



Selecting and disposing of household lamps: minimising the environmental impact

This information sheet provides guidance on the types of household lamps (or light bulbs) available and outlines good practice for their use and disposal to minimise their environmental impacts.

The world would be a very dark place without artificial light. The first lamp was invented around 70,000 BC and the first electric carbon arc lamp in 1801.¹ Since then, artificial lighting has made our work and social lives safer and more comfortable. However, as with all electrical products, lamps require energy to operate and, when spent, lamps need to be disposed of. Both have environmental impacts.

WHAT ARE THE DIFFERENT TYPES OF HOUSEHOLD LAMPS?

Incandescent lamps: The most common type of household light bulb. An electric current passes through a thin filament, heating it and causing it to emit light. Most widely used in domestic applications, and is the basis of most portable lighting, such as table lamps. Approximately 95 percent of the power consumed by an incandescent lamp is emitted as heat, rather than as visible light. It is about one quarter as efficient as a fluorescent lamp.

Halogen lamps: A modified form of incandescent lamp. They are more expensive to buy but last twice as long. They are often used for spotlighting in kitchens, bathrooms and living rooms. If you use halogen lamps it is possible to fit a lower wattage and more efficient bulb – an efficient 35 watt lamp can produce as much light as a standard 50 watt lamp.

¹ History of Lighting and Lamps, Mary Bellis, About: Inventors <http://inventors.about.com/od/lstartinventions/a/lighting.htm> accessed on 8 February 2007.

Light Emitting Diodes (LEDs): Potentially the lighting type of the future. LEDs have an extremely long lifespan. It is expected that technological advances will reduce costs such that this lighting type can be introduced into homes in the near future.

Fluorescent lamps: A lamp filled with neon or argon gas, a little bit of mercury and coated with a fluorescent or phosphorescent powder. Powered by electricity, the activated gas combines with the powder to produce light visible to the human eye.² Fluorescent lamps come in many shapes and sizes such as the popular fluorescent tube. Increasingly popular is the compact fluorescent light bulb (CFL), described in more detail below.

Compact fluorescent lamps (CFLs) or energy saving lamps: A type of lamp that fits into a regular light bulb socket. In comparison to incandescent light bulbs, energy saving lamps have a longer life and use less electricity.

- Energy saving lamps are typically rated at lasting 8,000 – 12,000 hours, depending on type and brand, whereas incandescent bulbs typically last 1,000 hours.
- Energy saving lamps use about a fifth of the power of incandescent bulbs. For example, a 15 watt CFL produces the same amount of light as a 60-75 watt incandescent bulb.
- Energy saving lamps save enough money in electricity costs to make up for their higher initial price within about 500 hours of use.³

² Fluorescent lamps, Wikipedia, http://en.wikipedia.org/wiki/Fluorescent_lamp accessed on 7 February 2007.

³ Compact fluorescent lamp, Wikipedia, http://en.wikipedia.org/wiki/Compact_fluorescent_lamp Figure based on US data. Accessed on 17 January 2008.



They are currently the best choice for efficient household lighting due to their longer life and energy efficiency. They also cost less in the long run.

Due to the variety in quality of energy saving lamps on the market, it is important to choose the best quality lamp that you can afford.

WHAT ARE THE BENEFITS AND DOWNSIDES OF USING ENERGY SAVING LAMPS?

Energy saving lamps contain a small amount of mercury which makes them operate much more efficiently than incandescent and halogen lamps. Mercury is toxic to human health and bioaccumulates⁴ in the environment but the amount inside an individual lamp is not large enough to pose a hazard to users.

Energy saving lamps need to be disposed of carefully so they do not break and let the mercury escape and pollute air and water.

Yet because of their energy efficiency, energy saving lamps have the greatest overall environmental life-cycle benefits, despite containing mercury.

A US report states that the amount of mercury released by using energy saving lamps is less than the mercury used by coal-fired power plants to generate the electricity used by less energy efficient incandescent lamps. Proper disposal of spent lamps can further reduce releases of mercury into the environment.

HOW CAN YOU DISPOSE OF HOUSEHOLD LAMPS SAFELY?

- Incandescent lamps can be disposed of with the usual household rubbish. Wrap any broken glass in newspaper to prevent injury during handling of the rubbish bags.

