



BC Lamps and Lighting Equipment Stewardship Plan

July 1, 2012 – June 30, 2017

For more information:

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1. Introduction and Background

This stewardship plan for **lamps and lighting equipment** has been developed by Product Care Association. Product Care recognizes the assistance from the Electrical Equipment Manufacturers Association of Canada (EEMAC), an industry council of Electro Federation of Canada. The stewardship plan has been developed pursuant to the requirements of Recycling Regulation B.C. Reg. 449/2004 (the “Regulation”).

The program anticipates a launch of July 1, 2012 and proposes actions and targets for the five year period ending June 30, 2017.

LightRecycle, Product Care’s BC Fluorescent Light Recycling Program, launched on July 1, 2010. The LightRecycle program is currently limited to residential-use fluorescent lamps. This stewardship plan describes the proposed expansion of the LightRecycle program, effective July 1, 2012, to cover lamps and lighting equipment from both the residential and commercial sectors. This stewardship plan will replace the currently filed *BC Fluorescent Lamps Stewardship Plan* upon approval by the BC Ministry of Environment.

The intent of the program, as described in this draft plan, is to establish and operate a collection system across B.C. to collect end-of-life lamps and lighting equipment. Collected products will be transported to appropriate facilities for recycling and other management options. The plan also includes a description of the communication efforts to ensure awareness of the program and to inform consumers, including residential, commercial and industrial users, of how to recycle their products through this program.

Upon approval of the program plan by the B.C. Ministry of the Environment, program plan implementation will begin, including:

- Registration of producers
- Budget development, cost analysis and fee setting
- Creation of the communication strategy
- Identification and qualification of collection sites, transporters and processors

2. Program Products – Lighting Equipment

2.1 Regulatory Reference

Schedule 3, Section 2.1 (e) of the BC Recycling Regulation required a stewardship program for “fluorescent light bulbs and lamps sold for residential use” by July 1, 2010. These products are currently managed in the LightRecycle program.

Schedule 3, Section 2.3 (e) requires a stewardship program for “all electronic or electrical lighting equipment, parts and bulbs, including lamps, fixtures and flashlights...” by July 1, 2012. Pursuant to these requirements, the LightRecycle program for residential-use fluorescent lights will be expanded on July 1, 2012 to include all lamps used in residential and non-residential applications, as well as lighting equipment, as defined in this section. The term “program products” will herein be used to describe the products that will be captured by this expanded program.

2.2 Program Products

The program is designed to collect and manage end-of-life lamps and lighting equipment products, as defined in the following categories.

Lamps:

A “lamp” can be defined as a light source or replaceable component, designed to produce light from electricity. Lamps are commonly referred to as “bulbs” or simply as “lights” by the public. The program will include the following common categories of lamps, whether they are marketed for residential, industrial or commercial purposes:

1. **Fluorescent Tubes** – Fluorescent tubes come in different lengths (4 feet, 8 feet etc.), diameters (T5, T8 and T12) and light output. Most are straight but some are curved or shaped.
2. **Compact Fluorescent Lamps (CFLs)** - Fluorescent bulbs that are typically similar in size and intended to replace an incandescent (traditional) light bulb, including pin-type sockets, covered CFLs and various output wattages
3. **High Intensity Discharge (HID) and other mercury containing lamps** – Includes mercury vapour, metal halide, high pressure sodium, low pressure sodium, UV and germicidal lamps
4. **Incandescent and Halogen Lamps** – Filament lamps of all shapes, sizes and wattages
5. **Light Emitting Diode (LED) Lamps** – Solid-state lamps used for specialty purposes and conventional lighting applications

Broken lamps will be accepted by the program, provided they are packaged in accordance with the requirements of the program and assuming that the current classification of mercury lamps under the hazardous waste regulations continues unchanged.

Lighting Equipment:

Lighting equipment includes fixtures and ballasts used with electrical or electronic lighting products. For the purposes of this plan, light fixtures included in the program are defined as electrical devices with the primary purpose of housing an electrical lamp to illuminate space. Typically, the purpose of the light fixture is to hold the lamp, to provide electricity to the lamp and to direct the light which is produced. Light fixtures can be affixed to a building or may be free standing or portable.

Ballasts are devices used to stabilize the current in an electrical circuit. They are commonly integrated into a lamp and/or a light fixture and, in many cases, are designed to be removed and replaced during the lifespan of the lamp or the light fixture.

The program will include the following common categories of fixtures and ballasts, regardless of whether they are marketed for residential, industrial or commercial purposes. Prominent examples and subcategories are included for each category.

1. **Linear Fixtures** – troffers, surface/suspended mount, strip lights
2. **Commercial/Industrial Indoor Non-Linear Fixtures** – ceiling mount, track lighting, wall mount, stage lighting
3. **Decorative and Light Commercial Fixtures** – pendant, wall mount, flush, semi-flush, track, canopy, recessed/pot, under-cabinet
4. **Chandeliers and Ceiling Fans** – chandeliers and ceiling fans that contain lights
5. **Portable Fixtures** – desk lamps, table lamps, floor lamps, work lights

6. **Small Outdoor Fixtures** – bollards, wall mount, path and walkway lighting, security lighting
7. **Large Outdoor Fixtures** – highway and street lighting, post lighting, highmast lighting
8. **Large Flood/Sports Field Lights**
9. **Hand-Held Lights** – flashlights, snake lights, night lights, book lights
10. **Emergency Lighting**
11. **Ballasts** – Ballasts integrated into fixtures, replacement ballasts sold and/or disposed of separately from a fixture

Orphan Products:

The program includes products manufactured by an existing producer as well as orphan products (those that are no longer in production or which the manufacturer is no longer producing) if their function was the same as products in the program.

Batteries:

Where products contain primary or rechargeable batteries designed to be removed/replaced, consumers will be encouraged to remove them from the product in accordance with the manufacturer’s instructions and managed through the Call2Recycle battery stewardship program. All batteries that are included in program products returned through the program, including batteries that are not designed to be removed by the user, will be managed by the program.

