
- If your waste agency incinerates its garbage, you should search a wider geographic area for proper disposal options such as your local tip. Never send a CFL or other mercury containing product to an incinerator.

For more information about the WEEE directive and to contact your national ELC member partner see www.elcfed.org.com/weee

30. What should I do if I break a CFLi lamp?

If you break a CFLi, do not panic and take the following steps:

- Ventilate the room for 20-30 minutes.
- Do not use a vacuum cleaner.
- Use gloves to remove all the bits.
- All the items used in cleaning up the spill should be treated as "universal waste" or disposed at your local lamp recycling point.
- Remove all broken lamp components from the luminaire before reusing the luminaire.
- ALWAYS switch off the mains before removing the remaining lamp components!

2 *Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC*

ADDITIONAL QUESTIONS

31. What about electromagnetic fields and energy-saving lamps?

Electromagnetic fields are an everyday fact of life for people in industrialized countries. There is more and more talk now of "electro-smog". Electromagnetic fields (EMF) occur wherever electricity is involved.

Lamps and energy-saving lamps both create EMF. All lighting systems sold by the member companies of the ELC, however, are well within the national and international limit values. EMF depends not only on the control gear and the lamp but also on the design of the luminaire.

Specialists and institutions such as the WHO are responsible for defining the limit values. The limit values are confirmed by the WHO and the International Radiation Protection Agency (IRPA) and incorporated in EU legislation.

32. Can LEDs be used as an energy saving alternative to inefficient domestic lamps?

LED technology is currently being used in some specific applications (such as traffic signals, mobile phones etc) and offers great potential for the future of lighting. However, this technology still requires further development before it can be used as a cost effective replacement for lamps in the home.

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