



Mercury in Compact Fluorescent Lamps

Source document:
SCHER (2010)
Summary & Details:
GreenFacts

Context - While energy efficient compact fluorescent lamps consume less electricity and lead to less emissions from power plants, they do contain mercury – a hazardous material.

Does the mercury they contain pose a risk to consumers?

Overall, in terms of mercury emissions, are compact fluorescent lamps beneficial to the environment compared to other lamps?

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The answers to these questions are a faithful summary of the scientific opinion produced in 2010 by the Scientific Committee on Health and Environmental Risks (SCHER):
"Opinion on Mercury in Certain Energy-saving Light Bulbs"

The full publication is available at: <https://copublications.greenfacts.org/en/mercury-cfl/>
and at: <http://ec.europa.eu/health/opinions/en/mercury-cfl/>

i This PDF Document is the Level 1 of a GreenFacts Co-Publication. GreenFacts Co-Publications are published in several languages as questions and answers, in a copyrighted user-friendly Three-Level Structure of increasing detail:

- Each question is answered in Level 1 with a short summary.
- These answers are developed in more detail in Level 2.
- Level 3 consists of the Source document, the internationally recognised scientific opinion which is faithfully summarised in Level 2 and further in Level 1.

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1. Why is mercury tolerated in compact fluorescent light bulbs?

Currently, traditional light bulbs are being phased out in favour of more energy-efficient lamps, mainly compact fluorescent lamps (CFLs) that contain some mercury.

Because mercury is a hazardous material, it is generally banned in electric and electronic equipment, but is exceptionally allowed in limited quantities for example in compact fluorescent lamps.

At present, it is scientifically and technically impossible to produce mercury-free compact fluorescent lamps, but new technologies can reduce the amount of mercury contained and the authorised content will be gradually lowered.



The mercury contained cannot escape from the lamps, except if they break accidentally or if they are discarded with household waste. If consumers take back their burned-out lamps to collection points, the mercury content will be recycled and not released to the environment.

2. How could mercury released from a broken CFL affect health?

2.1 Studies on exposed workers have shown that inhaling significant amounts of mercury can lead to inflammation of the lungs, kidney damage, gastroenteritis, restlessness and shaking. Swallowing a large dose of mercury can be fatal. Even exposure to lower levels over a long period of time, can be harmful. Moreover, children and the foetus are known to be more vulnerable to mercury.

2.2 When a fluorescent lamp breaks, the level of mercury vapour in the air of the room can briefly be relatively high, but rapidly the vapour turns to liquid droplets that may stick to surfaces or dust for some time, particularly if the room is not aired sufficiently and cleaned thoroughly. Thus mercury could be inhaled or swallowed by people in the room.

It is very unlikely that such a breakage would pose any health risks to adults and the risk to a foetus exposed through its mother is negligible.

Children tend to be more exposed than adults to the mercury released though the added risk cannot be estimated at present. Indeed, compared to adults, children breathe in more air for their size and are more physically active so they would inhale relatively larger amounts of vapours. Young children also put fingers and objects in their mouth so are more likely to swallow any droplets of mercury left on surfaces or dust.

[Note: To limit exposure, if a compact fluorescent lamp breaks accidentally, air the room before cleaning up the lamp with a wet cloth, avoid skin contact with debris and do not use a vacuum cleaner. Source: FAQ by European Commission [see http://ec.europa.eu/energy/lumen/doc/full_faq-en.pdf] on www.e-lumen.eu [see <http://www.e-lumen.eu>]]

3. Do mercury emissions due to light bulb use and disposal pose a risk to the environment?

3.1 Compared to traditional incandescent bulbs, compact fluorescent lamps save not only energy but also mercury emissions during their entire useful life. This saving in mercury emissions exceeds the amount of mercury they contain and that they could potentially release if broken or inadequately disposed of.

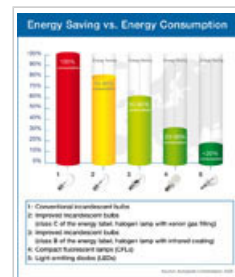
Indeed, producing electricity in coal-based power plants leads to the release of mercury to the environment. Since close to a third of electricity in Europe is produced from coal, using any type of light bulb contributes to mercury emissions, even if the lamp itself contains no mercury.