2.3 Excluded Products

“Light Containing” Products:

Products containing lights with a primary purpose that is not to illuminate or assist in the illumination of space are outside the scope of this program, including, but not limited to:

- Products covered by other schedules of the BC Recycling Regulation and for management in other product stewardship programs in BC. Examples include large appliances, small appliances, medical equipment and electronic products.
- Products containing lights with a primary purpose of signalling or displaying information are not considered “lighting equipment.” Examples include traffic signals, railway crossing signals, neon signs, backlit signs and electronic billboards.

Note that replacement lamps used in excluded products and which are sold and can be disposed of separately from excluded products are included in the program (see Section 2.2 above).

Aeronautical, Marine and Auto Fixtures:

Fixtures designed to be integrated into an airplane, boat, automobile or other means of transportation are excluded from this program such as automobile headlamps and signal lights, boat or aircraft navigation lights. These fixtures are typically both sold and disposed or recycled with the transportation equipment to which they are affixed. The program will manage/recycle any of these fixtures that are returned through the program’s collection system, but the program will not target their collection.

3. Stewardship Agency

This program will be developed, managed and operated by Product Care Association, a not-for-profit industry association that manages product stewardship program for household hazardous and special waste on behalf of its members across Canada. Since July 2010, Product Care has been managing LightRecycle, the BC Fluorescent Light Recycling Program.

Product Care is involved in the following product stewardship programs in BC. It is noted where Product Care's role is as contracted program manager to another association.

- Paint (established 1994), flammable liquids, pesticide and gasoline (1997);
- LightRecycle program (2010) for residential-use fluorescent light bulbs and tubes;
- Small appliances stewardship program, as program manager contracted by the Canadian Electrical Stewardship Association (CESA) (2011). Program start date: October 1, 2011;
- Smoke and CO Alarms – program start date: October 1, 2011.

Product Care also operates or is developing product stewardship programs in other Canadian provinces, including fluorescent lamp programs in Manitoba and Quebec.

4. Program Members

Product Care Association will manage this program on behalf of the producers of program products who are currently members of the LightRecycle program, as well as producers who become members of Product Care for this program. In joining the Product Care program, each producer appoints Product Care as its agent to carry out the duties of the producer imposed by the Recycling Regulation, pursuant to section 2(2) of the Regulation.

Program members may include the manufacturers, brand owners, distributors, first importers and retailers of program products in BC, including existing members of LightRecycle, Product Care's BC Fluorescent Light Recycling Program. Program membership will be open to all obligated producers.

5. Current End of Life Management

Current end of life management practices vary based on the type of product and whether it is considered residential-use or commercially generated.

5.1 Residential-Use Fluorescent Lamps

LightRecycle, Product Care's BC Fluorescent Light Recycling Program, launched on July 1, 2010. This program covers only residential-use fluorescent lamps, including fluorescent tubes and compact fluorescent lamps (CFLs). As of July, 2011, the program's collection system consisted of over 190 collection sites across BC – 163 return-to-retail locations, 11 private depots, and 17 municipal facilities.

In the first year of the program, over 110,000 CFLs and 170,000 fluorescent tubes were returned to LightRecycle collection facilities across BC. The collected lamps are shipped to a processor where they are crushed and then separated for recycling. The mercury is recovered through a retort process and reused in lighting products. The phosphor powder is reused in paint products and the metal and glass are recycled.

For further information on the current LightRecycle program, please visit www.lightrecycle.ca

5.2 Commercial Lamps

The current LightRecycle program manages only residentially generated fluorescent lamps. At this time, commercially generated lamps are the responsibility of the consumer/user of those products. Commercial users either remove and replace end of life fluorescent lamps, or contract with a service provider, sometimes referred to as a “relamper”, for that purpose. Some businesses or institutions crush the waste lamps using drum top crushing machines.

In many municipalities, fluorescent lamps are the subject of a landfill ban, and generators of waste lamps must find an acceptable means of disposal.

There are approximately 10 businesses located across the province that accept commercial quantities of lamps for a fee. These businesses may or may not partially process the lamps by crushing them, and then the lamps (whole or crushed) are sent for final recycling or disposal to a variety of processors in BC and North America.

For more information on current management options for commercial quantities of lamps and Canadian processors, please visit www.nrcan.gc.ca/mms-smm/busi-indu/flr-frl/index-eng.htm

5.3 Fixtures and Ballasts

An organized collection and processing system does not exist for fixtures and ballasts in BC at this time. End-of-life fixtures (residential or commercial use) and ballasts may be removed and replaced as part of an overall building renovation, or as part of a refitting for the purpose of energy savings. Fixtures are also present in buildings that are demolished.

Residential fixtures are typically landfilled, though some private and local government recycling depots and scrap metal dealers will accept those with higher metal content. Commercial fixtures, which are typically larger and higher metal content than residential fixtures, are often recycled through scrap metal dealers.

Municipalities, contractors and demolition companies have reported disassembling their fixtures into various material streams (copper wiring, ballasts, steel etc.) and arranging recycling with scrap metal dealers and other recyclers.

Fixtures that are not managed as scrap metal are typically landfilled. It is not known at this time what proportion of commercial fixtures are recycled as scrap metal versus landfilled.

Ballasts are typically sorted into those that may contain PCBs and those that do not. Non-PCB ballasts can be recycled, given their metal content, while PCB ballasts must be managed as hazardous waste according to relevant provincial and federal regulations.

6. Proposed Program Operations

6.1 Collection System

It is the intent of the program to provide a free and convenient collection option for all consumers of program products. The program recognizes that different collection systems may be needed depending on the type of use (residential or business), the type of product (lamps and fixtures) and the quantity involved.

Residential Volume Drop-Off Collection System:

The program will employ a system of permanent year-round collection locations for the collection of residential quantities of lamps and fixtures in order to provide reasonable accessibility to consumers. There will be no charge to drop off program products.

