Program Survey:
Promoting Fluorescent Lamp Recycling in the Commercial Sector

Background

A brief search for innovative program ideas was conducted within the United States in order to provide NEWMOA with a wider variety of options for promoting fluorescent lamp recycling in the commercial sector. Contacts were made with representatives of the following state and federal environmental agencies and non-profit organizations:

- California
- Delaware
- Florida
- Indiana
- Maryland
- Michigan
- Minnesota
- North Carolina
- Pennsylvania
- Washington
- Wisconsin
- EPA Regions 3 through 10
- Clean Water Action
- Washington Toxics Coalition

The search focused on areas with a history of innovative programs, as well as on government agencies whose websites indicated a more proactive mercury reduction program.

Search Results

Many states contacted do little more than publish guidance documents or basic educational materials. However, several states have incorporated outreach on fluorescent bulb recycling into existing technical assistance or enforcement activities.

North Carolina

The North Carolina Department of Environment and Natural Resources Division of Pollution Prevention and Environmental Assistance (DPPEA) offers free, non-regulatory environmental audits to businesses. Upon request, a team of 2 to 3 staff people will perform an audit and provide recommendations on reducing solid waste and saving energy and water. Although most are industrial facilities, DPPEA also does assessments and/or consultations with small businesses, hotels, hospitals, schools, institutions, local governments, etc. As part of the assessment, the team provides the company with a directory of bulb recyclers. Because the audits are non-regulatory, it is up to the business to follow through. DPPEA does not know how many companies do so because their clients are not required to report back to them once DPPEA's recommendations have been provided. A brief description of DPPEA's "Pollution Prevention Opportunity Assessments" can be found at:
http://www.p2pays.org/main/ppoa.asp

In addition to the assessments done by DPPEA staff, businesses in western North Carolina can also receive confidential, no-cost

waste reduction and energy conservation technical assistance from a team of highly experienced volunteer engineers, architects and scientists called the Waste Reduction Partners (WRP). WRP also provides clients with information on fluorescent lamp recycling. A program description can be found at:
http://www.landofsky.org/wrp/index.html

Contact: Tom Rhodes
Waste Reduction Specialist/
P2Assist Listserv Administrator
NC Division of Pollution Prevention & Environmental Assistance
(919) 715-6516
tom.rhodes@ncmail.net

Florida, Delaware and Minnesota
In these states, inspectors require large and small quantity generators of hazardous waste to prove that lamps generated in their facilities are managed properly.

By regulation, Florida businesses and governmental facilities generating more than 10 lamps per month must provide proof to inspectors in the form of shipping or purchase records that lamps are actually being recycled. Alternatively, Florida regulations also permit Florida businesses and governmental facilities generating more than 10 lamps per month to dispose of them at a permitted hazardous waste landfill. Low mercury lamps may be disposed of at permitted, lined solid waste landfills in any quantities.

In Delaware, it is by policy, not law, that LQGs and SQGs are required to confirm that a contract is in place for management of generated lamps. The requirement is only for high mercury lamps that would fail the TCLP. The contracts are usually found to be with a recycler, a universal waste destination facility or a hazardous waste TSDF. While at the time of the compliance assessment, most SQGs do not have a contract, the state's informal warning letter requires the SQG demonstrate the lamps will be properly managed. Routinely, the SQGs add the lamps to contracts they have in place for managing other generated hazardous waste.

In Minnesota, all lamp generators, regardless of size or status, are required to keep paperwork documenting recycling for three years and must show them on request to an inspector. Other proof, such as a contract, may be required as well. The record keeping requirement may change when the state adopts its universal waste rule.

Hazardous waste inspectors in these states provide generators with a list of local lamp recyclers. Initial compliance with lamp management requirements is high since inspected companies face penalties for non-compliance. However, it is unclear how many stay in compliance, since it may be a long time before a company faces inspection again. This is especially true for small quantity generators.

It is also the case that hazardous waste inspections do not typically target office buildings or shopping malls. Inspections of these types of facilities are more likely to occur as a

result of a complaint or a business voluntarily reporting the existence of hazardous waste. Minnesota did report that one of their first big enforcement actions was against a Kmart department store. Action was taken as a result of a complaint that a large quantity of bulbs had been disposed in a dumpster. A high level of public awareness regarding Minnesota's long standing and comprehensive mercury disposal ban increases the likelihood of violations being reported.

Contacts:
Laurie Tenace, Florida Department of Environmental Protection
850-245-8707
Laurie.Tanace@dep.state.fl.us

Karen J'Anthony
Delaware Department of Natural Resources and Environmental Control
302-739-3689
(The description of Delaware's policy is taken almost verbatim from an email received from Karen on 12/9/04.)

