

Proper Disposal of Fluorescent Lighting at the End of Life
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Introduction

In the last issue ([SEE Spring Issue 03](#)), “An Introduction to Sustainable Production and Consumption”, I presented the ideas of several popular authors on how to reduce and eliminate waste at the end of a product’s useful life. They ranged from recycling and reuse, returning products to the manufacturers at the end of useful life for reprocessing into new products, to designing products correctly in the first place such that the products could biodegrade. In this article, I present a problem that present technology has not been able to solve: How to produce mercury-free fluorescent lamps. I will briefly discuss fluorescent light, its mercury content, energy & cost advantages, how to choose proper fluorescent lamps, how to handle them safely, and what to do at the end of the product’s useful life.

Health Effects of Mercury

All fluorescent lighting contains mercury. Mercury is toxic to the human nervous system. The problem was first discovered in Japan in the 1950’s where consumption of fish with high concentrations of methyl mercury by pregnant women resulted in high incidences of cerebral palsy among their children. Recent studies showed connections between prenatal mercury exposures and development problems in memory, attention, and language skills in children. Elemental mercury (mercury vapor) emitted into the air can stay in the air for a long time and travel over long distances. Rain and snow bring it down into soil and water where microorganisms then turn it into methyl mercury, which is highly toxic.²

Advantages of Fluorescent Lighting

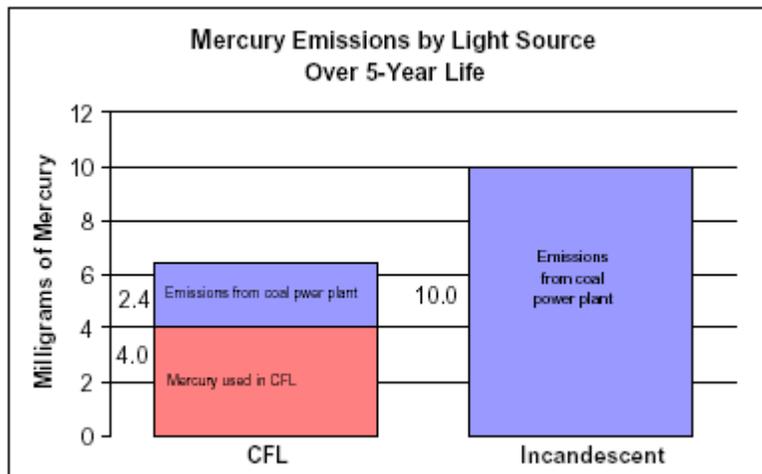
Ordinary incandescent bulbs are extremely inefficient as most of the electrical energy used to generate the light is lost as heat. Fluorescent lamps are very efficient. For the same light level, fluorescent lamps use 1/3 the amount of energy used in incandescent bulbs. Fluorescent lamps also have 6 to 10 times longer life - about 6000 to 10,000 hours compared to 1000 to 2000 hrs for typical incandescent bulbs.

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² Trasande, Landrigan, Schechter, “Public Health and Economic Consequences of Methyl Mercury Toxicity to the Developing Brain”. Environmental Health Perspectives, Vol. 113 No. 5 May 2005.

As consumers, the increased efficiency means money in our pockets. Essentially, for every dollar one spends on lighting a home with incandescent bulbs, one could save more than 60 cents switching to fluorescent lamps. Although fluorescent lamps cost more to purchase than incandescent bulbs, their lower energy cost and longer life make them more cost effective over a period of time. More important, reducing the electrical load means reducing the electrical generation at power plants, most of which are still fueled by fossil fuels such as oil, and coal.