The program will not directly own or manage collection sites but will contract with interested organizations that can provide a collection location. Facilities considered as collection sites include retailers, recycling organizations (both non-profit and for profit), local government recycling centres or transfer stations and other associations or businesses interested in participating in the program. Collection facilities already participating in the current LightRecycle program, which collects only residential-use fluorescent lamps, will be asked if they are able to also collect fixtures and other lamp technologies. Many residential use collection sites, especially return to retail locations, will have limited storage space and quantity limits will apply.

The collection network will be developed through the implementation period taking into consideration factors such availability and capacity of facilities, proximity to population, ease of access and cost effectiveness.

Commercial Volume Drop-Off Collection System:

Commercial generators of program products are expected to have larger quantities than residents.

The program will employ a system of permanent year-round collection locations for the collection of lamps and fixtures in quantities normally generated by commercial generators.

The program will not directly own or manage collection sites but will contract with interested organizations that can provide a collection location. Facilities actively being considered as collection sites include recycling organizations (both non-profit and for profit), local government recycling centres or transfer stations, electrical distributors, and other associations or businesses interested in participating in the program. There will be no charge to drop off program products.

The program will work with potential collection sites to develop limits for the quantity of program products that are appropriate to the applicable drop-off locations. Where possible, collection sites will collect all types of program products, including lamps and fixtures, but not all collection sites may be appropriate to both streams.

Some collection locations may accept both residential volumes and moderate commercial volumes of program products, and this practice will be encouraged where possible, but not all locations are expected to be able to offer this service. The program's communication materials to the public and commercial generators will clearly delineate which locations accept which types and quantities of products.

Large Volume Direct Service Collection System:

It is expected that some commercial generators of program products, including both lamps and fixtures, will generate quantities of these products that are too large for the program's commercial drop-off locations. The program will examine a number of different approaches to providing service to this category of generator including direct on-site pickup or delivery by the generator directly to a processor contracted by the program.

Collection Events:

The program may supplement the collection system with one-day events in underserved areas, possibly in collaboration with other stewardship programs or local governments.

Stewardship Collaboration:

Product Care will work with product stewardship programs for other electronic or electrical products with regard to the collection of LightRecycle program products by those programs, or the collection of products from other programs by LightRecycle.

6.2 Processing and Tracking

The program intends to negotiate contracts for the recycling of program products with service providers, based on a number of factors including location, capacity, processing methods, downstream vendors and conformity with processor standards established by the program.

A tracking system will be developed to track the program products from the point of collection to processors.

6.3 Product Life Cycle and Pollution Prevention Hierarchy

Reduce and Redesign:

The environmental impact of lighting equipment can be reduced through a reduction in toxic components, a reduction in the quantity of materials utilized in product, increased energy efficiency and increased product lifespans. Modern lamps have made significant gains on each of these fronts.

Mercury is a necessary part of fluorescent lamp technology, but manufacturers have been able to reduce the amount of mercury in the lamps. The average Canadian compact fluorescent lamp contains 3.7 mg of mercury (roughly the size of the ball in the tip of a ball point pen).¹

The Canadian Council of Ministers of the Environment (CCME) set Canada-wide standards for the amount of mercury in lamps with targets of a 70% reduction by 2005 and an 80% reduction by 2010 against the 1990 baseline of an average of 43 mg. By 2006, members of Electro-Federation Canada had exceeded the target with an 81.6% reduction in mercury content for an average of 7.9 mg per lamp (includes all fluorescent and HID lamps sold in Canada by Electro-Federation members).²

Most CFLs sold in 2003 lasted an average of 3 years but Energy Star™ rated lamps now can last up to 12 years.³ Fluorescent tubes are now available in a longer life version that provides 30,000 hours of light compared to the 24,000 hours of other lamps. In addition, fluorescent tubes are now available that are smaller in diameter (T8 or T5), providing the same or more light with about 50% less material resources by weight.⁴

Efforts to reduce the environmental impact of fixtures are also ongoing. Polychlorinated biphenyl (PCB) ballasts are no longer sold in Canada and the number of fixtures with these types of ballasts continues to decline. The use of lead-based paint has also declined significantly in modern fixtures. Fixture manufacturers are continuously improving the energy efficiency of their products and reducing the materials required and weight of products, where possible and applicable.

Lamp and fixture manufacturers regularly review the design of these products for functionality, sustainability and impact on the environment. The program will report on initiatives within the industry that reduce the environmental impact and improve the recyclability of products.

Reuse and Repair:

The program is designed for lighting equipment that no longer works and cannot be reused. Options for managing reusable products include the BC Industrial Materials Exchange (BCIMEX) or the Reuses networks run by the Recycling Council of British Columbia.

Recycle and Recover:

Processed lamps will be broken down into their component parts. The resulting glass, mercury and other components will be recovered and put back into the market where possible. Table 1 shows the relative amounts of the materials in CFLs and fluorescent tubes. The program will strive to reach the target of recycling 100% of the material recovered.

¹ European Lamp Companies Federation. *Climate, environment & health*. Accessed at http://www.elcfed.org/2_health_environment.html-materials.

² Wayne Edwards, EEMAC

³ Stewardship Ontario (2009). *Draft Consolidated Preliminary Municipal Hazardous and Special Waste Program Plan Volumes I & II*. Accessed at <http://www.stewardshipontario.ca/mhsw/index.html>

⁴ European Lamp Companies Federation. *Climate, environment & health*. Accessed at http://www.elcfed.org/2_health_environment.html-materials.

Table 1 - Compositions of Compact Fluorescent Lamps and Fluorescent Tubes⁵

Material	Composition of a CFL	Composition of Fluorescent Tube
Glass	75-90%	75-95%
Mercury	<0.015%	<0.01-<0.05%
Lead Oxide	0.2-2%	0.2-2%
Aluminum Oxide	0-2%	0-2%
Phosphor Powder	0.5-3%	0.5-3%
Miscellaneous Compounds (fluoride, manganese dust, tin dust etc.)	0-0.1%	0-0.1% per compound

Fixtures are typically comprised of steel, aluminum, brass, nickel, plastic, glass and porcelain, though material composition and size varies greatly depending on the type, market and brand. Ballasts are typically comprised of steel, copper and plastic. Some ballasts sold prior to 1979 contain polychlorinated biphenyl (PCBs).