To compare mercury emissions from different bulbs, their light output (in lumens) and lifetime need to be taken into account. For the same light output, conventional incandescent lamps lead to the greatest mercury emissions, followed by CFLs and halogen lamps. In the case of CFLs, most of the mercury is released at the end of the lamp's lifetime, if it is discarded with unsorted household waste and not recycled.

3.2 Each year, natural events (e.g. volcanic activity, weathering of rocks) and human activities (e.g. mining, fuel use, dental amalgams) are responsible for the release of thousands of tons of mercury into the environment.

3.3 In the EU, the estimated mercury emissions associated with the use and disposal of household lamps (incandescent, halogen & CFLs combined) are relatively low compared to other sources. It is therefore considered very unlikely that their contribution to the amount of mercury present in the environment poses any risk.

However, facilities that collect and recycle lamps could pose a local, environmental risk if they do not deal appropriately with potential mercury releases.



Energy Saving vs. Energy Consumption [see Annex 1, p. 5]
Source: EC [see http://ec.europa.eu/energy/lumen/overview/whatchanges/index_en.htm]



See also our summary on Dental amalgam [see <http://publications.greenfacts.org/en/dental-amalgam/index.htm>]

4. What would be the benefits of increased separate collection of compact fluorescent lamps?

Because of their mercury content, compact fluorescent lamps should increasingly be recycled and not discarded inappropriately with unsorted waste.

In 2007, only an estimated 20% of them were recycled. While the current use and disposal of compact fluorescent lamps is unlikely to pose any environmental risks, increased separate collection and recycling would further reduce mercury emissions



Packaging logo – not in standard waste
Source: EC [see <http://ec.europa.eu/energy/lumen/overview/howtodispose/>]

5. Do environmental benefits of compact fluorescent lamps outweigh potential risks?

Compared to conventional household lamps, compact fluorescent lamps (CFLs) save energy and result in lower emissions of mercury, greenhouse gases and other pollutants

The EC Scientific Committee on Health and Environmental Risks (SCHER) is therefore of the opinion that **compact fluorescent lamps offer a net environmental benefit compared to the other light bulbs considered, even when mercury content is taken into account.**

On potential risks SCHER concluded:

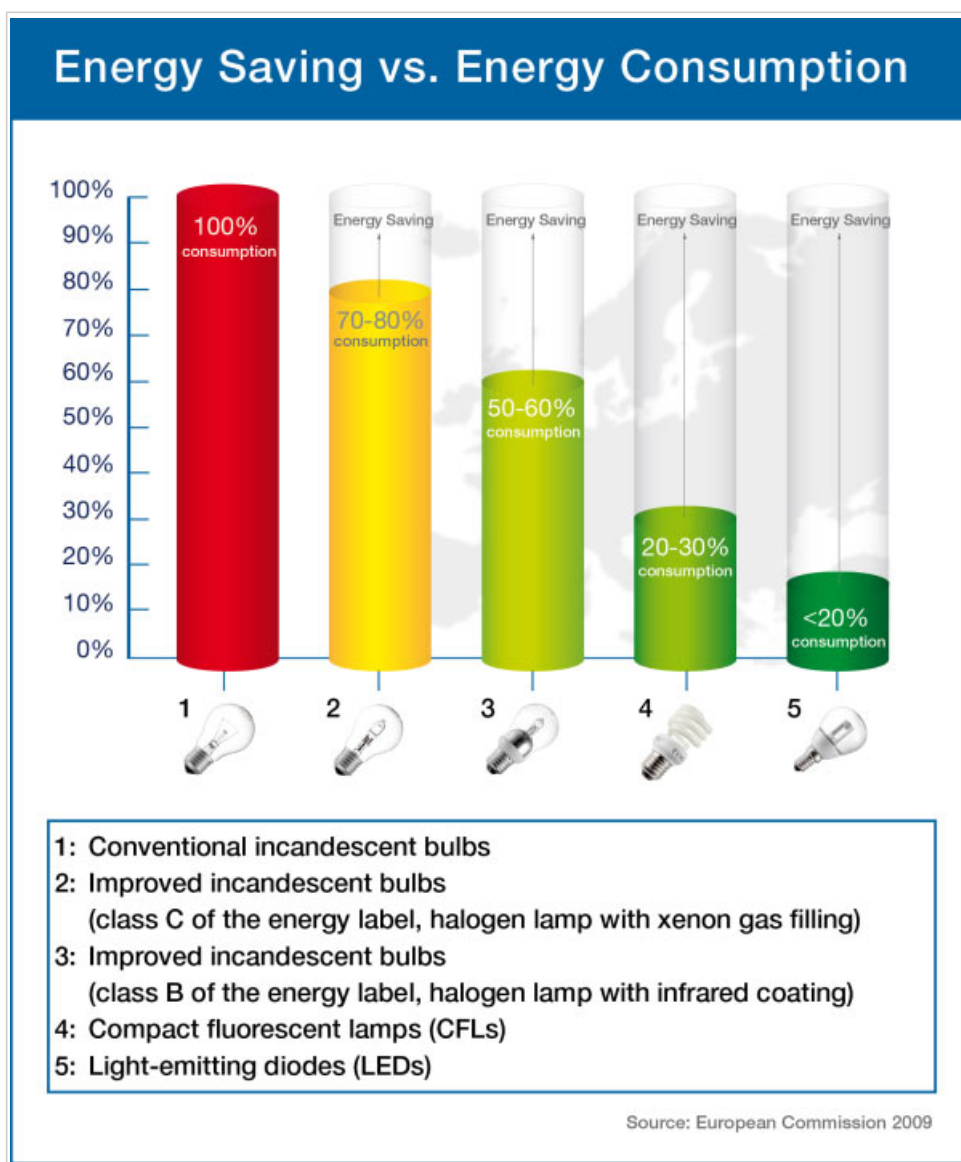
Compact fluorescent lamps that break accidentally in a consumer's home are not expected to pose any health risks to adults and the risk to a foetus exposed through its mother is negligible. However, no conclusions can be drawn on the potential risks to children, namely because there is a lack of data about the possibility of swallowing any droplets of mercury left on surfaces or dust (see question 2).