John Gilkeson, Minnesota Office of Environmental Assistance
651-215-0199
(The description of Minnesota's requirements is taken almost verbatim from an email received from John on 12/13/04.)

Several localities and organizations have made fluorescent lamp recycling more convenient and less expensive for businesses through cooperative purchasing.

La Crosse, Wisconsin

The City of La Crosse, Wisconsin (pop. 50,000) coordinates a 12 year old program that increases the convenience and decreases the cost of lamp recycling for close to 200 businesses and public sector agencies across four counties. Onyx Environmental takes the bulbs at substantial discount because of the combined volume recycled at the twice per year pick up/drop-off events -- about 20,000 bulbs per event. In the spring of 2005, it is anticipated that the quantity will increase to about 26,700 bulbs. The range of customers includes a hair salon in a mall, a sizable power company, city and county offices, a school district, several hospitals, several large factories and many very small businesses. One county uses the events to recycle lamps collected from small businesses at local hazardous waste days.

In advance of each event, the City's recycling coordinator sends a mailing to any business or agency that has expressed interest in the program. Those with bulbs to recycle return a form to the coordinator, who summarizes the requests and sends them to Onyx. Onyx does the rest -- arranging pick-ups at locations with more than 1000 bulbs; directing smaller customers to two drop-off sites in La Crosse and handling all of the billing. All of the pick-ups are done on one day. All of the drop-offs are done on a second day. Businesses and agencies pay Onyx directly. By unofficial agreement, the price is set at the state contract price of $0.17/four foot tube. By contrast, a trash hauler would charge up to $0.55/four foot tube to take the lamps from an individual business.

Depending on the size of the company/agency and their available storage space, customers participate in the recycling events as frequently as every six months or as

infrequently as every other year. Consequently, 35-45 customers will participate in any given event. Each collection event requires about 12 hours of administrative time on the part of the City's recycling coordinator.

The number of businesses and agencies participating in the program has grown by almost 10-fold over a period of twelve years, with program promotion occurring primarily by word of mouth. Wisconsin Department of Natural Resources hazardous waste inspectors refer businesses to the program. Other businesses learn of the program when they call the City's recycling coordinator for advice on proper disposal of fluorescent lamps.

Contact: Penny Pierce, City of La Crosse Recycling Coordinator.
Ph: 608-789-7507
piercep@cityoflacrosse.org

WasteCap of Lincoln

WasteCap of Lincoln, Nebraska serves as a reyclables marketing cooperative for its 75 members. It issues RFPs on its members' behalf for collection and recycling of a variety of materials, including fluorescent lamps. WasteCap signs a contract with a lamp recycler. The contract establishes minimum performance standards and a discounted price, which includes transportation and containers. WasteCap calculates that its members save $.16 on each 4 ft. bulb.

WasteCap provides a list of members to the service provider to ensure that members only receive this price. Over 60% of WasteCap's membership uses the fluorescent lamp recycling service. Members are responsible for making the initial contact with the service provider to set up service. The service provider does collections in Lincoln about three times per month, and calls each customer in advance to inform them of the pick-up opportunity. WasteCap also publishes the pick-up dates in their electronic newsletter. The service provider bills the customers directly.

WasteCap also coordinates electronics recycling drop-off events for its membership. Because these events are handled by the same firm that does the lamp recycling, fluorescents are accepted.

Contact: Carrie Hakenkamp
WasteCap of Lincoln
(402) 436-2384
wastecap@LCOC.com

BOMA St. Paul

The greater St. Paul, Minnesota BOMA has secured preferential pricing for its members from lighting distributors and recyclers. These vendors are required to become BOMA members in order to be considered as preferred vendors. Three florescent lamp distributors and four lamp recyclers have joined the organization.

A BOMA committee issues a RFP to these potential vendors, requesting information on price and service. The committee determines who is offering the best deal, and the association signs a "contract" with one or more vendors for a term of 1 to 3 years. BOMA's newsletter is

used to publicize which vendor(s) have been selected. The preferential price is not predicated on any required minimum amount of business from the association as a whole. All BOMA members get the same discount regardless of the volume of business they do with the distributor or recycler. The member recyclers and distributors who were not selected as the preferred vendors frequently offer to meet the preferential price on an informal basis.

The member recyclers and distributors market themselves to BOMA St. Paul's membership through avenues not available to non-members. These include displays at the chapter's annual trade show and paid ads in the chapter's newsletter. Bill Buth, the chapter's president, has also offered free space in the newsletter to any distributor or recycler who wishes to write an article about unique or cutting edge aspects of their products or service.