The program will ensure all materials are managed according to the requirements of all federal and provincial regulations. It is the program's intention to recycle as many components of collected fixtures and ballasts as possible and economically feasible. The final use of materials will be considered when selecting processors. This information will be tracked and reported in the program's annual reports. Availability of options to move materials up the hierarchy will be regularly monitored.

Environmental Impact:

The program will report annually on the estimated greenhouse gas (GHG) impact of the program, commencing with the program's 2013 annual report. Once this baseline has been established, the program will develop strategies to improve the environmental outcomes of the program and will report annually on these efforts.

6.4 Consumer Awareness

The Regulation requires that the plan makes adequate provision for informing consumers of the program, the location of collection facilities, how to manage products in a safe manner as well as the environmental and economic benefits of participating in the program. The strategy will be modified over time in response to the effectiveness of the program.

Key Messages:

It is important that consumers are aware of the importance of returning program products, where to return them and appropriate handling techniques. Specific information will be provided on:

- The categories of products included in the program

⁵ Kelleher, M. (2007). *Fluorescent Lighting in Ontario –Lifespan Model and Research Report to Waste Diversion Ontario*. Accessed at <http://www.wdo.ca/files/domain4116/Final%20Review%20of%20Fluorescent%20Capacity%20Report%20Sept%2025%2007.pdf>

- Return options and handling procedures
- Applicable fees and how they are used

With an increasing number of stewardship programs available for electric and electronic products, the program will work with the other stewardship programs to try to provide a coordinated message to consumers.

Communication Methods:

The Program will use a number of methods to create consumer awareness of the program. These include:

- **Website** - The program website will have information on what items can be returned and how to return them. A Google Map based depot finder will be available. The program website and depot finder will be designed to provide applicable information based on the type of product, sector and/or quantity of products to be returned. It will also include a print-ready brochure and a system for reordering consumer information materials produced by the program.
- **Recycling Hotline** 1 800 667 4321 or 604 RECYCLE– The program will participate in the Recycling Council of British Columbia (RCBC) recycling hotline service. Consumers can contact RCBC operators during business hours and obtain information about return options for program products.
- **RCBC Recyclepedia** – The program will provide RCBC with updated lists of collection sites for inclusion in their online search system, which informs consumers of their return options.
- **Point of Return** – Any participating collection depots will be offered program signage to display and counter cards to distribute to consumers.
- **Earned media and advertising** – The Program will target the use of earned media (press releases etc) and paid advertising.
- **Direct Mailings and Communications** – The program will directly target large commercial generators of program products through dedicated mailings and partnerships with relevant associations and groups.
- **Other** – Other methods of communications may be identified by the program and explored for potential effectiveness.

Partnerships:

The program will work towards partnering with organizations interested in collaborating to promote the program. Collaboration strategies will be developed through discussions with potential partners. Some possible avenues are:

- **Retailers**– Point of sale materials could include shelf-talkers, counter cards, consumer brochures and/or program posters, provided at no cost to retailers.
- **Other Stewardship Programs** – Opportunities to combine communication efforts with existing stewardship programs will be explored.
- **Municipal and Regional District Partnerships** – The program will seek opportunities to partner with local governments, including:
 - Advertising in municipal calendars
 - Participation in community recycling events and promotions
 - Links from local government websites to Program website and inclusion of program information in recycling specific web pages

- Inclusion of program information with local government householder communications
- **Utilities** – BC Hydro and Fortis Energy have extensively promoted to their residential customers the energy efficiency use of fluorescent lamps. The Program will investigate opportunities to work with the utilities to reach target consumers and to ensure consistent messaging.
- **Trade Associations and Business Organizations** – The program will explore partnerships with trade associations and other business organizations to target large commercial generators of program products.
- **Others** – Brand owners and other agencies with an interest in recycling may wish to have links to the proposed stewardship agency website.

The communication strategy will be modified over time based on the results of the methods employed and ongoing studies.

For information on promotional materials used in the existing LightRecycle program, please visit www.productcare.org/BC-Lights-marketing-material. Applicable materials and information will be updated by July 1, 2012 to incorporate newly accepted program products.

6.5 Program Administration

Program Budget:

The program will be managed and funded by members of the program based on fees on the sale of new program products in British Columbia. Fees will be subject to HST and may be passed on by the members to their customers, either as visible fees or by incorporating the cost directly into the price of the product. The fees will be set using estimates for program costs and product sales units. Fees may be adjusted in the future to address surpluses or deficits, but all fees will be used for program purposes.

Reserve Fund:

As part of its risk management system, the program intends to build and maintain a reserve fund. The reserve fund will stabilize program funding in the case of unexpected collection volume increases, fluctuations in operating costs or reduced revenue due to economic or other factors.

Producer Compliance:

In order to maintain a 'level playing field' for the program members and to ensure compliance with the Regulation, the program will actively search for, identify and recruit producers of program products. If a potential member has not joined the program (or an equivalent program) despite repeated notifications of their obligations, the program will refer the matter to the BC Ministry of Environment for regulatory compliance and potential enforcement proceedings.

Dispute Resolution:

The Program will contract with all suppliers and service providers to the program by the use of commercial agreements. Any disputes arising from collection or processing contracts would be resolved using normal commercial legal procedures.

7. Performance Measures and Targets

7.1 Collection System and Accessibility

The proposed collection system is described in Section 6.1 above. The program will strive to provide a collection system that offers a reasonable level of access for all program products (lamps and fixtures) and sectors (residential and commercial). Table 2 below summarizes the performance measures and targets related to the collection system and accessibility.

Number of Collection Sites:

The program's annual reports will publish the location and number of collection sites for residential-use quantities of lamps, residential-use quantities of fixtures, commercial lamps and commercial fixtures. In many cases these collection systems may overlap, as described in Section 6.1 above, and this will be noted where applicable.