According to the US Environmental Protection Agency (EPA)³, the highest source of mercury in the atmosphere in the US comes from burning fossil fueled power plants. A compact fluorescent lamp (CFL) uses 75% less energy than an



Source: US EPA, June 2002

incandescent light bulb and lasts at least 6 times longer. A power plant will emit 10 mg of mercury to produce the electricity to run an incandescent bulb compared to only 2.4 mg to run a CFL for the same time. Adding the 4 mg of mercury typically contained in a fluorescent lamp, the mercury for CFL is still less (6 mg compared to 10 mg). This reduces electrical consumption and also reduces harmful power plant emissions of mercury, as well as other environmentally harmful emissions such as carbon dioxide, nitrous oxide and sulfur dioxide that cause global warming, acid rain and smog.

Choosing the Proper Fluorescent Lamps⁴

Although years of research by companies and government laboratories have not resulted in mercury-free fluorescent bulbs, the technology has improved significantly in the last decade. Fluorescent lamps now have lead-free ballasts, and the amount of mercury used has been reduced from 40 mg or more to about 4 mg in compact fluorescent lamps, and less than 20 in fluorescent tubes. Look

³ Factsheet: Mercury in Compact Fluorescent Lamps (CFLs), prepared by the US Environmental Protection Agency. <http://www.nema.org/lamprecycle/epafactsheet-cfl.pdf>

⁴ While I would like to list the manufacturers of design for reprocessing and low-mercury fluorescent lamps, I am reluctant to do so for fear of lawsuits by other manufacturers not included in the list.) Search the web for “low-mercury fluorescent lighting”. Also search the web for “fluorescent lighting recycling” and your country to identify a recycler near you. In the US, go to NEMA’s LampRecycle.org to find out about each state’s lamp recycling regulation and locate lamp recyclers in the US and Canada.

for package labels that show these new improvements. If long fluorescent tubes are to be used, select T8 instead of T10 or T12, as T8-types are more energy efficient and also use less mercury. Some of the new, low-mercury fluorescent tubes can be easily identified by their green end caps.

The European Union is putting the burden on manufacturers to assume the responsibility of waste disposal of electronic and electrical items. Fluorescent lamps fall under this category. As a result, some fluorescent lamp manufacturers have designed their lamps such that the glass, end caps, and almost all the phosphor and mercury can be reclaimed to produce new fluorescent lamps.

End of Life

In many parts of the world, industrial and commercial large quantity users are required to send their fluorescent lamps for reprocessing. Household and small-quantity users are generally not required to do so. Ideally, if a take-back policy is available in your area, you should take advantage of that. Otherwise, if reprocessing or hazardous waste facilities are available in your area, you should keep your burned-out lamps in the carton and cardboard box in which they came until you gather sufficient quantities to take them to the reprocessing or collecting facilities.

As last resort, put burned out fluorescent lamps in a sealed plastic bag before you put them in regular trash.

RECOMMENDED BROKEN LAMP HANDLING PRACTICES: IF LAMPS ARE BROKEN, VENTILATE AREA WHERE BREAKAGE OCCURRED. TAKE USUAL PRECAUTIONS FOR COLLECTION OF BROKEN GLASS. DO NOT USE A STANDARD VACUUM CLEANER. PLACE MATERIALS IN CLOSED CONTAINER TO AVOID GENERATING DUST.⁵

Hong Kong Conservancy Association

<http://www.conservancy.org.hk/CAnews/04March/page03E.htm>

“The waste recovery and recycling program is jointly organized by CA and the Housing Society, 25 public housing estates are participating in the program. Recovery items include waste paper, aluminum cans, and PET bottles. CA has initiated a Compact Fluorescent Lamp trade in program on its own. The program started on 29th December last year, up to mid March, it attracted 4 738 participants, 25 976 kg of paper, 33 128 cans and 70 178 PET bottles have been collected. Out of 3 500 Compact Fluorescent Lamps, 2 700 have already been traded in.

Participants are awarded coupons based on the quantity of the items they have taken to the collection stations. The coupons can be used to redeem daily necessities such as toilet papers, salt, sugar or soy sauce. To encourage participants to build up the habit of recycling, a stamp will be printed on a participation card each time they send in the items; they can enter the lucky draw if they have collected seven stamps or above.”

⁵ National Electrical Manufacturers Association (USA). <http://nema.org>