Bill sees the arrangement as a win for BOMA's property managers and buildings owners, a win for the member recyclers and distributors and a win for the environment and public health.

Contact: Bill Buth, President
Ph: 651-291-8888
bill.buth@bomastpaul.org

Several other organizations and agencies have conducted multifaceted programs to increase lamp recycling.

Oregon Environmental Council

In 2003, The Oregon Environmental Council conducted a multifaceted outreach pilot project to raise awareness about the need to recycle florescent bulbs in commercial buildings. An evaluation indicated that the project resulted in an 8% increase in the number of firms recycling bulbs in their target audience. More detailed information can be found in Appendix A.

King County, Washington

Some of the initiatives that King County has used to overcome barriers to fluorescent lamp recycling include a widespread educational campaign with key audiences, featuring media outreach, workshops, publications, trade show exhibits and seminars, articles and ads in the trade press, and a fluorescent lamp website with an extensive vendor list at http://www.govlink.org/hazwaste/business/fluor/.

To reach the property manager audience, the County focuses on local/regional events and publications such as those offered by property manager and facility manager associations - BOMA, IREM, IFMA and Commercial Real Estate Women, Northwest, and NAIOP.

The County hosts speakers and trade show booths at trade shows and workshops sponsored by BOMA, such as the annual Buildex event for commercial property managers. Using mailing lists from BOMA and their own contacts, the County hosted a lamp recycling seminar in downtown Seattle in

summer 2000.

For general business and residential audiences, King County's media campaigns have resulted in coverage in business and mass media such as The Seattle Times, King 5 News, the Daily Journal of Commerce, NPR Morning Edition and other news outlets.

To reach the lighting contractor audience, the County has worked with the regional electrical utilities Seattle City and Puget Sound Energy as well as Seattle's Lighting Design Lab and individual lighting contractors. It took time to build partnerships, get on the speaker list, distribute materials, and garner referrals via word of mouth. Using mailing lists from these three sources, the County hosted a lamp recycling seminar in downtown Seattle in autumn 2000.

The County also provided technical review of the utilities' contract documents for energy-efficient lighting retrofits at area businesses. To ensure that the promoters of energy efficient lighting also provide (and model) environmentally friendly disposal, the County inserted a clause into the utilities' contracts mandating lamp recycling.

To help overcome informational and logistical barriers to lamp recycling, the County does on-site visits, providing property managers with technical assistance and referrals to lamp recyclers.

In addition, the County operates the Voucher Incentive Program. The VIP covers 50% of the cost of lamp recycling, up to $500 per site. The VIP has existed for more than 10 years and applies to a wide range of hazardous wastes generated by small to medium sized businesses, including mercury lamps and ballasts (PCB and non-PCB). In 2003, the VIP provided 400 businesses with matching funds worth $143,000 for hazardous waste management and disposal expenses.

Since 1998, the VIP has provided matching funds totaling $114,817 to 244 businesses (not just property managers) to recycle hundreds of thousands of lamps. With more than 50,000 potentially qualifying businesses in King County, this is a very small percentage. While cost can be a barrier to lamp recycling, providing financial help to every business is unrealistic. The County sees the VIP primarily as good community service, good PR and a nudge to a small number of businesses, providing one "hook" for outreach.

To qualify, businesses must:
1) Be in King County.
2) Generate <220 lbs. of hazardous waste/month.
3) Receive a site visit from the County's program, during which the voucher will be issued.
4) Contact a recycler (or work with a lighting contractor that does) and mail the completed voucher with receipt to King County.

For more on VIP, see www.govlink.org/hazwaste/business/financial.html

Susan McDonald, Communications Planner for King County, says that the most effective means thus far to increase the lamp recycling rate has been increased regulation, i.e., the addition of lamps to the universal waste rule statewide in 2000. In 1998, the commercial lamp recycling rate in King County was <10%. In 2003, that figure was estimated at 27%.

Contact: Susan McDonald,
Communications Planner III
King County Hazardous Waste Management Program
Ph: 206-263-3059
susan.mcdonald@metrokc.gov

Developing Partnerships with Professional Organizations

Developing partnerships with professional organizations is likely to be part of a successful strategy to promote fluorescent lamp recycling.

Minnesota Department of Natural Resources

Emily Moore, of the Minnesota Department of Natural Resources Office of Environmental Assistance, (OEA) suggests that Minnesota's initial stakeholder process helped to launch working relationships between OEA and local BOMA chapters. In Emily's opinion, soliciting stakeholders' input on program development may be a more persuasive tool initially for fostering involvement than offering to provide information on lamp recycling. As members of the state's initial stakeholder process, local BOMAs were invited to provide information on the barriers their members faced in recycling bulbs and to help brainstorm solutions: "We need to deal with this complex problem. Can you help us figure out how?" "Here are the educational materials we have. Are they of use?"