The program will target a minimum of 150 collection sites for residential volumes of lamps and a minimum of 60 collection sites for residential volumes of fixtures by the end of 2012, assuming that the current classification of mercury lamps under the hazardous waste regulations continues unchanged. If these end-of-life products are reclassified by the BCMOE in a way that requires additional permits or imposes other regulatory burdens on collection sites, it will become significantly more difficult to locate collection sites and these targets may not be met. .

Accessibility:

By the end of 2013, the program will target an accessibility standard for residential use quantities of lamps of a minimum of 95% of the provincial population having access to a drop-off collection point, where "access" is defined as a 30 minute drive or less to a collection point for those living in urban centres of 150,000 or more and a 45 minute drive or less for those living in communities greater than 4,000 people.

Accessibility targets for collection locations for fixtures (residential or commercial use) and commercial use quantities of lamps will be developed after a baseline of 18 months of program operation have occurred (July 2012-December 2013). The program will file an amended program plan with the BC Ministry of Environment containing updated accessibility targets for this sector by April 1, 2014. The program will conduct public consultation events on these targets through the use of webinars.

Table 2 – Collection System and Accessibility Performance Measures and Targets

Performance Measures		Targets
Collection System and Accessibility:		
Number of collection sites	Residential volume lamps	150 by end of 2012*
	Residential volume fixtures	60 by end of 2012*
	Commercial volume lamps	To be reported only
	Commercial volume fixtures/ballasts	
Percent of population with access to a collection site	Residential-use lamps	95% of population by end of 2013

	Residential-use fixtures	Targets to be set during first quarter of 2014 after baseline has been established
	Commercial lamps	
	Commercial fixtures/ ballasts	

* See above re potential regulatory change regarding classification of end of life mercury containing lamps under hazardous waste regulations and the impact on the number of collection sites

7.2 Consumer Awareness

The proposed consumer awareness plan is described in Section 6.4 above. To measure the performance of the communication strategy, the program proposes to conduct a consumer awareness survey after the first complete calendar year (2013) of program operation to create a baseline of consumer awareness. The program will target a baseline of 45% consumer awareness of the program during this survey. Surveys will then be conducted every two years. The program will target a 50% consumer awareness level by the end of 2015 and a 55% consumer awareness level by the end of 2017.

The program will also track and report on the number of program website visits, RCBC Recyclepedia visits and RCBC Hotline calls for program information.

Table 3 – Consumer Awareness Performance Measure and Targets

Performance Measure	Targets
Consumer Awareness:	
Percent of population aware of the program	45% of population by end of 2013, 50% of the population by end of 2015, 55% of the population by end of 2017
Program website visits	To be reported only
RCBC Recyclepedia website visits and Hotline calls for program information	To be reported only

7.3 Collection Rate

Table 5 below summarizes the performance measures and targets related to the program's collection rate.

7.3.1 Absolute Collection Data

Absolute collection quantity, expressed as the quantity of units and/or weight collected across BC by the program on an annual basis, will be summarized in the program's annual reports. The number of units and/or weight of each type of lamp collected will be reported separately. The weight of fixtures and ballasts collected will be reported in kilograms and/or tonnes. Available information suggests that a high proportion of commercial fixtures are currently recycled through scrap metal dealers, however it

will not be possible to segregate all fixtures from the mixed- stream of recycled metal products. The program may therefore conduct sampling studies to estimate the quantity of fixtures that are managed through the scrap metal system as part of the program's commercial volume collection system. Details on these studies and the corresponding results will be provided in the program's annual reports.

Absolute collection rate targets for fixtures and ballasts will be developed after a baseline of 18 months of program operation have occurred (July 2012-December 2013). The program will file an amended program plan with the BC Ministry of Environment containing updated collection rate targets by April 1, 2014. The program will conduct public consultation events on these targets through the use of webinars.

The program's annual reports will also contain absolute collection data by Regional District, but targets will not be set on this basis.

7.3.2 "Unaccounted Study" – Large Commercial Fixtures

It is expected that some commercial generators will continue to direct fixtures to recycling options outside the scope of the program's collection system (as described in Section 6.1).

The program will focus on creating a collection system that is available to all commercial generators, but does not believe it is economically or environmentally advantageous to attempt to redirect program products away from existing recycling streams. Within the first 18 months of the program's operation, the program will complete an "unaccounted study" that will estimate the quantity (by units and/or weight) of fixtures being recycled or otherwise managed outside the collection system managed by the program. This study will provide a basis for the absolute collection targets for fixtures (see section 7.3.1) that will be developed by April 1, 2014.

The program will consider conducting an "unaccounted study" for commercial-use lamps if it is determined, after 18 months of program operation, that significant quantities of commercial lamps are being managed outside the program's collection system.

7.3.3 Capture Rate

A capture rate compares the quantity of products collected in a year to the quantity of products believed to be "available for collection" in that year. A capture rate model is considered more appropriate than a recovery rate model (units collected/units sold in that year) for lamps given the long and increasing lifespans of these products and changing sales patterns of various lamps categories. Because of the durable nature of these products, each product unit sold should eventually be available for collection.

Capture rate targets for two lamp types, fluorescent tubes and CFLs, are shown in Table 4 below. The program has set a range for the capture rate targets because of the lack of data available. The program believes that the minimum rates provided in the chart are achievable within the first 5 years of program operation and will continuously work towards a capture rate of 75%. The methodology that will be used to determine the quantity "available for collection" in each of the years is described in Appendix B. If these end-of-life products are reclassified by the BCMOE in a way that requires additional permits or imposes other regulatory burdens on collection sites, it will become significantly more difficult to locate

collection sites and these targets may not be met.

The current LightRecycle residential-use lamp program, which will have completed two years of operation as of July 1, 2012, is estimated to cover 60% of all CFL sales, but only 5% of all tube sales. Accordingly, the capture rate targets set for CFLs in this plan reflect the relatively greater program “momentum” for CFLs compared to tubes.