It is very unlikely that the use and disposal of compact fluorescent lamps poses any risk to the environment. However, facilities that collect and recycle them could pose a local, environmental risk if they do not deal appropriately with potential mercury releases (see question 3).

Annex

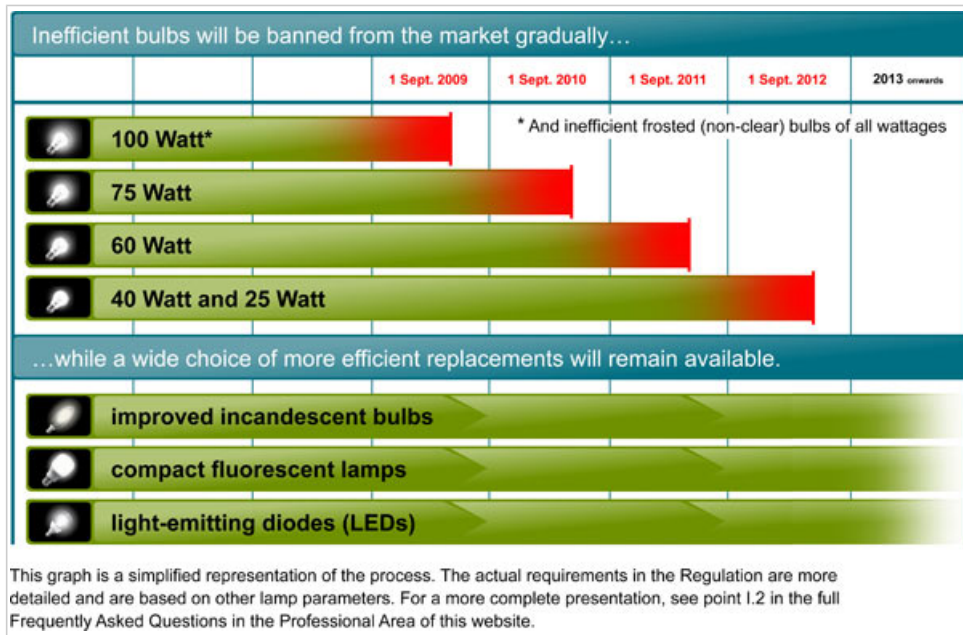
Annex 1:

Energy Saving vs. Energy Consumption



Source: http://ec.europa.eu/energy/lumen/overview/whatchanges/index_en.htm [see http://ec.europa.eu/energy/lumen/overview/whatchanges/index_en.htm]

Annex 2: Inefficient bulbs will be banned from the market gradually



Source: http://ec.europa.eu/energy/lumen/overview/whatchanges/index_en.htm [see http://ec.europa.eu/energy/lumen/overview/whatchanges/index_en.htm]

Partner for this publication

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