Emily suggests that it is also important to raise the question of how fluorescent bulb recycling should be paid for. Options for responding to cost concerns on the part of building owners and managers are likely to be limited. However, giving people the opportunity to voice their concerns on this issue is important.

At the completion of the Minnesota stakeholder process, the local BOMAs invited the Department of Natural Resources to present information on mercury reduction to their members. A member of the Minneapolis BOMA continues to head up a committee of building owners containing medical facilities. This individual still disseminates the latest mercury reduction information from the Department of Natural Resources to the committee and to other BOMA members.

Contact: Emily Moore
Minnesota Department of Natural Resources
Ph: 651-215-0201
Emily.moore@moea.state.mn.us

Prepared by:
Aceti Associates
Arlington, MA 02474
Ph: 781-646-4593
jan@acetiassociates.com
www.acetiassociates.com

Appendix A
Oregon Environmental Council Reports

RECOMMENDATIONS FOR PERSUADING COMMERCIAL BUILDINGS TO RECYCLE THEIR FLUORESCENT TUBES

~results of an outreach project conducted by the Oregon Environmental Council with recommendations to reduce barriers and increase recycling rates~

Introduction

From May 2002 through June 2003, the Oregon Environmental Council (OEC) subcontracted with Metro to undertake an outreach project to increase the rate of fluorescent tube recycling by office building owners and managers in the Portland metropolitan area and to encourage purchase of low mercury lamps. The project was funded through a grant from the Oregon Department of Environmental Quality (DEQ).

The project had five elements: 1) identify the barriers office buildings face in recycling their fluorescents; 2) produce an educational brochure that focuses on the identified barriers; 3) promote recycling through articles, public recognition of buildings that do recycle, dissemination of our brochures, and other means; 4) evaluate the feasibility of using fluorescent tube recovery as a voluntary "offset" project for point sources of mercury; and 5) conduct a survey to determine the project's effectiveness.

This report describes the results of our outreach and provides specific recommendations for policy makers and governmental entities interested in reducing mercury pollution from fluorescent lighting.

The Need

According to a DEQ fact sheet, several million fluorescent lamps are discarded by business and government in Oregon each year, making these lamps one of the largest sources of mercury in our solid waste stream. When a lamp is broken, or placed in a landfill or incinerator, the mercury is released into the environment and can contaminate the air, surface water and groundwater. Based on data from the U.S. EPA and other sources, an estimated 211 pounds of mercury each year reaches Oregon's waste stream just from disposal of fluorescent lamps. It is imperative that we divert mercury-containing lamps away from Oregon's waste stream to qualified recycling facilities.

Barriers to Recycling and Recommendations for Overcoming These Barriers

Cost. Cost is almost certainly the main barrier to recycling. Basically, firms that choose to recycle incur a cost not incurred by those who don't recycle, and that cost can be hefty. One property manager said, "Government sees office buildings as deep pockets and doesn't look at the combined impact of tacking on lots of fees."

For firms that are not required to recycle, the decision to do so is therefore based primarily on a desire to do the right thing, and outreach campaigns must be designed to emphasize protecting human health and the environment.

An outreach campaign alone cannot overcome the cost barrier, but can make it clear that the cost of recycling represents just 1-2% of the lifetime costs of the bulb (purchase price plus energy cost).

Perception that someone else should pay for recycling. Closely related to the cost issue was the feeling of most property managers that the cost should not be borne by them alone. Some suggested that the distributor should pay, others that government should pay, and others that there ought to be an up-front refundable charge when purchasing the bulb that would encourage recycling at the end of the bulb's life (like a bottle deposit). "Why should I pay to recycle fluorescent lamps, when less dangerous stuff, like paper, is recycled for free?" said one interviewee. "What's the government's sense of priorities?"

In the post outreach survey, we asked a question about who should pay for recycling and found that people felt very strongly one way or another about different possibilities. Respondents either thought increasing garbage rates slightly to pay for "free" lamp recycling for all businesses was a good idea or not a good idea; there was little in between. Likewise, they felt strongly one way or another about increasing the price of lamps slightly to pay for "free" lamp recycling. But almost all agreed that businesses that recycle their fluorescent lamps should not have to shoulder the entire burden of paying for that service. (However, on average, those who answered the survey may be more likely to be already recycling than the general population of all building managers.)