If the program has not met the 22% capture rate target for fluorescent tubes and the 28% target for CFLs at the end of 2014, it will undertake research to determine the barriers to higher capture rates. Once the barriers are identified, the program will create an action plan to address them. The actions, timelines and results will be included in the future annual reports.

Table 4 - Capture Rate Targets – Fluorescent Tubes and CFLs

	2012*	2013	2014	2015	2016	2017*
Fluorescent Tubes	10-12%	16-25%	22-37%	28-50%	34-62%	40-75%
CFLs	19-24%	24-30%	28-38%	32-50%	36-62%	40-75%

*6 months only

Capture rate targets have not been set for the other lamp technologies, given the lack of comparable data on current recycling rates and sales patterns. Comparable targets for these lamp categories will be developed after a baseline of 18 months of program operation has occurred (July 2012-December 2013) and will be based either on an absolute collection or capture rate model. The program will file an amended program plan with the BC Ministry of Environment containing updated capture targets for these categories by April 1, 2014. The program will conduct public consultation events on these targets through the use of webinars.

Table 5 – Collection Rate Performance Measures and Targets

Performance Measures		Targets
Collection Rate:		
Absolute collection (units and/or weight collected)	All lamps (units)	Targets (if applicable) to be set during first quarter of 2014 after baseline has been established
	All fixtures and ballasts(kg)	Targets to be set during first quarter of 2014 after baseline has been established
Absolute collection by Regional District	All lamps (units)	n/a
	All fixtures and ballasts (kg)	
Capture Rate (%) – units or weight collected/ units or weight “available for collection”	Fluorescent Tubes	Refer to Table 4*
	CFLs	Refer to Table 4*
	Other Lamps	Targets (if applicable) to be set during first quarter of 2014 after baseline has been

		established
	Fixtures and ballasts	n/a – Targets based on absolute collection

* see above re potential regulatory change regarding classification of end of life mercury containing lamps under hazardous waste regulations and the impact on relevant targets.

8. Stakeholder Consultations

A stakeholder consultation process was held in August and September, 2011 as a prerequisite to the filing of this plan. The consultation included:

- Web based consultation using the www.productcare.org website
- Email communication to stakeholders and notification through the RCBC member advisory service, as well as other organizations
- In-person consultation events in Richmond and Nanaimo
- Dedicated webinars for the Southern Interior and Northern BC regions
- Webinar for a general audience
- Written submission provided by stakeholders
- Meetings with key stakeholders

Results of the consultation meetings are summarized in Appendix A.

Consultation sessions were held on the original stewardship plan (*BC Fluorescent Lamps Stewardship Plan*), which was limited to residential-use fluorescent lights, in September 2009. These comments can be found in Appendix F of the original plan, which is available at www.productcare.org/BC-Lights-Publications

Appendix A – Consultation Summary

Feedback received at the consultation events and via email is summarized in the table below. The left-hand column outlines the specific question or comment and the right-hand column contains the response. The number in brackets refers to the number of times the issue was raised

Issue Raised:	Response:
General:	
The plan is insufficiently detailed to provide enough information on how the program will operate or how consumers will be affected. (1)	The plan provides all applicable details that the program is able to provide at this time. In many cases, applicable data on sales, expected recovery volumes, collection site coverage etc. is not available. As discussed in Section 6, the program is committed to conducting public consultation on applicable program targets as they are developed in the coming years once baseline data is available.
The program’s approach to consultation is inadequate. The consultation timeline did not provide for a reasonable amount of time after comments were closed to consider stakeholder comments and revise the plan accordingly. (1)	The program conducted five consultation events to ensure all stakeholders would have an opportunity to submit comments, including a general audience webinar, in-person events in Richmond and Nanaimo, and dedicated webinars for both the Southern Interior and Northern BC. In addition, the plan was posted and written comments were accepted for over a month. The program reviewed comments as they were received, and considers that sufficient time was available to review and take into account all submitted comments.
Program Products:	
Are batteries included in the program? (1)	All batteries that are included in program products returned through the program, including batteries that are not designed to be removed by the user, will be managed by the program.
If broken lamps are eligible in the program, they should be included as “program products” in the plan.	Language pertaining to broken lamps has been added to Section 2.2 above in response to this comment.
Will PCB ballasts be accepted by the program? How many are expected to be returned. (1)	Yes. The program will have a system in place to manage ballasts containing PCBs. Given the fact that ballasts containing PCBs have not been sold since the 1970s and ballasts have a typical lifespan of about 20 years, it is not expected that the program will recover many PCB ballasts.
Collection System:	
What is the average drive time to a collection site under the existing LightRecycle program? (1)	This information is not yet available, but the program is currently conducting a GIS analysis of the existing LightRecycle collection network. The applicable report will be publically available and posted on the program’s website shortly.

