



Safeguarding the Environment and Health

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Content

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- Two major information sources available:
 - Australian Government/USAID report:
 - Policy Makers Guide to Mercury in CFLs
 - United Nations Environment Programme/GEF en.lighten initiative
 - Efficient Lighting Toolkit

Policy Makers Guide to Mercury in CFLs

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- Extensive review of available scientific literature and other source material to provide:
 - Chemistry of mercury
 - How and why mercury used in lighting
 - The quantity of mercury from lighting entering the waste stream and the impacts of various disposal options
 - Potential health impacts associated with mercury

Findings

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- Mercury in CFLs:
 - Average mercury content in individual CFLs now approximately
 - 4mg globally
 - 5mg in Asia
 - Total mercury content in all CFLs estimated
 - Globally to have peaked in 2008 at 25 tonnes
 - 2013 peak in Asia at 12.5 tonnes
 - Should be viewed in context of mercury in all lamp types
 - Mercury in CFLs approximately 30% of mercury in all lighting in Asia in 2010

Findings

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- Strong evidence to suggest exposure to broken lamps does not constitute a health risk
 - *May not be the case with commercial scale breakage and potential risks to production staff*
- Peak CFL (2008) mercury content of CFLs, when entering the waste stream, constitutes
 - 1-2% of total human caused mercury emissions
 - >0.6% of total global mercury emissions
 - Net reduction in both through use of CFLs and reduced electricity generation emissions
- End-of-life, evidence suggests disposal to landfill and through incineration is safe with respect to direct exposure from sources

Recommendations

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- Focus on source reduction:
 - 5mg maximum mercury content (target 3.5mg)
 - Encourage use of more advanced dosing techniques
 - Invest in enforcement

- While recycling is ultimately desirable, most cost effective reduction in mercury emissions by:
 - Upgrading landfill quality
 - Fitting scrubbing equipment to incinerators

Source Publication

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- Available very soon at:
 - <http://www.energyrating.gov.au/resources/program-publications/?viewPublicationID=2441>

UNEP en.lighten Toolkit

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- Section 5: Safeguarding the Environment and Health
 - Production
 - Regulation of mercury levels in mercury-added lamps (CFLs)
 - Minimizing toxicity at the design and manufacturing stages
 - Occupational health during production
 - Usage
 - Environmental impact during use and dealing with breakage
 - End-of life
 - Management and financing of collection, recycling and disposal
 - International policies
 - Basel Convention on Control of Trans-boundary Movement of Hazardous Wastes
 - Intergovernmental Negotiating Committee on reducing mercury pollution

Production

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- Hg dosing techniques used in CFL lamp production
 - Manual dosing
 - Outdated technology
 - Pipette open-air method and Hg vapour exposure during production
 - Dosing units
 - Precise, low variance, using amalgam and non-amalgam methods
 - Current technology supports amounts as low as 1.5mg
 - Hg not released until bulb is sealed (no occupational exposure)
- Lead-free soldering techniques are increasingly replacing lead solder

Usage - Mercury

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- The mercury in an intact (unbroken) CFL poses minimal risk to consumers
- On breakage:
 - Rapid release of mercury vapour occurs over the first few minutes, which then declines rapidly over the first hour
- Critical variables that influence the risk from a broken CFL include:
 - Amount of mercury in the bulb (older lamps may contain more than new)
 - Ensuring good quality lamps in the market with compliant mercury limits
 - Most importantly, the effective clean-up actions taken by consumer
 - Ventilation and factors such as temperature and room volume

Usage – other hazards

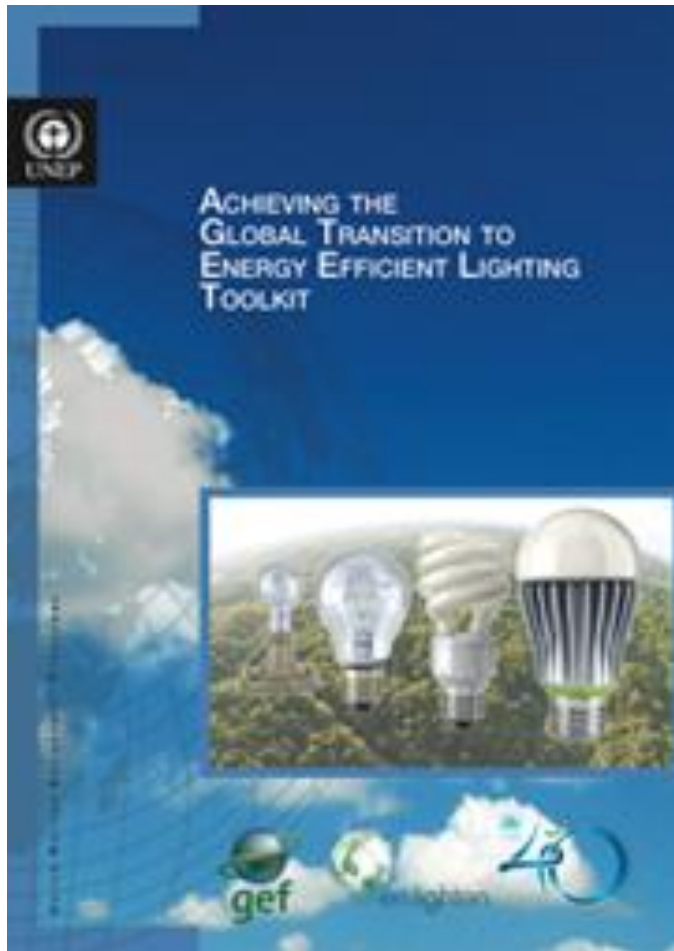
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- Ultraviolet (UV) radiation
 - Prolonged (>8 hours) exposure to an unshielded CFL at very close distance (< 5 cm) could exceed occupational limits for UV exposure
 - Mitigated with use of double-envelope CFLs for light-sensitive individuals
 - For people with UV sensitivities, Health Canada recommends:
 - Buy CFLs that are marked low UV and/or that have a glass cover
 - Use additional glass, plastic or fabric materials in luminaires
 - Increase the user's distance from the CFL
- Electromagnetic Fields (EMF)
 - No demonstrated adverse health effects caused by EMF exposure
 - International Commission on Non-Ionizing Radiation Protection has set limits
 - Incorporated into EU legislation
 - Endorsed by International Radiation Protection Agency and WHO

End of Life

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- CFLs and LEDs are responsible for lower global mercury and greenhouse gas emissions than are incandescent lamps
 - Widespread adoption necessitates sound management at all lifecycle stages
- Compliant, high-quality lamps are essential
- Policymakers should consider international best practices for guidance
 - Recycling is essential, manageable, affordable and can create new jobs
 - Extended producer responsibility can be an effective recycling approach
- Basel Guidelines on hazardous waste management will help eliminate emissions
- Success requires legislative frameworks, sustainable funding, communication and awareness



See Section 5, “Safeguarding the Environment and Health” UNEP en.lighten’s

Efficient Lighting Toolkit

www.enlighten-initiative.org



Thank you!