Again, an outreach campaign cannot overcome this barrier. It is likely that ultimately, to raise recycling rates significantly, one of the suggestions above will have to be implemented. Or, if statewide landfill bans are imposed, all businesses will be required to step up to the plate, and none will be at a competitive disadvantage.

Inconvenience. Small businesses that don't generate many bulbs most often state the inconvenience of taking the bulbs to a transfer station as the main obstacle. They don't see the point of contracting with a recycler because it requires saving their few bulbs for a long time before there are enough to pick up or recycling them via mail, which is cumbersome. Several larger property managers also indicated it would be much simpler if fluorescent recycling were part of the regular recycling program.

The City of Gresham is working with some business clusters (malls) to coordinate a common collection area for fluorescents and split fees for collection. This is a time-consuming, but perhaps necessary, task to increase recycling by small businesses.

Storage space. Related to the issue of inconvenience stated above, some property managers say that storage space for dead lamps is limited and that recycling would need

to be relatively frequent. One said, “Storage is a problem. In order to comply with the fire code, we cannot store anything under our stairwells.”

This does not seem to be a major barrier, but it is an easy excuse for property managers to use. In face-to-face conversations with property managers, if storage space is cited, a discussion should be had about ways to create storage space.

I don’t need to recycle my low mercury tubes. This is a particularly troubling barrier. We found that several firms that have switched to low mercury bulbs no longer recycle because they consider these bulbs “safe.” They are paying a premium price for these bulbs and feel that doing so exempts them from having to recycle.

Our brochure addresses this issue, urging recycling of all bulbs, but it is a misperception will be difficult to change because low mercury bulbs help some property owners/managers feel “just good enough” about their environmental stewardship. One way to overcome this barrier may be to work with lighting firms to provide the correct information at point of sale. In fact, a project to engage lighting firms in educating their customers on recycling might be very worthwhile.

We recommend the following website for identifying whether or not a lamp is truly “low mercury” – `www.informinc.org/fact_P3fluorescentlamps.php#important`. INFORM, Inc. is an independent research organization that examines the effects of business practices on the environment and on human health.

According to the National Electronics Manufacturers Association, lamp manufacturers are expected to label lamps as to their mercury content in the near future. See `www.nema.org/docuploads/37CABA47-7032-4C6D-91D6A1EC6309EA41//LabelingofMercuryContainingLamps.pdf`.

How-to information is perceived as not readily available, or distribution of information is limited and not proactive. Many property owners and managers know little about the mechanics of recycling and do not want to take the time to find out. “I’m not going to search out the information,” said one property manager, “but I might consider recycling and make a few calls if the information were in front of me.”

Our brochure was modeled to provide this needed how-to information. We suggest that outreach programs be designed to get this information into the hands of the people who make decisions about recycling.

The decision-maker may be the president of the company, but the instigator could be any number of people…the custodian, an environmentally-conscious employee, a single property manager in a firm of many property managers, etc. Because it varies from firm to firm, a host of different educational activities to target all employees would be best. But that is difficult to do.

Not convinced of need. Most property managers recognized that fluorescents contain mercury and that mercury is dangerous. Despite this awareness, we did notice some dismissal of the problem during conversations we had over the course of the outreach.

In the best of all worlds, property managers would act on their understanding of the dangers of mercury, but like many environmental problems, denial of personal responsibility is strong. Our best suggestion is to continue to raise awareness of the problem.

Materials

OEC is happy to provide copies the brochure we created (enclosed or at `www.orcouncil.org/brochures/LampRecyclingBrochure.pdf`).

DEQ has several publications including a "Waste Lamps & Ballasts" fact sheet, which can be found at `www.deq.state.or.us/wmc/hw/factsheets/WasteLampsBallasts.pdf`.

The Association of Lighting and Mercury Recyclers (ALMR) will be coming out with a suite of materials for outreach around fluorescent lamp recycling by the beginning of 2004. Contact information for ALMR can be found at `www.almr.org`. The US EPA is funding development of these materials, as well as others. For information, see `www.epa.gov/epaoswer/hazwaste/id/univwast/lamp.htm`.

Other Means of Getting the Word Out

We found that our target audience took note of an article printed in a trade journal it reads, the Portland Metropolitan Building Owners and Managers Association newsletter. We suggest identifying trade journals read by your target audience and getting articles placed in those journals.

We released a press release and called targeted reporters, which resulted in a couple of media hits. This is a good strategy to use no matter where you are located and no matter who your target audience is. It raises the awareness of the general public and encourages the curious to ask their place of employment whether fluorescent tubes are recycled.