<p>Will there be limitations on quantities of lamps that can be dropped off at collection sites? (1)</p>	<p>Quantity limits will continue to apply to the “residential volume drop-off system” as many collection sites are expected to have space limitations. Those with quantities larger than what is accepted through this system will be able to use the “commercial volume drop-off system” designed for larger quantities.</p>
<p>Will the program use or encourage the use of drum top crushers by end-users and/or collection sites? (3)</p>	<p>At this point in time, the program is not able to endorse the use of drum top crushers. A comprehensive study completed by the U.S. Environmental Protection Agency (EPA) concluded that there are outstanding health and safety issues related to these products. In particular, some models resulted in unacceptable levels of mercury exposure for operators. In addition, it is the understanding of the program that any collection site which processes lamps using a drum top crusher that have not been not generated on-site is subject to requirements under the Hazardous Waste Regulation. The Hazardous Waste Regulation is currently under review. The program will re-assess the issue of drum top crushers as applicable once the Hazardous Waste Regulation has been amended.</p>
<p>Collection points should be co-located with other programs, including the program covering outdoor power equipment. (3)</p>	<p>It is the program’s intent to co-locate as many as possible of the collection sites with other stewardship programs which collect electrical or electronic products, as well as to establish other locations where the program considers service is desirable and opportunities are present.</p>
<p>How will collection points be compensated for collecting program products? (2) Collection points should be fairly compensated for their services and the program should not rely on voluntary partners. (1)</p>	<p>The program’s objective is to provide a province-wide collection system with good consumer convenience while at the same time managing a cost effective program. The program will enter into contractual arrangements with every collection site, including monetary compensation as negotiated.</p>
<p>What kind of training will the program provide to collection sites so that they can educate those that drop off products? (1)</p>	<p>Each collection site will receive training and will be provided with a detailed guidance manual that explains all aspects of the program. The program will also conduct site visits to ensure that collection sites are meeting the standards of the program. The program will provide signage to all collection sites that explain the types of products included in the program. Point of return materials, such as brochures, will also be provided.</p>
<p>The program should use a deposit refund system to encourage high recovery rates. (1)</p>	<p>The program is not considering a deposit-refund system, which requires significant administrative expense. In the opinion of the program, deposits are not a necessary or appropriate tool for this type of product. The program will provide a free and convenient collection system across the province.</p>
<p>Consumers should not be required to pay an “eco-fee” on the sale of program</p>	<p>Both urban and rural areas of the province provide challenges to any organization attempting to provide</p>

products in areas of the province that are not serviced by a collection point. (1)	province wide services. It is expected that the program will achieve a high rate of collection site availability, based on the parameters specified in the program.
The program should consider contracting bottle depots as collection sites as the public is aware of their locations and most are able to collect additional material under their current zoning. (1)	The program is actively exploring this option and expects to contract with a significant number of bottle depots to provide collection site services.
Regional Districts should be compensated for managing program products that end up in regional landfills. (1)	The program does not consider this approach to be an element of product stewardship. The program's aim is to provide an accessible collection network for program products and a communication strategy to inform consumers of the program's collection system. The program will work with local governments regarding landfill bans.
An adequate number of drop-off facilities are required in rural communities. Service levels should be based on population centres. (2)	The program aims to provide reasonable levels of access to all British Columbians, including those living in rural communities.
As a minimum service level, a depot, return-to retail location or curbside collection service should be provided in each community (including population within 30 km radius) of greater than 3,000 residents. 18 months is an acceptable transition period to establish this level of service from the date of program implementation. As a minimum service level, drop off events should be held annually in communities (including population within 30 km radius) of less than 3,000 residents where product purchasing ability is limited. Events should be initiated within the first 18 months of program implantation. (1)	The program is dedicated to establishing a collection system that provides reasonable levels of access to all British Columbians. Once the initial collection network is established, the program will review the need to site additional depots and establish collection events. As outlined in Section 6.3, the program will develop accessibility targets by the end of 2012. This proposed standard will be further studied and will be considered when these targets are developed.
Product Life Cycle:	
Product stewardship programs do not provide effective incentives to manufacturers to redesign their products. (1)	The program will report on initiatives within the industry that reduce the environmental impact and improve the recyclability of their products. The program's initial focus will be to promote reuse, where applicable, and will provide an environmentally appropriate collection and recycling system for all program products.
The program should provide financial incentives to support the development of local markets for materials that are collected by the program. (1)	In the initial stages of the program's development, the program will focus on recycling as many components of collected products as possible and economically feasible. The final use of materials will be considered when selecting

	processors. The program will consider the need for mechanisms to incentivize the creation of local markets in the future once feedback from program processors is received.
Processing:	
Commercial fixtures and other steel-rich products should be transported directly from collection points to scrap metal recyclers, who can handle these types of products. (1)	The program is actively exploring this option and will consider working with scrap metal recyclers.
The program should report on the final disposition of materials in its annual reports, including what countries materials are managed in. (1)	The program will report on the final use of collected materials, as outlined in Section 5.3 above. The program will work with registered program processors to provide relevant details on the final disposition of materials, where possible.
Consumer Awareness:	
The program should work with local governments and other stewardship programs to research the problem of abandoned program waste, and develop a strategy to address this issue. Performance measures and targets should be developed in relation to abandoned waste. (1)	The program is committed to working with local governments and other stewardship agencies to better understand the problem of abandoned waste and explore opportunities to address this issue.
The program should not rely on voluntary partners (regional districts, etc.) to advertise the program. (1)	The program will partner with organizations and companies that have an interest in assisting in the promotion of the program, but only as a part of a broader communications strategy.
Performance Measures:	
The program should use existing waste composition studies and/or develop their own to evaluate the effectiveness of the program. (1)	A commitment to explore opportunities to participate in waste composition studies, in possible collaboration with regional districts and other stewardship agencies and to help evaluate the performance of the program, has been added to Section 6.1 above in response to this comment.
The program should develop collection rate targets for each Regional District in the province. (1)	Absolute collection will be reported by the program for each Regional District. Collection rate targets will be set on a provincial basis as it is not practical for the program to collect certain types of data broken down by Regional District, such as product sales. The program will strive to provide reasonable levels of access to collection points and effective communications in all Regional Districts.

Appendix B – Program Members

The following companies are currently members of Product Care's LightRecycle program for residential-use fluorescent lamps as of September 28, 2011.

- Amway Canada Co
- Beghelli Canada
- Best Buy Canada
- Canadian Tire
- Conglom Inc
- Dollarama LP
- Federated Co-operatives Ltd
- GE Lighting Canada
- Globe Electric Company Inc
- Home Depot Canada
- Home Hardware
- Hudson's Bay Co Inc
- IKEA Canada
- LiteLine Corp
- Loblaw Co Ltd
- London Drugs Ltd
- Osram Sylvania Ltd
- Panasonic Canada Inc
- Philips Lighting
- Rona Revy Inc.
- Satco Products Inc
- Shoppers Drug Mart
- Standard Products Inc
- Thrifty Foods- Jace Holdings
- Ushio
- Wal-Mart Canada

Appendix C – “Available for Collection” Methodology

The following section describes the methodology used to determine the number of fluorescent tubes and CFLs “available for collection” between 2012 and 2017. The capture rate targets described in Section 7.3.3 are based on this methodology. The number of units derived from this methodology is considered an estimate based on the best available data to date.