- Energy saving and other mercury-containing lamps, such as the fluorescent tubes, should be recycled to ensure that the mercury is collected and recycled in an environmentally safe manner. Some councils provide an annual or periodic hazardous waste collection, the HazMobile. If you are uncertain as to what you should be doing, approach your local council and ask them how you can recycle your fluorescent tubes and energy saving lamps. There is also a company that offers a collection and recycling service for which there is a charge (for further information see: www.interwaste.co.nz). This could be a good option for a larger building or facility that is carrying out a bulk upgrade of its lighting, such as a school, community centre or hospital.

IF YOUR ENERGY SAVING LAMP BREAKS

The public health risk from energy saving lamps (also known as compact fluorescent light bulbs or CFLs) only exists when the lamps break and release small amounts of mercury into the environment. The mercury cannot escape from an intact lamp. The amount of mercury in CFLs is less than in a mercury thermometer – you need to break over 100 CFLs to be exposed to the same amount in a mercury thermometer (5 mg vs 500 mg). The very small amount of mercury contained in a single CFL is most unlikely to pose any risk if the guidelines for a safe clean-up are followed.⁵

As with other household hazardous products⁶, broken CFLs must be handled responsibly and with care.

The following steps outline how a safe clean-up can be done.

1. Use rubber or latex gloves while cleaning up and to protect yourself from being cut by broken glass.
2. Have people and pets leave the room. Do not walk over the affected area.

⁴ Bioaccumulate – the accumulation of a substance, such as a toxic chemical, in various tissues of a living organism.

⁵ The guidance is based on the highest at risk population group, pregnant women, babies and young children.

⁶ A few examples of household hazardous products include: pesticides, bleach, oven cleaner, disinfectants and paint stripper.



3. Ventilate the room before you start the clean-up. Mercury vaporises readily at room temperature. Open all windows and leave the room for at least 15 minutes. Turn off heating/air conditioning systems, heat pumps, dehumidifiers and ventilation systems.

Clean up for hard surfaces

4. Carefully sweep all the big pieces up using stiff paper or cardboard. Wrap the gathered pieces in newspaper and place in a glass jar with a metal lid or a sealable plastic bag.
5. Use the sticky side of duct tape to clean up all the small pieces. Wrap in newspaper and place in the jar or a plastic bag.
6. Wipe the area down with a damp paper towel. Place used paper towels in the plastic bag.
7. Remove rubber gloves and place in a plastic bag.
8. Wash your face, hands and arms thoroughly, and change your clothing after cleaning up.
9. Seal all the plastic bags and/or jar containing the broken pieces of the light bulb, and the paper towels and rubber gloves used in cleaning up, and dispose of them with the household rubbish. Store outside until the next collection.

Clean up for carpets or rugs

Repeat as above.

- If vacuuming is required, vacuum the affected area and then remove the bag (or empty and wipe out the canister). Dispose of all the debris, including the vacuum bag in the sealable plastic bag as outlined above (9).

Future cleaning of carpets or rugs

- The next several times the vacuum cleaner is used, turn off any central heating, heat pumps or air conditioning units and open a window before vacuuming.
- Keep the central heating, heat pumps or air conditioning turned off and the window open for at least 15 minutes after vacuuming has been completed.

Clean up for clothing and bedding

- Dispose of any clothing or bedding that comes into direct contact with powder or broken glass.
- Clothing, bedding or other materials exposed to mercury vapour but which have not come into direct contact with materials from the broken bulb can be washed and re-used.
- If shoes come into direct contact with powder or broken glass, wipe them with damp paper towels or disposable wet wipes.
- Place the paper towels or wet wipes in a glass jar or sealed plastic bag for disposal.

The Ministry for the Environment is continually reviewing its clean-up and disposal recommendations for CFLs to ensure we present the most up-to-date information for consumers and businesses. Guidance is reviewed by the Ministry of Health.

WHAT ELSE CAN YOU DO?

- Switch off lights when you leave a room unattended to reduce your power bill and save electricity.
- Use the lowest wattage bulb or tube that will meet your lighting requirements.
- When renovating a room or home, carefully consider your lighting needs and system as you can make energy and financial savings and reduce your impact on the environment. See under further information below and the Ministry for the Environment's Smart Build project.