We also placed an advertisement recognizing office buildings already recycling in the Daily Journal of Commerce. This requires determining who does or doesn't recycle and is therefore time intensive. It does provide those who do recycle with a positive stroke and those who don't recycle with the impetus to look in to recycling to better their image, but may not be cost-effective.

Suggested venues for distributing materials or otherwise getting the word out:

- trade journals
- meetings of associations that your target audience belongs to
- chambers of commerce

- mailings to property management companies
- mailings to lodging (hotels/motels), colleges, breweries, event facilities, shopping centers, and other businesses that likely manage their own properties
- building operator certification programs/classes
- lighting fairs
- lighting firms/contractors
- utilities
- "green building" programs
- energy efficiency programs

Feasibility of "Offsets"

We discussed the possibility of mercury "offsets" with three firms that are point sources of mercury. The results were mixed. One firm does not want to associate itself with projects that link it to a pollutant it emits; another would probably be willing to fund a one-time project, but not an ongoing project; and another is willing to sponsor fluorescent lamp recycling in an Oregon school. We expect that utilities will not participate in mercury "offset" projects unless a mercury cap and trade program is established, and that other point sources of mercury may be receptive to doing so on a case-by-case basis. However, given that there are few point sources of mercury in Oregon and those approached to date are lukewarm to the idea of offsets, this does not appear to be an effective strategy to fund recycling at this time.

Project Results

Our ultimate goal was to achieve an increase in the purchase of low mercury lamps (relative to regular fluorescent tubes) and an increase in the recycling rates of fluorescent tubes in office buildings (preventing at least 15,000 tubes from reaching the waste stream).

Out of the sample of 62 firms that we interviewed post outreach (which represented our target audience, but not the entire population that received outreach materials), we can point to five firms that definitely began recycling after the onset of our project, representing an increase of about 8% of firms that recycle in our target audience. Unfortunately, we do not have a good sense of how many tubes will be diverted by these firms because none provided square footage.

We also spoke with three firms that provide recycling services in Oregon to find out whether they have seen an increase in business in the Portland metro area. One firm provided us with specific figures showing a significant difference between the increase in lamps recycled in the Portland metro area and lamps recycled statewide. A second indicated it has seen an increase in inquiries from commercial building managers, particularly from the Portland metro area, with several mentioning our brochure. The third firm had inconclusive data.

At least 68% of the companies who completed our survey claim to use lamps that are marketed and/or may be perceived as being "low mercury" lamps (Sylvania Ecologic,

Phillips Alto, and GE Ecolux). Unfortunately, in designing the survey, we forgot to ask when they began using the low mercury lamps so we cannot point to an increase since the onset of our outreach. Low mercury lamps are used primarily for environmental reasons, but are also promoted by lighting contractors.

We also hoped to simply increase awareness among building owners and managers of mercury pollution and methods to prevent it, including the importance of recycling fluorescent tubes, anticipating that awareness will eventually turn into action. We were highly successful in this area. We asked property owners and managers "Are you aware that fluorescent tubes contain mercury?" and found that survey respondents were overwhelmingly aware (100% of those who answered the question in the full survey, and 93% of those who answered the question in a shorter refusal survey). And their level of awareness had increased (by 35% for those who answered the question in the full survey and by 26% for those who answered the question in the shorter survey).

For More Information

Please feel free to contact us for any reason. Chris Hagerbaumer, 503-222-1963 x102 or chris@orcouncil.org.

ANALYSIS OF SURVEY ON MANAGING FLUORESCENT LIGHTING

- A survey of members of the Portland Metropolitan Building Owners and Managers Association (BOMA) regarding recycling fluorescent lighting and the use of low mercury lamps.
- Conducted April-June 2003 by the Oregon Environmental Council (OEC).
- Goals were to determine:
    1) the effectiveness of the OEC-led outreach campaign
    2) whether there have been any changes in awareness, lamp purchasing, and recycling/disposal practices among building owners/managers
    3) barriers to improvement
- Raw data has been provided to Metro & DEQ as an Excel file "Fluor Survey Results.xls"

Survey logistics: We began with a list of 90 BOMA members from the 2002-2003 BOMA directory, plus an additional two companies that had been BOMA members in 2001 but were not in the 2002-2003 directory. From this list, we removed businesses and individuals not located in the Portland area and not property managers.

Some building management companies manage a single property, while others manage multiple properties. Of those who manage multiple properties, there may be one or more than one individual designated as the property manager, and there may or may not be company-wide standards for the handling of spent fluorescent tubes. OEC made calls to BOMA member companies to determine who the survey should be sent to, and if there were multiple individuals with property management responsibilities who should receive the survey. Some but not all of the BOMA members called provided us with this information; several provided multiple contact names. From this effort we created an initial list of 77 individuals to whom we sent a web-based survey via e-mail, or a hardcopy if they did not have e-mail.