The methodology described below is subject to change. If more accurate methodology or related data is developed that alters the estimated number of units available for collection in a given year, this information will be included in the program’s annual reports.

Fluorescent Tubes:

Both the sales and the lifespans of fluorescent tubes have remained relatively stable over the last decade. As such, a seven year sales average has been used to estimate the quantity available to collect in a given year. Table 1 below illustrates the estimated sales numbers of fluorescent tubes in BC between 2004 and 2010 as well as the seven year sales average.

Table 1 – Estimated BC Fluorescent Tube Sales, 2004-2010⁶

Fluorescent Tubes			
Year Sold	C & I	Consumer	Total
2004	4,254,968	1,473,693	5,728,661
2005	4,561,066	1,337,445	5,898,511
2006	4,643,848	1,360,964	6,004,812
2007	4,821,825	1,367,710	6,189,534
2008	4,683,087	1,412,502	6,095,589
2009	4,386,108	1,376,042	5,762,150
2010	3,886,948	1,388,801	5,275,749
Seven Year Average	4,462,550	1,388,165	5,850,715

Table 2 below illustrates the number of units available to collect for each program year between 2012 and 2017, based on this sales average. Only half a year is shown for 2012 and 2017, given the timeline of program launch on July 1, 2012. The table also illustrates the actual number of units targeted for collection by the program, based on the capture rate targets discussed in Section 7.3.3.

Table 2 – Fluorescent Tubes Available to Collect and Targeted for Collection, 2012-2017

	2012	2013	2014	2015	2016	2017
Available to Collect - TOTAL	2,925,358	5,850,715	5,850,715	5,850,715	5,850,715	2,925,358
Capture Rate - Low Target	10%	16%	22%	28%	34%	40%
Targeted for Collection (Low)	292,536	936,114	1,287,157	1,638,200	1,989,243	1,170,143
Capture Rate - High Target	12%	25%	37%	50%	62%	75%
Targeted for Collection (High)	351,043	1,462,679	2,164,765	2,925,358	3,627,443	2,194,018

⁶ Based on 43% of total EEMAC Western Canada sales for 2004-2008. BC EEMAC actual used for 2009 and 2010 C&I. Additional 5% non-EEMAC sales added for C&I channel and 10% for consumer channel.

Compact Fluorescent Lamps (CFLs):

Given increasing lifespans and changing sales patterns of CFLs, the quantity of CFLs available to collect in a given year is not considered stable. Table 4 below illustrates the estimated sales numbers of CFLs in BC between 2004 and 2011.

Table 4 – Estimated BC CFL Sales, 2004-2011⁷

CFLs			
Year Sold	C & I	Consumer	Total
2004	497,240	826,789	1,324,028
2005	521,453	1,687,820	2,209,273
2006	598,413	1,696,583	2,294,996
2007	890,185	3,865,000	4,755,185
2008	922,543	3,253,492	4,176,035
2009	1,081,461	2,539,547	3,621,008
2010	1,018,170	2,919,588	3,937,758
2011	1,018,170	2,919,588	3,937,758

Table 5 below illustrates the estimated lifespans of CFLs sold between 2004 and 2011.

Table 5 – Estimated CFL Lifespans, 2004-2011⁸

Year Sold	Percentage of CFLs sold with lifespan of:			
	3 years	6 years	9 Years	12 Years
2004	45%	35%	10%	10%
2005	35%	30%	20%	15%
2006	20%	30%	30%	20%
2007	10%	15%	40%	35%
2008	0%	5%	40%	55%
2009	0%	5%	40%	55%
2010	0%	5%	40%	55%
2011	0%	5%	40%	55%

Based on the data provided in Table 5, Table 6 extrapolates the percentage of CFLs that will expire, given the year that they were sold.

⁷ Based on 43% of total EEMAC Western Canada sales for 2004-2008. BC EEMAC actual used for 2009 and 2010 C&I. Additional 5% non-EEMAC sales added for C&I channel and 40% for consumer channel. 2011 derived by assuming sales flat from 2010 onwards.

⁸ Based on research completed by the Stewardship Ontario Working Group

Table 6 – Percentage of CFLs Expected to Expire by Year Sold

Year sold	% of CFLs sold in a given year that are expected to expire					
	2012	2013	2014	2015	2016	2017
2004		10%			10%	
2005			20%			15%
2006	30%			30%		
2007		15%			40%	
2008			5%			40%
2009				5%		
2010					5%	
2011						5%

Table 7 translates this data into the number of units available for collection between 2012 and 2017, based on the sales estimates from Table 4.

Table 7 – CFLs Available for Collection, 2012-2017

Year sold	Amount available for collection in a given year					
	2012	2013	2014	2015	2016	2017
2004		132,403			132,403	
2005			441,855			331,391
2006	688,499			688,499		
2007		713,278			1,902,074	
2008			208,802			1,670,414
2009				181,050		
2010					196,888	
2011						196,888
Available for Collection	688,499	845,681	650,656	869,549	2,231,365	2,198,693

Table 8 below illustrates the number of CFLs available to collect for each program year between 2012 and 2017. Only half a year is shown for 2012 and 2017, given the timeline of program launch on July 1, 2012. The table also illustrates the actual number of units targeted for collection by the program, based on the capture rate targets discussed in Section 7.3.3.

Table 8 - CFLs Available to Collect and Targeted for Collection, 2012-2017

	2012	2013	2014	2015	2016	2017
Available to Collect - TOTAL	344,249	845,681	650,656	869,549	2,231,365	1,099,346
Capture Rate - Low Target	20%	24%	28%	32%	36%	40%
Targeted For Collection (Low)	68,850	202,963	182,184	278,256	803,291	439,739
Capture Rate - High Target	24%	30%	38%	50%	62%	75%
Targeted for Collection (High)	82,620	253,704	247,249	434,775	1,383,446	824,510