The Smarter Homes project

The Smarter Homes project, run by the Ministry for the Environment, provides credible and accessible information to homeowners and the residential building industry to enable sustainable building and renovation.

Smarter Homes aims to stimulate consumer demand for building and renovating homes and offices in a sustainable way by demonstrating the benefits. Smarter Homes also enables designers and trades people to develop the skills and knowledge to deliver sustainable housing to consumers.

The Ministry worked with the Department of Building and Housing and the Building Research Association of NZ to create a sustainable building and renovation resource. www.smarterhomes.org.nz

USEFUL LINKS TO FURTHER INFORMATION

Local council

Some of the larger authorities, such as the Auckland region and Hawke's Bay, have a HazMobile service, www.hazmobile.govt.nz, to collect hazardous household wastes such as batteries, chemicals and fluorescent lamps. Please check with your local council to find out if they have a hazardous waste collection service and which waste they can accept.

To find a contact number for your local council access the following website www.localgovt.co.nz

Recycling services

Interwaste (formerly known as Medi-Chem Waste Services) recycle all types of fluorescent lamps and high intensity discharge lights. www.interwaste.co.nz
Phone 0800 102 131.

Tredi NZ Ltd handles pre-1980 fluorescent ballasts (see PCBs section below). A 'sister' company of Interwaste. www.tredi.co.nz email Tredi@tredi.co.nz
Phone: (09) 525 1550.

Further information

RightLight has been developed to help people make more informed decisions on the best lighting for your home or workplace. For practical, independent, up-to-date information: www.rightlight.govt.nz

Zero Waste is a charitable trust which supports the activities of community organisations, councils, businesses, schools and individuals involved in waste minimisation and recycling.
www.zerowaste.co.nz/default,759.sm

The **Energy Efficiency and Conservation Authority (EECA)** promotes a sustainable energy future by encouraging New Zealanders to change the way they think about and use energy. EECA works to raise community awareness of energy efficiency issues and provides businesses and individuals with the tools to make changes. www.eeca.govt.nz/standards-and-ratings/minimum-energy-performance-standards-and-labelling EECA manage an online information website called 'Energy wise' to help households make changes in the home to save money and save energy. www.energywise.org.nz/yourhome

'Switch and Save' – handy questions and answers from the Canadian Natural Resources website. <http://oee.nrcan.gc.ca/residential/energystar-portal.cfm> Please note that some of the responses relate to Canada only.

The **Electricity Commission** is a Crown entity set up under the Electricity Act to oversee New Zealand's electricity industry and markets. The Commission promotes and facilitates the efficient use of electricity. www.electricitycommission.govt.nz



THE STOCKHOLM CONVENTION AND FLUORESCENT TUBE BALLASTS

New Zealand has signed up to the Stockholm Convention. This convention commits countries to stop manufacturing and using persistent organic pollutants (POPs) and to minimise the release of these chemicals into the environment. Over 150 countries have signed up. POPs are toxic chemicals that persist in the environment. Their toxic impacts become stronger as they move through the food chain and increase in quantity in the fatty tissues of birds, mammals and humans.

Twelve chemicals are presently listed as POPs under the Stockholm Convention. The chemicals are a group of pesticides (aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene), industrial chemicals (PCBs), and dioxins and furans that are unintentional by-products of combustion or of the manufacture of some chlorine-containing chemicals.

PCBs were used in New Zealand's electricity industry and most stocks have already been collected and disposed of. Arrangements will be made to safely dispose of remaining stocks that are collected, including the small PCB ballasts associated with fluorescent tubes made before 1980.

The Lighting Council New Zealand is working with the Ministry for the Environment to publicise appropriate methods of handling PCBs and their disposal.

Please contact Howard Ellis at the Ministry for more information on the disposal of fluorescent ballasts over 20 years old. Email: howard.ellis@mfe.govt.nz or phone: (04) 439 7437.

For more information on the Stockholm Convention see: www.mfe.govt.nz/laws/meas/stockholm.html

MORE INFORMATION

Contact the Ministry for the Environment by phoning (04) 439 7400 or emailing e-waste@mfe.govt.nz or check out our website: www.mfe.govt.nz