Each person invited to participate received at least two e-mails and at least two reminder calls. More than half of the people unwilling to complete the full survey were willing to do the refusal survey, which we administered when we were fairly certain they were not going to complete the actual survey, but some simply would not return our calls or refused to take the survey when reached.

Some firms manage all their tubes the same way, no matter how many locations they manage, while other firms allow property managers to manage tubes differently even if the firm is headquartered in a single location. Despite the fact that we did not reach all property managers in firms in the latter category, we are confident that the sample of 57 individuals that either completed the full survey or the refusal survey are wholly reflective of the individuals targeted during our outreach campaign. This campaign included, among other things, a mailing to BOMA members representing multiple people in a given firm and an article in the BOMA newsletter.

Individuals that completed survey	28 (one anonymous[1])
Individuals that completed refusal survey	29
Individuals that refused to take even the refusal survey	3
Individuals we were unable to reach directly	17
Total	77

Recycling behavior of firms surveyed[2]	*Recycle all bulbs*	*Don't recycle all bulbs*	*Don't know*
Individuals that completed survey	19 (68%)	8 (29%)*	1 (4%)
Individuals that completed refusal survey	13 (45%)	15 (52%)	1 (3%)
Individuals that refused to take survey or that we couldn't reach			20 (100%)
Total	32 (42%)	23 (30%)	22 (29%)

*Of the eight individuals completing the full survey and not recycling all of their bulbs, one claims that its contractor that conducts group relamping recycles the bulbs but that bulbs replaced during spot relamping are landfilled; the other seven responses are that all lamps are disposed of, regardless of replacement method (group relamping and/or spot relamping).

Although a preliminary scan of the data above would suggest that individuals completing the full survey were more likely to have their lamps recycled than individuals only completing the refusal survey (thus suggesting that the results of the full survey are biased), the sample sizes are not large enough for these differences to be statistically meaningful. Thus, we can not draw statistically meaningful conclusions as to whether or not the individuals completing the full survey are in fact representative of the entire sample universe.

Of individuals who completed the full survey and claim to be using a "low mercury" lamp, 12 (63%) claim to recycle all bulbs, 6 (32%) claim not to recycle all bulbs, and 1 (5%) said they didn't know if their bulbs were recycled. Although this is a very small sample size, no statistically meaningful difference in recycling behavior was observed between firms that use so-called "low mercury" lamps vs. those that do not.

Five firms began recycling after onset of outreach. Several of these firms mentioned specifically that they began recycling as a result of our brochure or other outreach. Firms completing the refusal survey were not asked explicitly if they had started recycling after the onset of our outreach efforts, however, several volunteered this information. Thus, it

[1] The anonymous survey could either be an unknown respondent from a firm that has multiple managers, a respondent from one of the firms we were unable to reach by telephone, or even a respondent from the category of the firms that completed refusal survey.

[2] Many respondents answered for only a portion of their firm's property. Other managers in that firm may work in the Portland area, or they may work outside of the Portland market; we did not tailor the question well enough to determine that, and no one guided us to additional colleagues in their firm.

is possible that a larger number of firms began recycling after the onset of our outreach effort. Of 62 firms surveyed (as opposed to 77 individuals surveyed) the initiation of recycling by 5 firms represents an increase in the percentage of firms recycling of 8%.

Group relamping behavior			
	Yes	*No*	*Don't know*
Practice group relamping?	19	9	
Use contractor to relamp (8)			
Relamp themselves (6)			
Both (5)			
Contractor recycles?	10	1	2

Awareness of mercury in tubes	*Firms that completed survey*	*Firms that completed refusal survey*
Aware that tubes contain mercury?		
Yes	27 (100% of those who answered)	25 (93% of those who answered)
No	0	2
No answer	1	2
Level of awareness compared to one year ago?		
More	9 (35% of those who answered)	7 (26% of those who answered)
The same	17	20
Less	0	0
No answer	2	2
Heard about mercury pollution in the environment?		
Yes	25 (93% of those who answered)	not asked in refusal survey
No	2	not asked in refusal survey
No answer	1	not asked in refusal survey

The following questions were not asked in the refusal survey.

Where people heard about mercury in fluorescent tubes in past year:

- Newspaper article (11)
- BOMA newsletter article (9)
- DEQ (8)
- Metro (4)
- A website (3)
- Public recognition of companies that recycle in the Daily Journal of Commerce (2)
- Brochure (2)
- Other (radio, lighting supplier, other BOMA members, Clackamas County Recycling Representative)

Importance of reasons for recycling *1 = not at all important reason for why you recycle fluorescent lighting* *5 = very important reason for why you recycle fluorescent lighting*	
It's the right thing to do (N=18)	4.9
We're concerned about liability (N=18)	3.9
The property owner requested it (N=17)	3.7
We're required to recycle under regulatory requirements (N=18)	3.6
Our tenants requested it (N=17)	2.5

Suggestions for ways to increase recycling:

- Public awareness - list the companies that do recycle tubes in the paper. People/tenants will ask why their office management company is not on the list.
- Offer incentives *(no specifics given)*
- Mercury contamination is a serious issue with leaching and landfills. We all must do our part to identify environmental impacts associated with the work we do and find ways to put our traditional wastes back to work. I often confront others who think they are throwing something away by telling them there is no away.
- Recycling keeps the tubes out of the landfill.
- Become ISO 14001 Certified
- We purchased a 'Bulb Crusher' - it has saved us money, storage space, need to store used bulbs, and provided a sense of pride with the tenants knowing that we are doing our part to minimize landfill's and future environmental contamination.

Importance of reasons for <u>not</u> recycling *1 = not at all important reason for why you don't recycle fluorescent lighting* *5 = very important reason for why you don't recycle fluorescent lighting*	
We have limited storage capabilities (N=7)	4
It's too expensive (N=7)	3.9
It's free and legal to throw them in the trash (N=7)	3.3
We are concerned about liability (N=6)	3
We are not convinced that the need is great enough (N=7)	2.7
We don't know how (N=7)	2.6
The thought never crossed our minds (N=6)	2

Other reasons mentioned for not recycling:

- Changed out type of tube to lowest mercury and didn't realize they still needed to be recycled
- Time constraints
- Quantity too small to bother with
- The company that was doing this for us went out of business

Incentives mentioned that would get them to recycle:

- Equipment provided, training, free pick up
- Reasonable pricing and dependable pick up
- Minimal/no cost; convenient pick up
- Rebate -- cost effective pricing needs to make it worthwhile
- The problem lies in the fact that they must be boxed up, stored, and taken to the recycler. Then there is a substantial charge for the service. That charge, plus our time, makes it very expensive, not to mention the work that cannot get done due to the use of our time elsewhere.
- None, the energy and emissions involved don't seem worth it for small quantities. The T-8 lamps last a long time.
- Our staff is quite busy. It must not distract them from their main duties. We do not want to incur any more expense in waste removal.

Opinions about who should pay for recycling (N=26)	***1* = *strongly disagree*** (# of checks)	***2* = *somewhat disagree*** (# of checks)	***3* = *neutral*** (# of checks)	***4* = *somewhat agree*** (# of checks)	***5* = *strongly agree*** (# of checks)	Ave. #
Garbage rates should be increased slightly to pay for "free" lamp recycling for all businesses.	7	4	3	11	1	2.8
The price of lamps should be increased slightly to pay for "free" lamp recycling for all businesses.	9	1	4	9	3	2.9
Business that recycle their fluorescent lamps should pay extra for the recycling service, and businesses that don't recycle their fluorescent lamps shouldn't pay for recycling.	14	5	4	2	1	1.9

Use of "low mercury" bulbs	
Use "low mercury" bulbs	19 (68%)
-Difference in performance?	Yes (3) No (14) No answer (2)
-Difference in length of life?	Average answer = 3 (no change in length of life)*
Don't use low mercury bulbs	7 (25%)
No answer	2 (7%)
Aware that some bulbs contain less mercury?	Yes (22) No (5) No answer (1)

*Responses were distributed symmetrically around the mean: 1 answered "much shorter life" (1), 2 answered "a little shorter life" (2), 12 answered "no change" (3), 2 answered "a little longer life" (4), and 1 answered "much longer life" (5).

Two full survey respondents stated that they stopped recycling bulbs because they switched over to "low mercury" lamps.

Primary reasons why low mercury bulbs are used:

- Environmental (6)
- Someone else's decision (4)
- Advertising (1)
- Cost (1)
- Electrical use and longevity of bulbs (1)

How the Survey Met Its Goals:

We determined that the outreach campaign led to an increase in recycling behavior of at least 8% by the target audience, and that the level of awareness of mercury in bulbs increased by 35% for those who answered the question in the full survey and by 26% for those who answered the question in the refusal survey. A discussion of barriers to improvement can be found in the narrative report "Recommendations for Persuading Commercial Buildings to Recycle Their Fluorescent Tubes."